# Puget Sound Maritime Air Emissions Inventory

*August 2012* May 2013 Update

PUGET SOUND MARITIME AIR FORUM

United States Environmental Protection Agency

pscleanair.org
Puget Sound Clean Air Agency

Port of Anacortes Est. 1926

WSPA
Western States Petroleum Association

Port of Seattle

American Lung Association of the Mountain Pacific

North West & Canada Cruise Association

Port of Olympia

Washington State Department of Transportation

BNSF Railway

PMSA

Port of Everett

Washington State Department of Ecology

Port of Tacoma

northwest Clean Air agency

Prepared by
Starcrest Consulting Group, LLC
Quality Assurance & Environmental Management

***Government Vessel Airshed Emissions*** As part of the 2011 Puget Sound Maritime Air Emissions Inventory data collection effort for Harbor Vessels, data from nine 1988 diesel powered United States Coast Guard (USCG) vessels were provided to the data collection team. Vessel data for these vessels were not provided from the associated agencies during the 2005 emissions inventory and therefore these vessels were not included in the 2005 inventory. Further investigation, after the publication of the inventory report, by the Puget Sound Clean Air Agency revealed that the USCG vessels, which all come under the Government Vessel category, were actually operated in the Puget Sound during 2005. This new information affects only the tables that compare 2011 vs 2005 Airshed emissions that include Government Vessels. For a proper 2011 vs 2005 comparison, these vessels should be added back into the 2005 emissions. Adding these vessels back into the 2005 Airshed totals increases $NO_x$ by 269 tons or 1%, VOC by 10 tons or 0.3%, CO by 22 tons or less than 0.2%, $SO_2$ by 0.13 tons or less than 0.1%, $PM_{10}$ by 12.62 tons or 0.8%, $PM_{2.5}$ by 11.57 tons or less than 0.9%, DPM by 12.62 tons or less than 1%, and $CO_2e$ by 14,229 or less than 0.8%. It is important to note that this new information ***does not*** affect any of the port comparison tables as the USCG vessels are not tenants nor associated with any port.

The affected 2011 vs 2005 Airshed emissions comparison tables in the inventory report include those in the Overview, Executive Summary, Section 2, and Section 4. The following key tables have been updated to facilitate more accurate comparisons: Tables ES.6/2.5, Tables ES.7/2.6, and Tables 4.19/4.20. Again, it should be noted that 2011 vs 2005 comparison tables by ports in Section 9 are not affected because these vessels are not tenants nor associated with any port.

**Original - Tables ES.6/2.5: 2011 vs 2005 Total Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 22,912 | 1,830 | 11,905 | 11,729 | 1,304 | 1,092 | 1,122 | 1,736,226 |
| 2005 | 26,790 | 3,060 | 17,686 | 13,621 | 1,552 | 1,298 | 1,329 | 1,831,684 |
| **Change, tpy** | **-3,877** | **-1,230** | **-5,781** | **-1,892** | **-248** | **-206** | **-208** | **-95,457** |
| **Change, %** | **-14%** | **-40%** | **-33%** | **-14%** | **-16%** | **-16%** | **-16%** | **-5%** |

**Adjusted 2005 - Tables ES.6/2.5: 2011 vs 2005 Total Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 22,912 | 1,830 | 11,905 | 11,729 | 1,304 | 1,092 | 1,122 | 1,736,226 |
| 2005 | 27,059 | 3,070 | 17,708 | 13,621 | 1,565 | 1,310 | 1,342 | 1,845,912 |
| **Change, tpy** | **-4,146** | **-1,240** | **-5,804** | **-1,892** | **-261** | **-218** | **-220** | **-109,686** |
| **Change, %** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

## Original - Tables ES.7/2.6: 2011 vs 2005 Total Airshed Emissions by Source Category, tpy

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| Ocean-going vessels | 11,658 | 442 | 1,036 | 11,709.00 | 879.65 | 703.72 | 711.12 | 737,640 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5.34 | 291.52 | 271.64 | 277.72 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 10.51 | 45.15 | 41.35 | 45.15 | 75,289 |
| Cargo-handling equipment | 594 | 37 | 297 | 0.60 | 32.60 | 31.70 | 32.60 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3.40 | 55.00 | 43.50 | 55.00 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0.05 | 0.09 | 0.08 | 0.04 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,728.90** | **1,304.01** | **1,092.00** | **1,121.63** | **1,736,226** |
| **2005** | | | | | | | | |
| Ocean-going vessels | 14,551 | 509 | 1,200 | 12,923.71 | 1,030.66 | 822.51 | 841.99 | 812,391 |
| Harbor vessels | 6,228 | 2,207 | 14,455 | 380.17 | 293.72 | 270.58 | 259.54 | 450,134 |
| Locomotives | 2,156 | 109 | 269 | 168.60 | 59.11 | 54.39 | 59.11 | 98,495 |
| Cargo-handling equipment | 832 | 81 | 814 | 61.84 | 54.89 | 53.25 | 54.64 | 79,581 |
| Heavy-duty vehicles | 3,012 | 148 | 899 | 86.70 | 114.00 | 97.60 | 114.00 | 387,846 |
| Fleet vehicles | 10 | 5 | 50 | 0.04 | 0.08 | 0.08 | 0.08 | 3,237 |
| **Total** | **26,790** | **3,060** | **17,686** | **13,621.05** | **1,552.46** | **1,298.41** | **1,329.37** | **1,831,684** |
| **% Change** | | | | | | | | |
| Ocean-going vessels | -20% | -13% | -14% | -9% | -15% | -14% | -16% | -9% |
| Harbor vessels | 13% | -49% | -33% | -99% | -1% | 0% | 7% | 7% |
| Locomotives | -41% | -27% | -25% | -94% | -24% | -24% | -24% | -24% |
| Cargo-handling equipment | -29% | -54% | -64% | -99% | -41% | -40% | -40% | -19% |
| Heavy-duty vehicles | -22% | -3% | -26% | -96% | -52% | -55% | -52% | -3% |
| Fleet vehicles | -34% | -48% | -31% | 24% | 8% | 3% | -47% | -13% |
| **Total** | **-14%** | **-40%** | **-33%** | **-14%** | **-16%** | **-16%** | **-16%** | **-5%** |

## Adjusted 2005 - Tables ES.7/2.6: 2011 vs 2005 Total Airshed Emissions by Source Category, tpy

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| Ocean-going vessels | 11,658 | 442 | 1,036 | 11,709.00 | 879.65 | 703.72 | 711.12 | 737,640 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5.34 | 291.52 | 271.64 | 277.72 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 10.51 | 45.15 | 41.35 | 45.15 | 75,289 |
| Cargo-handling equipment | 594 | 37 | 297 | 0.60 | 32.60 | 31.70 | 32.60 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3.40 | 55.00 | 43.50 | 55.00 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0.05 | 0.09 | 0.08 | 0.04 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,728.90** | **1,304.01** | **1,092.00** | **1,121.63** | **1,736,226** |
| **2005** | | | | | | | | |
| Ocean-going vessels | 14,551 | 509 | 1,200 | 12,923.71 | 1,030.66 | 822.51 | 841.99 | 812,391 |
| Harbor vessels | 6,497 | 2,217 | 14,477 | 380.31 | 306.34 | 282.15 | 272.17 | 464,362 |
| Locomotives | 2,156 | 109 | 269 | 168.60 | 59.11 | 54.39 | 59.11 | 98,495 |
| Cargo-handling equipment | 832 | 81 | 814 | 61.84 | 54.89 | 53.25 | 54.64 | 79,581 |
| Heavy-duty vehicles | 3,012 | 148 | 899 | 86.70 | 114.00 | 97.60 | 114.00 | 387,846 |
| Fleet vehicles | 10 | 5 | 50 | 0.04 | 0.08 | 0.08 | 0.08 | 3,237 |
| **Total** | **27,059** | **3,070** | **17,708** | **13,621.18** | **1,565.08** | **1,309.97** | **1,341.99** | **1,845,912** |
| **% Change** | | | | | | | | |
| Ocean-going vessels | -20% | -13% | -14% | -9% | -15% | -14% | -16% | -9% |
| Harbor vessels | 9% | -49% | -33% | -99% | -5% | -4% | 2% | 4% |
| Locomotives | -41% | -27% | -25% | -94% | -24% | -24% | -24% | -24% |
| Cargo-handling equipment | -29% | -54% | -64% | -99% | -41% | -40% | -40% | -19% |
| Heavy-duty vehicles | -22% | -3% | -26% | -96% | -52% | -55% | -52% | -3% |
| Fleet vehicles | -34% | -48% | -31% | 24% | 8% | 3% | -47% | -13% |
| **Total** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

## Original - Table 4.19: 2011 vs 2005 Commercial Harbor and Government Vessel Emissions Comparison, tpy

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 6,253.0 | 247.2 | 1,021.9 | 3.7 | 272.3 | 253.7 | 272.1 | 381,275 |
| 2005 | 5,299.7 | 189.4 | 919.1 | 358.3 | 252.7 | 232.5 | 252.5 | 338,949 |
| **Change, tpy** | **953.3** | **57.8** | **102.8** | **-354.6** | **19.6** | **21.2** | **19.6** | **42,326** |
| **Change, %** | **18%** | **31%** | **11%** | **-99%** | **8%** | **9%** | **8%** | **12%** |

## Adjusted 2005- Table 4.19: 2011 vs 2005 Commercial Harbor and Government Vessel Emissions Comparison, tpy

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 6,253.0 | 247.2 | 1,021.9 | 3.7 | 272.3 | 253.7 | 272.1 | 381,275 |
| 2005 | 5,568.7 | 199.6 | 941.5 | 358.5 | 265.4 | 244.1 | 265.1 | 353,178 |
| **Change, tpy** | **684.3** | **47.6** | **80.3** | **-354.8** | **7.0** | **9.6** | **7.0** | **28,097** |
| **Change, %** | **12%** | **24%** | **9%** | **-99%** | **3%** | **4%** | **3%** | **8%** |

### Original - Table 4.20: 2011 vs 2005 Harbor Vessel Activity Change

| Type | 2005 as 2011 hp-hr-lf | 2011 hp-hr-lf | % Change |
|---|---|---|---|
| Assist/Escort | 81,212,373 | 89,289,023 | 10% |
| Commercial fishing | 10,558,042 | 9,493,618 | -10% |
| Excursion | 16,962,842 | 17,248,062 | 2% |
| Ferry | 314,514,283 | 350,485,994 | 11% |
| Government | 32,032,977 | 52,947,794 | 65% |
| Harbor tug | 45,559,880 | 54,657,979 | 20% |
| Ocean tug | 86,344,802 | 80,122,263 | -7% |
| Tank barge | 3,006,689 | 3,373,361 | 12% |
| Workboat | 4,250,700 | 6,520,218 | 53% |
| **Total** | **594,442,588** | **664,138,311** | **12%** |

### Adjusted 2005 - Table 4.20: 2011 vs 2005 Harbor Vessel Activity Change

| Type | 2005 as 2011 hp-hr-lf | 2011 hp-hr-lf | % Change |
|---|---|---|---|
| Assist/Escort | 81,212,373 | 89,289,023 | 10% |
| Commercial fishing | 10,558,042 | 9,493,618 | -10% |
| Excursion | 16,962,842 | 17,248,062 | 2% |
| Ferry | 314,514,283 | 350,485,994 | 11% |
| Government | 56,818,977 | 52,947,794 | -7% |
| Harbor tug | 45,559,880 | 54,657,979 | 20% |
| Ocean tug | 86,344,802 | 80,122,263 | -7% |
| Tank barge | 3,006,689 | 3,373,361 | 12% |
| Workboat | 4,250,700 | 6,520,218 | 53% |
| **Total** | **619,228,588** | **664,138,311** | **7%** |

**Port Average 2011 OGV Type Characteristics** Upon further review of the average 2011 OGV type characteristics tables, Starcrest noted that the hotelling time was actually the total annual hotelling plus anchorage time for each ship in the inventory domain, averaged by vessel type. Taking advantage of the update for Harbor Vessels, Starcrest replaced Hotelling Time with At-Berth Time which is the average time at-berth per call, by vessel type, for ships under normal operations (staying at berth less than 200 hours per call). There are occasional ships that have maintenance issues or are laid-berthed at a terminal with no loading/unloading operations. These ships were not included in At-Berth Time as to not skew the average.

It should be noted that Year Built, DWT, Main Engine Power, and Aux Engine Power columns are derived from data provided in the IHS Fairplay dataset and is averaged by vessel type. All four columns were updated with the latest data as part of this update.

The affected tables were:

Table 3.25: Port of Anacortes Average 2011 OGV Type Characteristics, pg 117
Table 3.27: Port of Port Angeles Average 2011 OGV Type Characteristics, pg 119
Table 3.29: Port of Everett Average 2011 OGV Type Characteristics, pg 120
Table 3.31: Port of Olympia Average 2011 OGV Type Characteristics, pg 120
Table 3.33: Port of Seattle Average 2011 OGV Type Characteristics, pg 122
Table 3.35: Port of Tacoma Average 2011 OGV Type Characteristics, pg 127

PUGET SOUND
MARITIME AIR
FORUM

# 2011 PUGET SOUND MARITIME AIR EMISSIONS INVENTORY

**September 2012**

**Prepared by:**

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## TABLE OF CONTENTS

# TABLE OF CONTENTS (cont'd)

## TABLE OF CONTENTS (cont'd)

## TABLE OF CONTENTS (cont'd)

## TABLE OF CONTENTS (cont'd)

## LIST OF FIGURES

## List of Figures (cont'd)

## List of Figures (cont'd)

## List of Figures (cont'd)

## LIST OF TABLES

## LIST OF TABLES (cont'd)

## LIST OF TABLES (cont'd)

## LIST OF TABLES (cont'd)

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Port of Everett - $10,000
Port of Olympia - $10,000
Port of Seattle - $75,000
Port of Tacoma - $75,000
Puget Sound Clean Air Agency - $25,000
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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ATB | articulated tug-barge |
| BNSF | BNSF Railway Company |
| bhp | brake horsepower |
| BSFC | brake-specific fuel consumption |
| CARB | California Air Resource Board |
| CAS | Northwest Ports Clean Air Strategy |
| CFR | Code Federal Regulations |
| $CH_4$ | methane |
| CHE | cargo handling equipment |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide equivalents |
| DOC | diesel oxidation catalyst |
| DPF | diesel particulate filter |
| DPM | diesel particulate matter |
| DWT | deadweight in tonnes |
| ECA | emission control area |
| EF | emission factor |
| EMD | Electro-Motive Diesel, Inc. |
| EMS | Environmental Management System |
| EPA | U.S. Environmental Protection Agency |
| FCF | fuel correction factor |
| Forum | Puget Sound Maritime Air Forum |
| g | gram |
| gensets | electrical generator sets |
| GVWR | gross vehicle weight rating |
| HAL | Holland America Line |
| HC | hydrocarbon |
| HDDV | heavy-duty diesel fueled vehicle |
| HDGV | heavy-duty gasoline vehicle |
| HDV | heavy-duty vehicles |
| hp | horsepower |
| hr | hour |
| IFO | intermediate fuel oil |
| IMO | International Maritime Organization |
| ITB | integrated tug-barge |
| kg | kilogram |
| K-Line | Kawasaki Kisen Kaisha |
| kW | kilowatts |
| kW-hr | kilowatt-hour |
| lbs | pounds |
| LDGT | light-duty gasoline truck |
| LDGV | light-duty gasoline vehicle |
| LDV | light-duty vehicles |
| LF | load factor |

## ACRONYMS AND ABBREVIATIONS (CONT'D)

| | |
|---|---|
| LLA | low load adjustment |
| LPG | liquefied petroleum gas |
| LPG | liquefied petroleum gas |
| MarEx | Marine Exchange of Puget Sound |
| MARPOL | International Convention for the Prevention of Pollution from Ships |
| MCR | maximum continuous rated (power) |
| MOBILE | EPA on-road vehicle emission modeling software |
| mph | miles per hour |
| $N_2O$ | nitrous oxide |
| NAAQS | National Ambient Air Quality Standards |
| $NO_x$ | oxides of nitrogen |
| NONROAD | EPA non-road equipment emission modeling software |
| NWCCA | North West & Canada Cruise Ship Association |
| NWCAA | Northwest Clean Air Agency |
| OGVs | ocean-going vessels |
| ORCAA | Olympic Region Clean Air Agency |
| PM | particulate matter |
| $PM_{10}$ | particulate matter, diameter of ten microns or less |
| $PM_{2.5}$ | particulate matter, diameter of 2.5 microns or less; fine particulate |
| POLA | Port of Los Angeles |
| POLB | Port of Long Beach |
| ppb | parts per billion |
| ppm | parts per million |
| PSCAA | Puget Sound Clean Air Agency |
| PSEI | Puget Sound Emissions Inventory |
| PSRC | Puget Sound Regional Council |
| RFID | radio-frequency identification |
| RIA | regulatory impact analysis |
| RO | residual oil |
| RoRo | roll-on/roll-off |
| rpm | revolutions per minute |
| RSD | Regulatory Support Document |
| RTG | rubber tired gantry (crane) |
| SIG | Seattle International Gateway |
| $SO_2$ | sulfur dioxide |
| $SO_x$ | sulfur oxides |
| TEU | twenty-foot equivalent units |
| tonnes | 1,000 kg also known as a metric ton |
| TOTE | Totem Ocean Trailer Express |
| tpy | tons per year |
| TTI | Total Terminals, Inc |
| U.S. | United States |
| USCG | United States Coast Guard |
| ULSD | ultra low sulfur diesel (fuel) |
| UP | Union Pacific (Railroad) |

## ACRONYMS AND ABBREVIATIONS (CONT'D)

| | |
|---|---|
| VBP | Vessel Boarding Program |
| VLCC | very large crude carriers |
| VMT | vehicle miles traveled |
| VOCs | volatile organic compounds |
| VTS | Vessel Traffic Service |
| vs | versus |
| WDOE | Washington State Department of Ecology |
| WSF | Washington State Ferries |
| WSPA | Western States Petroleum Association |
| WUT | Washington United Terminals |

## OVERVIEW

### What is the 2011 inventory?

The 2011 Puget Sound Maritime Air Emissions Inventory updates the 2005 baseline inventory which identified and quantified pollutants emitted from maritime-related diesel equipment and alternatively fueled equipment operating within the greater Puget Sound region airshed. The inventory update quantifies maritime-related emissions for the calendar year 2011, and compares the data against the 2005 baseline inventory.

### Why was the inventory developed?

The purpose of this emission inventory is to provide scientific data and evaluation of emissions from maritime-related activities in the region in 2011 and compare those emissions to 2005. This study will improve understanding of the nature, location, and magnitude of emissions from maritime-related operations, aid in the planning and prioritization of pollution prevention investments in the region, and evaluate the success of existing emission reduction programs.

### Who developed the emissions inventory?

The inventory was funded by the Puget Sound Maritime Air Forum (Forum), a voluntary association of private and public maritime organizations, ports, air agencies, environmental, public health advocacy groups, and other parties with operational or regulatory responsibilities related to the maritime industry. The Forum is committed to accurately quantifying and voluntarily reducing air emissions associated with the maritime transportation of freight, vehicles and passengers. The Forum selected Starcrest Consulting Group, LLC (Starcrest) to be the technical lead for the inventory in collaboration with the Forum. Several Forum members collected and provided data for the inventory update.

### What does the inventory measure?

Similar to the 2005 inventory, this emissions inventory quantifies annual marine diesel emissions, expressed in tons per year, from maritime-related activities associated with U.S. operations in a defined portion of the greater Georgia Basin/Puget Sound International Airshed (see Figure O.1 on the next page). The emissions inventory domain is bounded in the north by the black dotted line and to the south by the solid red line. This area spans approximately 140 miles south to north and 160 miles west to east, at its extremities. The geographical domain used in the 2011 inventory is the same as the domain used in the 2005 inventory and is referred to as the greater Puget Sound airshed in this report.

Pollutants measured in the inventories include relevant U.S. Environmental Protection Agency (EPA) criteria pollutants and precursors, including carbon monoxide, nitrogen oxides, sulfur dioxides, volatile organic compounds and fine particulate matter, as well as greenhouse gases, and diesel particulate matter. The 2011 inventory update is an activity-based inventory following a similar methodology as the 2005 baseline inventory.

Data was gathered for the following six major source categories associated with marine sectors:

- Ocean-going vessels (OGV): cargo and cruise ships, tankers;
- Harbor vessels: commercial harbor vessels, government (non-military) vessels, and recreational vessels;
- Cargo handling equipment: cranes, straddle carriers, yard trucks, forklifts;
- Off-terminal and on-road heavy-duty trucks;
- Fleet vehicles which consist primarily of light-duty vehicles and some on-terminal heavy-duty vehicles not associated with direct cargo movement; and
- Locomotive operations.

Military operations and equipment of the U.S. Department of Defense have not been included due to national security considerations.

**Figure O.1: Georgia Basin/Puget Sound International Airshed**

**Why does the inventory focus on diesel engines?**

Marine diesel engines, like all diesel engines, are significant generators of fine particles and toxic emissions. Exposure to these pollutants can contribute to increased rates of lung cancer, chronic respiratory and cardiovascular disease, and other health effects. Diesel emissions also contribute to acid deposition, climate change and impaired visibility. Given the implications for public health and the environment, reducing and minimizing these emissions is a top priority for the Forum. This inventory will help identify where pollution prevention efforts could provide the best public health and environmental benefits.

While the EPA has not listed diesel exhaust emissions as a hazardous air pollutant, it is important to note that effective federal regulations require dramatically cleaner fuels and lower-emitting diesel engines. In the meantime, members are proactively working together to achieve early emissions reductions from maritime-related operations to protect public health and the environment.

**Technical Approach**

The technical approach used for the 2011 inventory is consistent with the 2005 baseline report with updates to source category activities and emissions modeling methods or parameters (where applicable). The inventory is activity-based using 2011 annual activity data collected from ports, individuals, agencies and companies (or their representatives) that own, operate, maintain and/or charter equipment and vessels. When there are emissions modeling methods or parameter updates that differ from the 2005 inventory and affect the comparison of 2011 results with 2005 results, the 2005 emissions have been updated using the same modeling parameters to allow a direct comparison between the baseline year and 2011. This approach avoids misrepresentation of emissions changes dues to modeling methods or parameter updates and is used in other marine-related inventories to compare among years and monitor emission reduction progress.

**What's being done now to reduce maritime air pollution?**

In addition to participating in the emissions inventory project, the Forum partners are also working within their own organizations on local initiatives and nationally and internationally on efforts to reduce emissions. The Forum partners and their customers are switching to cleaner fuels, using shore power instead of ship engines when cruise and cargo ships are in port, replacing old engines with cleaner engines, retrofitting older engines with advanced pollution control devices, rebuilding engines to lower emission standards, and implementing systems to use equipment more efficiently.

The Northwest Ports Clean Air Strategy (CAS) was developed collaboratively in 2007 by the Port of Tacoma, the Port of Seattle and Port Metro Vancouver, British Columbia, along with the Puget Sound Clean Air Agency (PSCAA), EPA, the Washington State Department of Ecology (WDOE) and Environment Canada. The CAS defines emission reduction initiatives, potential actions and sets air emission reduction goals.

Through the implementation of the CAS over the last four years, the ports have achieved significant progress in reducing emissions in several areas: at berth emissions for ocean going vessels through the use of low-sulfur fuels and shore power; reduced cargo handling equipment emissions, reduced on-terminal truck emissions through engine retrofits and scrap-and-replace incentive programs, and reduced locomotive emissions through application of idle-reduction technologies.

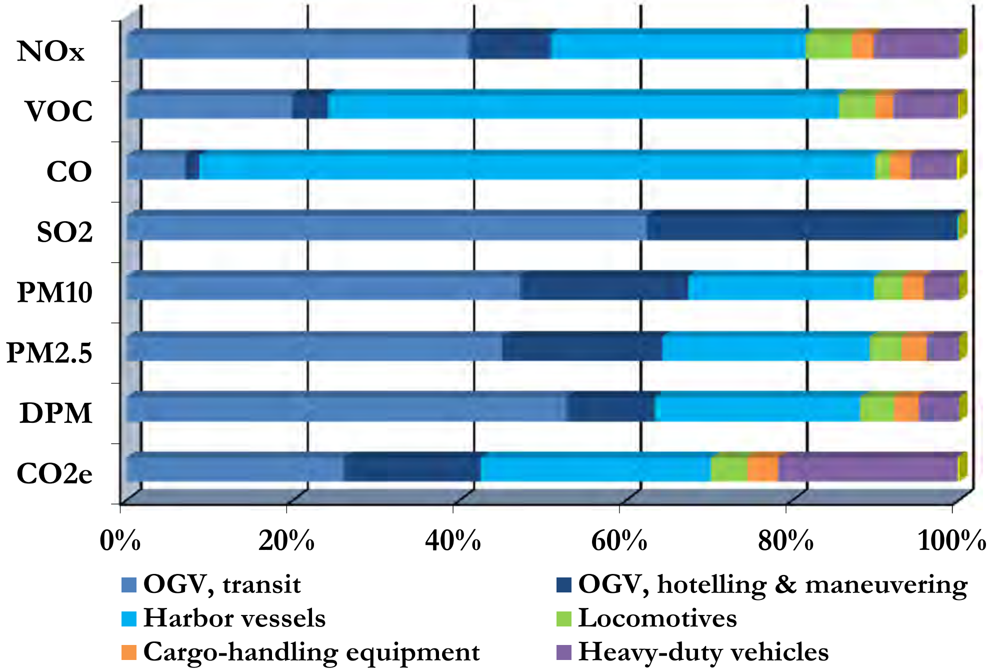
**What are the findings?**

Total emissions from the inventoried maritime-related sources in the greater Puget Sound region airshed are summarized in Table O.1. Contributions by source category are summarized in Figure O.2. Harbor vessels emissions include commercial harbor vessels, government (non-military), and recreational vessels.

**Table O.1: 2011 Total Airshed Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, transit | 9,424 | 363 | 840 | 7,333 | 616 | 493 | 593 | 452,613 |
| OGV, hotelling & maneuvering | 2,234 | 79 | 196 | 4,376 | 264 | 211 | 118 | 285,028 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5 | 292 | 272 | 278 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 11 | 45 | 41 | 45 | 75,289 |
| Cargo handling equipment | 594 | 37 | 297 | 1 | 33 | 32 | 33 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3 | 55 | 44 | 55 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0 | 0 | 0 | 0 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,729** | **1,304** | **1,092** | **1,122** | **1,736,226** |

**Figure O.2: 2011 Total Airshed Emissions**



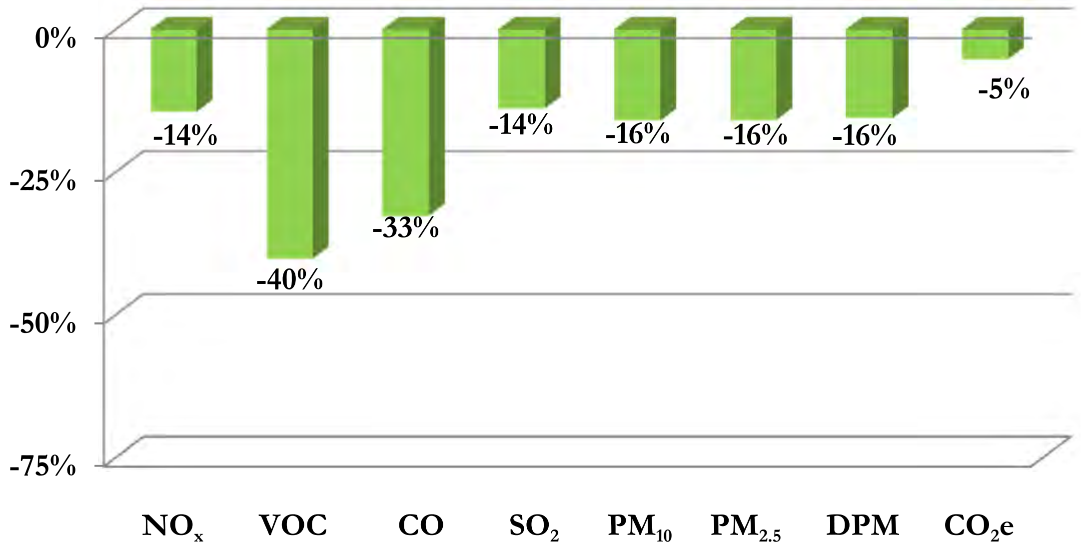
Please read the full report for details regarding emissions from each source category.

Table O.2 and Figure O.3 compare the 2011 airshed total maritime-related air emissions to the 2005 emissions. In 2011, emissions decreases ranged from 5% to 40% as compared to 2005, depending on pollutant. These reductions are primarily from activity level changes, switching to ultra low sulfur diesel, and the various efforts associated with the implementation of the CAS, as detailed in Section 10 of the report.

**Table O.2: 2011 vs 2005 Total Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 22,912 | 1,830 | 11,905 | 11,729 | 1,304 | 1,092 | 1,122 | 1,736,226 |
| 2005 | 26,790 | 3,060 | 17,686 | 13,621 | 1,552 | 1,298 | 1,329 | 1,831,684 |
| **Change, tpy** | **-3,877** | **-1,230** | **-5,781** | **-1,892** | **-248** | **-206** | **-208** | **-95,457** |
| **Change, %** | **-14%** | **-40%** | **-33%** | **-14%** | **-16%** | **-16%** | **-16%** | **-5%** |

**Figure O.3: 2011 vs 2005 Total Airshed Emissions Change**



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

**What's next?**

This inventory provides the most complete picture to date of maritime-related emissions in the greater Puget Sound region airshed. Review and assessment of this data will enable the maritime community to better plan, design, implement and evaluate the effectiveness of fact-based air pollution control strategies to help maintain air quality, minimize health risks, and protect the environment.

In 2008 the International Maritime Organization (IMO) amended international rules to lower worldwide fuel sulfur content for ocean-going vessels from 4.5%to 3.5% beginning in 2012. Fuel sulfur limits will lower again to 0.5% as early as 2020, but no later than 2025 (subject to a fuel availability study to be conducted in 2018). New NOx engine emission standards require vessels constructed after 2011 to meet Tier 2 levels (14.4 gram NOx/kilowatt-hour [kW-hr]); a reduction of 20% from current levels. Vessels constructed after 2016 are required to meet Tier 3 levels (3.4 gram NOx/kW-hr); a reduction of 80% below current Tier 1 standards.

On 26 March 2010, the IMO officially designated waters off North American coasts (except for Mexico) as an Emission Control Area (ECA) in which stringent international fuel content limitations and engine emission standards will apply to ships. The North American ECA went into effect on August 1, 2012. The second phase of the ECA will reduce sulfur content of fuels an additional 90% from the August 2012 levels. These standards will dramatically reduce ship sulfur and particulate related emissions and deliver substantial air quality and public health benefits that extend hundreds of miles inland.

Since the implementation of the CAS in 2008, the ports, stakeholders and partners have achieved considerable progress toward emission reduction measures. The ports will continue to encourage the spirit of collaboration and cooperation among their partners to promote proactive engagement of stakeholders and implement innovative approaches for reducing emissions. The ports also recognize the need to review and adjust the CAS on a regular basis in light of new standards, technology advancement, air emissions data, and evolving climate change policy frameworks. A five-year review and update of the CAS is currently underway to incorporate these external changes and to integrate lessons learned.

# EXECUTIVE SUMMARY

The 2011 Puget Sound Maritime Air Emissions Inventory was developed by members of the Puget Sound Maritime Air Forum (Forum) to provide an update to the 2005 baseline and to assess the changes in maritime-related air emissions in the greater Puget Sound region since the baseline year. With the exception of a portion of Pierce County, which has been designated as nonattainment for the 24-hr fine particulate standard, $PM_{2.5}$, the region is currently in attainment with federal, state and local ambient air quality standards.

On April 30, 2012, U.S. Environmental Protection Agency (EPA) finalized a rule that redirects the implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for ozone including 0.075 parts per billion (ppb) 8-hour ozone standards requirement in 2032[1]. The more stringent ozone standard may result in the region being designated as nonattainment for ozone.

Effective focus of air pollution prevention resources on maritime-related emissions requires a good understanding of the nature, location, and magnitude of emissions, which include ocean-going vessels (OGV), harbor vessels, heavy-duty and light-duty vehicles, locomotives, and cargo handling equipment. This report is not a policy document and does not include policy recommendations. The purpose of this 2011 emissions inventory update is to provide scientifically valid data to determine changes since the 2005 baseline and aid in the planning and prioritization of pollution prevention investments in the region.

Project partners are motivated by a commitment to protect the environment and public health in the Puget Sound region and elsewhere. Public and private organizations with maritime operations could have prepared separate inventories of their own operations and effectively reduced their emissions, but success in protecting ambient air quality standards and reducing the public health risks from exposure to diesel emissions relies on the larger maritime community working together to address the issue from an industry-wide perspective. One example is the Northwest Ports Clean Air Strategy (CAS) which was developed in 2007 and adopted in 2008 by the Port of Tacoma, Port of Seattle and Port Metro Vancouver, British Columbia to reduce maritime-related air emissions in the region. The Forum partners also are working within their own organizations on local initiatives, with other West Coast entities on national efforts and with the Pacific Ports Clean Air Collaborative to reduce emissions.

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[1] EPA, *http://www.epa.gov/glo/actions.html.*

The 2011 Puget Sound Maritime Air Emissions Inventory includes quantified emissions from most U.S. maritime-related sources within a portion of the Georgia Basin/Puget Sound International Airshed (see Figure ES.1) for the year 2011. It includes sources such as cargo and cruise ships, fishing boats, tugboats, tankers, recreational vessels, ferries, cargo handling equipment, locomotives, buses, trucks and light-duty vehicles. Military operations and U.S. Department of Defense equipment were not included due to national security considerations. Pollutants in the inventory include relevant EPA criteria pollutants and precursors (carbon monoxide [CO], nitrogen oxides [$NO_x$], sulfur oxides [$SO_2$], volatile organic compounds [VOC], particulate matter [PM]); greenhouse gases (carbon dioxide [$CO_2$], methane [$CH_4$], nitrous oxide [$N_2O$], and carbon dioxide equivalents [$CO_2e$]); and diesel particulate matter[DPM].

This activity-based emissions inventory provides detailed information on the major source categories associated with the marine activities, which are ocean-going vessels, harbor vessels, cargo handling equipment, on-road heavy-duty and light-duty vehicles, and rail operations.

Emissions inventories that are updated over time are very useful tools to quantify mass emissions and track emission changes from the various sources of emissions in a geographic area and to help prioritize those sources for potential emission reductions. Furthermore, the regional emissions inventory, including the maritime-related portion, is a critical component of an overall air quality assessment and mitigation strategy development process employed by air regulatory agencies to ensure the area complies with local, state and national air quality standards.

Diesel fueled engines and boilers, like many other mobile, stationary, and area sources, are significant generators of criteria pollutants, their precursors and toxic emissions. Excessive exposure to these pollutants can contribute to increased rates of lung cancer, chronic respiratory disease, impaired lung development in children, cardiovascular disease, and other health effects. Given the implications for public health, the reduction and minimization of these emissions are a top priority for the Forum as well as the American Lung Association, the Puget Sound Clean Air Agency (PSCAA), the Olympic Region Clean Air Agency (ORCAA), the Northwest Clean Air Agency (NWCAA), the Washington Department of Ecology (WDOE), EPA, and others. This emission inventory will support that effort by increasing the understanding of the emission contributions from the maritime-related sources, one component of the state's air quality concerns. Because the health impacts of toxic emissions can be proximity dependent, this inventory will contribute to a better understanding of where emission reductions could provide the best public health benefit. While the EPA has not yet officially designated diesel emissions as a hazardous air pollutant, and there are no established regulatory standards for diesel particulate emissions beyond inclusion in the $PM_{10}$ and $PM_{2.5}$ ambient air standards, it is important to note that federal regulations are in place to require dramatically cleaner fuels and new diesel engines in the future. In addition, in its Health Assessment Document for Diesel Engine Exhaust [EPA/600/8-90/057F May 2002, page ii, pdf p.3] EPA concludes that "long-term (i.e., chronic) inhalation exposure is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways depending on exposure."

The Forum participants are committed to proactively working with regulatory agencies and others to achieve early emissions reductions from maritime-related operations to protect public health and the environment.

### ES.1.1 Maritime-Related Source Categories

Maritime-related air emission source categories included in this inventory are:

- Ocean-going vessels
- Harbor vessels
- Cargo handling equipment
- Locomotives
- Heavy-duty vehicles
- Fleet vehicles

Ocean-going vessels include containerships, ocean-going tug boats, refrigerated vessels (reefers), roll-on roll-off (RoRo) ships, passenger cruise vessels, auto carriers, general cargo ships, dry bulk ships, bulk liquid tankers and miscellaneous vessels. There were a total of 2,582 inbound ocean-going vessel calls to the Puget Sound region in 2011. Military vessels were not included due to security considerations.

Harbor vessels include commercial, recreational, and government vessels that spend the majority of their operational time within or near ports, harbors, and coastal areas. Vessel parameters and/or activity data was updated for 263 vessels out of 709 total harbor vessels including commercial fishing vessels, ocean tugs, harbor tugs, towboats, excursion vessels, government (non-military) vessels, ferries, tank barges, work boats, and assist and escort tugs. Vessels that were not updated were assumed to operate at their 2005 activity levels.

Non-road cargo handling equipment includes equipment used to move cargo (containers, general cargo, and bulk cargo) to and from marine vessels, railcars and on-road trucks. This category includes cranes, straddle carriers, yard tractors, top and side handlers, forklifts and other related equipment not designed for use on public roads. A total of 1,196 pieces of cargo handling equipment was inventoried at Puget Sound terminals.

The locomotive category includes switching or yard locomotives serving marine cargo terminals, and line-haul or Class 1 locomotives carrying cargo to or from marine terminals to out-of-area destinations. Marine cargo transported by rail may be loaded at on-dock or near-dock rail yards. Emissions from line-haul and related switch locomotives serving maritime-related facilities were included in the inventory.

On-road heavy-duty vehicles include the heavy-duty trucks that are used to move cargo to and from terminals, local and national destinations and between terminals and off-port railcar loading facilities. This category also includes the buses that are used to transport passengers to and from cruise ship terminals and the airport or other locations in the region.

Fleet vehicles consist primarily of light-duty vehicles and some on-terminal heavy-duty vehicle not associated with direct cargo movement. There are three categories of fleet vehicles: terminal fleet vehicles, cruise terminal vehicles, and import/export vehicles. There were approximately 805 terminal fleet vehicles were used on cargo terminals in 2011.

### ES.1.2 Puget Sound Maritime Air Emissions Inventory Findings

#### *ES.1.2.1 Emissions Inventory Domain*

The red solid line in Figure ES.1 illustrates the entire Georgia Basin/Puget Sound International Airshed. The southern portion of which, below the dashed black line and within the solid red line as shown in Figure ES.1, represents the geographical domain of this emissions inventory. This domain includes the U.S. portions Georgia Basin/Puget Sound International Airshed as well as the entire Straits of Juan de Fuca and the waters east of Vancouver Island (stopping at the U.S./Canada Boarder to the north). Specifically, the Georgia Basin portion of the emissions inventory includes Whatcom and San Juan Counties and the southern coastline of the Strait of Juan de Fuca, while the Puget Sound portion encompasses the counties to the south of Whatcom County in Washington State. The specific emissions inventory over-water domain is detailed in Section 3.2.

**Figure ES.1: Georgia Basin/Puget Sound International Airshed**

In 2005, the geographical domain of the emissions inventory was considered one emissions zone, the airshed. In 2011, in an effort to gain a deeper understanding of port-related emissions, the Port of Tacoma and Port of Seattle allocated 2011 emissions into three geographical zones, compared to using only one zone in 2005. For comparison purposes, the allocations were also retroactively applied to the 2005 emissions results. The three geographical zones are:

- Port - emissions within port terminals and adjacent waterways
- Air district – emissions within the PSCAA boundaries (Pierce, King, Kitsap, and Snohomish counties)
- Airshed – emission within the inventory domain

The other participating port's specific port emissions and comparisons remain consistent with the 2005 approach.

*ES.1.2.2 2011 Airshed Total Emissions*

Total emissions from U.S. maritime-related sources (expressed in tons per year or tpy) in the inventory domain or airshed, are presented in Table ES.1. Distribution of emissions by emissions source category is presented in Table ES.2 and Figure ES.2. Greenhouse gases are presented as carbon dioxide equivalents ($CO_2e$), which include the contributions of carbon dioxide, nitrous oxide, and methane. Details regarding emissions from each source category are provided in relevant sections of this report as noted below. The 2011 airshed total emissions include the following:

- Ocean-going vessel emissions include hotelling (i.e., dockside), maneuvering, and transiting emissions, which are detailed in Section 3. The emissions inventory over-water domain is detailed in Section 3.2.
- Harbor vessel emissions include commercial harbor vessels (i.e., assist tugs, private ferries including Washington State Ferries [WSF], harbor tugs, excursion vessels, workboats, etc.), government vessels (local, state, federal non-military, and port-owned vessels), and recreational vessels, which are detailed separately in Section 4.
- Cargo handling equipment emissions include emissions from all terminal equipment including yard trucks, top picks, side picks, rubber-tired gantry cranes and other heavy-duty and light-duty equipment, which are detailed in Section 5.
- Locomotive emissions include switch and line-haul operations, which are detailed in Section 6.
- Heavy-duty vehicle emissions include on-road drayage and long-haul trucks, which are detailed in Section 7.
- Fleet vehicles consist primarily of light-duty vehicles and some on-terminal heavy-duty vehicles not associated with direct cargo movement. There are three categories of fleet vehicles: terminal fleet vehicles, cruise terminal vehicles, and import/export vehicles, which are detailed in Section 8.

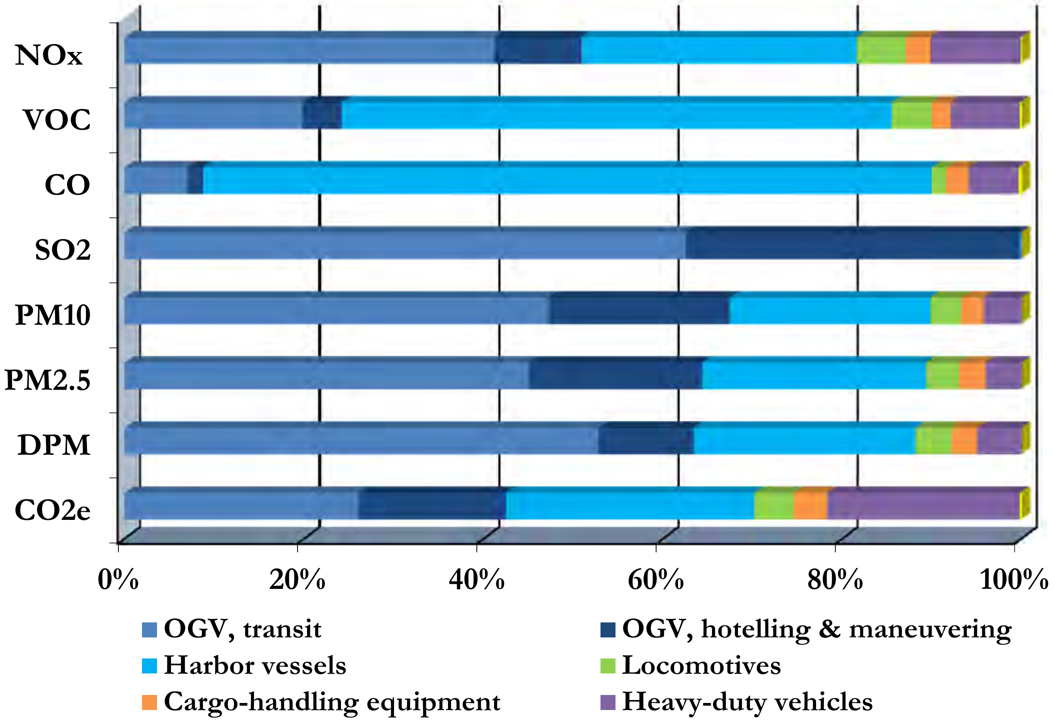
**Table ES.1: 2011 Total Airshed Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, transit | 9,424 | 363 | 840 | 7,333 | 616 | 493 | 593 | 452,613 |
| OGV, hotelling & maneuvering | 2,234 | 79 | 196 | 4,376 | 264 | 211 | 118 | 285,028 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5 | 292 | 272 | 278 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 11 | 45 | 41 | 45 | 75,289 |
| Cargo handling equipment | 594 | 37 | 297 | 1 | 33 | 32 | 33 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3 | 55 | 44 | 55 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0 | 0 | 0 | 0 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,729** | **1,304** | **1,092** | **1,122** | **1,736,226** |

**Table ES.2: 2011 Total Airshed Emissions Contribution by Source Category**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, transit | 41% | 20% | 7% | 62% | 47% | 45% | 53% | 26% |
| OGV, hotelling & maneuvering | 10% | 4% | 2% | 37% | 20% | 19% | 11% | 16% |
| Harbor vessels | 31% | 61% | 81% | 0% | 22% | 25% | 25% | 28% |
| Locomotives | 5% | 4% | 2% | 0% | 3% | 4% | 4% | 4% |
| Cargo handling equipment | <3% | <2% | <2% | 0% | <2% | <3% | <3% | <4% |
| Heavy-duty vehicles | 10% | 8% | 6% | 0% | 4% | 4% | 5% | 22% |
| Fleet vehicles | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

**Figure ES.2: 2011 Total Airshed Emissions Distribution**



In table ES.3, the 2011 airshed total emissions from U.S. maritime-related sources in the emissions inventory domain are allocated by regional clean air agency jurisdiction. The NWCAA includes Island, Skagit and Whatcom counties. The ORCAA includes Clallam, Grays Harbor, Jefferson, Mason, Pacific, and Thurston counties. The PSCAA includes Pierce, King, Kitsap, and Snohomish counties.

**Table ES.3: 2011 Total Airshed Emissionsby Clean Air Agency, tpy**

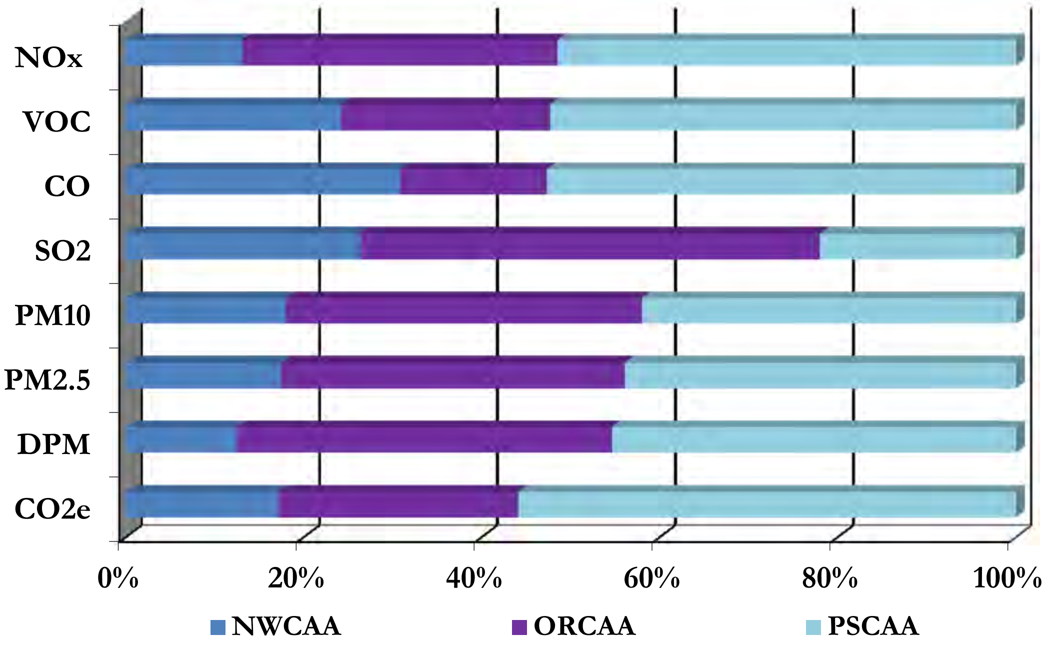
| Agency | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| NWCAA | 2,988 | 442 | 3,663 | 3,076 | 233 | 191 | 140 | 296,048 |
| ORCAA | 8,074 | 428 | 1,970 | 6,056 | 521 | 421 | 472 | 465,699 |
| PSCAA | 11,851 | 959 | 6,271 | 2,597 | 550 | 480 | 510 | 974,479 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,729** | **1,304** | **1,092** | **1,122** | **1,736,226** |

Table ES.4 and Figure ES.3 presents the 2011 U.S. maritime-related clean air agency distribution of emissions by regional clean air agency boundaries. The PSCAA region comprises half of the U.S. maritime-related emissions due to having the two major ports in the region located within PSCAA as well as having significant portion of the over-water boundary. ORCAA has the next highest percentage of emissions which is due to the long ocean-going vessel transits associated with the Straits of Juan de Fuca.

**Table ES.4: Distribution of 2011 Total Airshed Emissionsby Clean Air Agency**

| Agency | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| NWCAA | 13% | 24% | 31% | 26% | 18% | 17% | 12% | 17% |
| ORCAA | 35% | 23% | 16% | 52% | 40% | 39% | 42% | 27% |
| PSCAA | 52% | 53% | 53% | 22% | 42% | 44% | 46% | 56% |

**Figure ES.3: 2011 Total Airshed Emissions by Clean Air Agency**



### ES.1.3 Overview of Comparison, 2011 vs 2005

Table ES.5 compares the 2011 and 2005 ship inbound activity[2], cargo throughput in twenty-foot-equivalent units (TEU), and total cargo tonnage in metric tons (tonnes) for the Ports of Anacortes, Everett, Olympia, Seattle, and Tacoma. Due to the worldwide economic downturn, the overall activity and throughput was down in 2011 for the Puget Sound ports when compared to 2005. The Port of Seattle and Port of Tacoma had lower vessel call counts and TEU throughput. The exceptions are the Port of Everett and Port of Olympia, which increased their vessel calls and tonnage in 2011 as compared to 2005. Overall, the inbound calls decreased 9%, TEU decreased 15% and tonnage decreased slightly by 1%.

**Table ES.5: 2011 vs 2005 Port Activity Comparison**

| Port | 2011 Inbound Activities | 2005 Inbound Activities | 2011 Throughput (TEU) | 2005 Throughput (TEU) | 2011 Cargo (tonnes) | 2005 Cargo (tonnes) |
|---|---|---|---|---|---|---|
| Anacortes | 38 | 29 | na | na | na | na |
| Everett | 103 | 47 | 20,918 | 9,561 | 152,995 | 103,757 |
| Olympia | 26 | 20 | 0 | 903 | 711,536 | 129,512 |
| Seattle | 1,136 | 1,197 | 2,033,535 | 2,087,929 | 22,762,678 | 20,564,860 |
| Tacoma | 875 | 1,093 | 1,488,795 | 2,070,000 | 17,270,252 | 20,400,000 |
| **Total** | **2,178** | **2,386** | **3,543,248** | **4,168,393** | **40,897,461** | **41,198,129** |
| **Change, %** | **-9%** | | **-15%** | | **-1%** | |

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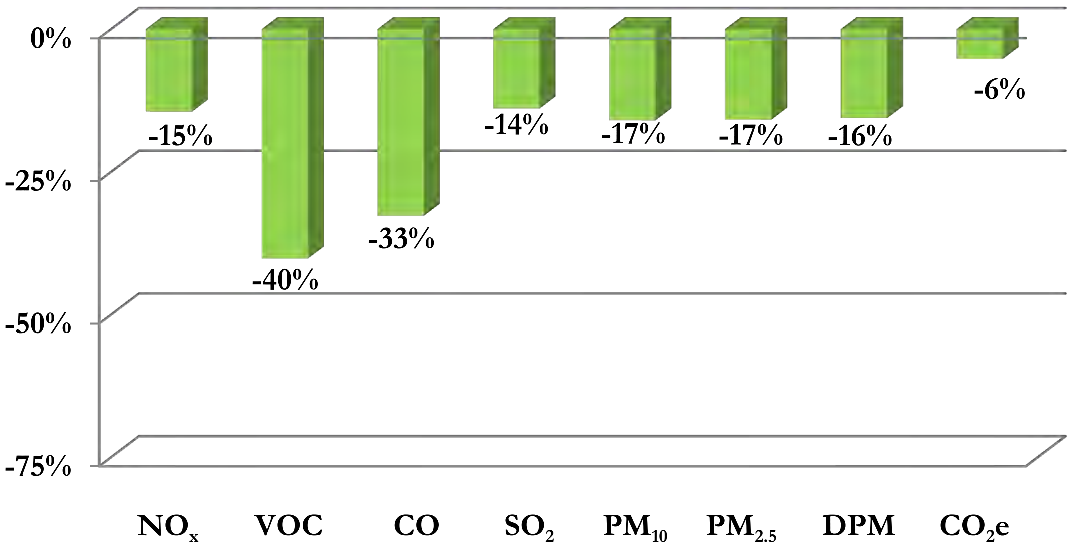
[2] Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

Table ES.6 and Figure ES.4 compare the total 2011 maritime-related air emissions to the 2005 emissions. In 2011, the emissions decreased 5% to 40% as compared to 2005, depending on pollutant. These reductions are primarily from activity level changes, switching to ultra low sulfur diesel (ULSD), and the various efforts associated with the implementation of the CAS, as detailed in Section 10.

**Table ES.6: 2011 vs 2005 Total Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 22,912 | 1,830 | 11,905 | 11,729 | 1,304 | 1,092 | 1,122 | 1,736,226 |
| 2005 | 27,059 | 3,070 | 17,708 | 13,621 | 1,565 | 1,310 | 1,342 | 1,845,912 |
| **Change, tpy** | **-4,146** | **-1,240** | **-5,804** | **-1,892** | **-261** | **-218** | **-220** | **-109,686** |
| **Change, %** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

**Figure ES.4: 2011 vs 2005 Total Airshed Emissions Change**



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

For some of the source categories, the emissions calculation methodology was different in 2011 compared with 2005. In order to compare 2011 emissions to 2005 emissions, for those source categories with methodology changes, the 2005 emissions were updated with the 2011 emissions modeling parameter changes or were otherwise adjusted so the two inventories can be directly compared. Thus, the 2005 emissions included in this report are, in some cases, different from the published emissions in the 2005 Puget Sound Emissions Inventory (PSEI) report. The changes to the 2005 methodology are as follows:

- 2005 cargo handling equipment emissions were recalculated to include the updated 2011 load factors for yard tractors and rubber tired gantry (RTG) cranes. The RTG crane load factor changed from 43% to 21% in 2011; while the yard tractor load factor changed from 59% to 39% in 2011. These load factors have a direct impact on emissions and by applying the lower load factors in 2011 to the 2005 activity, the 2005 CHE emissions included in this 2011 PSEI report for comparison to 2011 emissions are lower than what was presented in the 2005 PSEI.
- 2005 commercial harbor vessels and government vessel emissions were recalculated to include the updated 2011 load factors for harbor tug, ferry, excursion and workboats. Please refer to section 4.9 for a comparison of the various load factors used in 2005 and the 2011 PSEI. The 2011 load factors are lower than the load factors used in 2005, thus the 2005 harbor vessel emissions included in this 2011 PSEI report for comparison to 2011 emissions are lower than what was presented in the 2005 PSEI. Recreational vessel counts and assumptions used in the 2005 inventory were rerun in the EPA non-road equipment emission modeling software, NONROAD2008a model, used for the 2011 inventory to enable direct comparisons.
- 2005 heavy-duty vehicle emissions were recalculated for on-terminal and total port-related emissions due to differences in source of heavy-duty vehicle model year distribution, truck size class and the version of the EPA on-road vehicle emission modeling software, model MOBILE, used for 2005 emissions and 2011 emissions.

Ocean-going vessels, locomotives, and fleet vehicle emission calculation methodology used in 2011 inventory is similar to the methodology used in 2005, except for a minor change in switching locomotive $CO_2$ emission estimates resulting from a change to the EPA's value for brake-specific fuel consumption. Thus 2005 total emissions for these categories remained the same as the published 2005 PSEI emissions, except for locomotive $CO_2$ emissions.

It's important to note that changes in activity have direct impacts on emissions when comparing 2011 vs 2005. In each of the source category sections, Sections 2 and 9, all present the changes in activities related to each section along with the emission changes between 2011 and 2005.

Table ES.7 summarizes the total maritime-related emissions for 2011 and 2005 and the 2011 vs 2005 comparison by source category.

**Table ES.7: 2011 vs 2005 Total Airshed Emissionsby Source Category, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| Ocean-going vessels | 11,658 | 442 | 1,036 | 11,709.00 | 879.65 | 703.72 | 711.12 | 737,640 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5.34 | 291.52 | 271.64 | 277.72 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 10.51 | 45.15 | 41.35 | 45.15 | 75,289 |
| Cargo handling equipment | 594 | 37 | 297 | 0.60 | 32.60 | 31.70 | 32.60 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3.40 | 55.00 | 43.50 | 55.00 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0.05 | 0.09 | 0.08 | 0.04 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,728.90** | **1,304.01** | **1,092.00** | **1,121.63** | **1,736,226** |
| **2005** | | | | | | | | |
| Ocean-going vessels | 14,551 | 509 | 1,200 | 12,923.71 | 1,030.66 | 822.51 | 841.99 | 812,391 |
| Harbor vessels | 6,497 | 2,217 | 14,477 | 380.31 | 306.34 | 282.15 | 272.17 | 464,362 |
| Locomotives | 2,156 | 109 | 269 | 168.60 | 59.11 | 54.39 | 59.11 | 98,495 |
| Cargo handling equipment | 832 | 81 | 814 | 61.84 | 54.89 | 53.25 | 54.64 | 79,581 |
| Heavy-duty vehicles | 3,012 | 148 | 899 | 86.70 | 114.00 | 97.60 | 114.00 | 387,846 |
| Fleet vehicles | 10 | 5 | 50 | 0.04 | 0.08 | 0.08 | 0.08 | 3,237 |
| **Total** | **27,059** | **3,070** | **17,708** | **13,621.18** | **1,565.08** | **1,309.97** | **1,341.99** | **1,845,912** |
| **% Change** | | | | | | | | |
| Ocean-going vessels | -20% | -13% | -14% | -9% | -15% | -14% | -16% | -9% |
| Harbor vessels | 9% | -49% | -33% | -99% | -5% | -4% | 2% | 4% |
| Locomotives | -41% | -27% | -25% | -94% | -24% | -24% | -24% | -24% |
| Cargo handling equipment | -29% | -54% | -64% | -99% | -41% | -40% | -40% | -19% |
| Heavy-duty vehicles | -22% | -3% | -26% | -96% | -52% | -55% | -52% | -3% |
| Fleet vehicles | -34% | -48% | -31% | 24% | 8% | 3% | -47% | -13% |
| **Total** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

A summary of the changes listed above and the leading actions that led to the changes are presented below:

- Ocean-going vessel emissions decreased 9% to 20% across all pollutants compared to 2005. The reductions were due to decreased vessel calls, use of shore power, and use of lower sulfur fuel in the auxiliary engines by some vessels/shipping lines while at berth.
- Harbor vessel $SO_2$, and PM emissions decreased compared to 2005 due to the use of ULSD. $NO_x$, DPM and $CO_2$ emissions increased due to the increased activity and changes in the fleet characteristics associated with harbor vessels.
- Locomotive emissions decreased compared to 2005 due to lower throughput, improved fuel efficiency, idle reduction, lower sulfur fuel, cleaner locomotive engines, and more fuel-efficient routing of trains within the air basin.
- Cargo handling equipment emissions decreased 19% to 99% across all pollutants compared to 2005. The reductions were due to decreased activity, use of ULSD, emission reduction retrofits such as diesel particulate filters (DPFs) and diesel oxidation catalysts (DOCs), engine repowers, and equipment turnover which includes the purchase of newer equipment.
- Heavy-duty vehicle emissions decreased compared to 2005, except for $CO_2e$ which remained essentially the same in 2011 as in 2005. The reduction in heavy-duty vehicle emissions is due to fleet turnover, the implementation of the clean truck programs by the Ports of Tacoma and Seattle, and the use of ULSD.
- For fleet vehicles, the varying emission changes compared to 2005 are due to the different fleet mix of gasoline, propane and diesel powered vehicles included in the two inventories.

As an addition to the 2011 Puget Sound Maritime Air Emissions Inventory, estimates have been developed of the emission reductions achieved in 2011 calendar year by the Port of Seattle and the Port of Tacoma through the implementation of Strategy measures. The 2011 emission reductions are discussed in Section 10.

Tables ES.8 and ES.9 summarize the 2011 emission reductions for ocean-going vessels, harbor craft, CHE, switching locomotives, and heavy duty vehicles for the Port of Seattle and Port of Tacoma, respectively.

### Table ES.8: Port of Seattle 2011 Emission Reductions, tpy

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Ocean-going vessels | 38.5 | 0.8 | 2.3 | 371.0 | 23.5 | 18.8 | 19.1 | 1,778 |
| Harbor craft | 4.8 | 0.0 | 0.0 | 56.1 | 3.3 | 3.0 | 3.3 | 0 |
| Cargo handling equipment | 91.8 | 7.8 | 15.4 | 0.0 | 2.7 | 2.6 | 2.7 | 0 |
| Locomotives | 2.6 | 0.0 | 0.0 | 20.0 | 0.1 | 0.1 | 0.1 | 137 |
| Heavy duty vehicles | 135.9 | 1.3 | 0.0 | 0.0 | 8.2 | 7.3 | 8.2 | 0 |
| **Total** | **273.6** | **9.4** | **17.7** | **447.1** | **37.7** | **31.8** | **33.3** | **1,915** |

### Table ES.9: Port of Tacoma 2011 Port Direct Emission Reductions, tpy

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Ocean-going vessels | 21.4 | 0.5 | 1.3 | 132.7 | 8.5 | 6.8 | 6.1 | 1,159 |
| Harbor craft | 4.8 | 0.0 | 0.0 | 34.1 | 2.1 | 1.9 | 2.1 | 0 |
| Cargo handling equipment | 15.7 | 5.2 | 17.3 | 0.0 | 2.4 | 2.4 | 2.4 | 0 |
| Locomotives | 3.1 | 0.2 | 0.0 | 16.9 | 0.1 | 0.1 | 0.1 | 59 |
| Heavy duty vehicles | 58.2 | 0.8 | 0.0 | 0.0 | 3.6 | 3.2 | 3.6 | 0 |
| **Total** | **103.1** | **6.6** | **18.7** | **183.7** | **16.7** | **14.3** | **14.3** | **1,218** |

# SECTION 1 INTRODUCTION

This section describes the rationale behind the Puget Sound Maritime Air Emissions Inventory, introduces the Puget Sound Maritime Air Forum (Forum) that sponsored the effort, provides an overview of this and related efforts, describes maritime-related entities in the Puget Sound area, including ports, petroleum refineries, ferry terminals, and military installations, and discusses emission reduction efforts identified at these entities.

## 1.1 Reason for Study

Comprehensive air quality planning requires quality emissions inventories as a foundation. An emissions inventory identifies and quantifies by means of engineering calculations the pollutants emitted by sources in a geographic area or airshed and their relative contributions to total emissions within that airshed. The emissions inventory is the foundation or baseline for other activities such as air quality analysis and strategy development.

This activity-based emissions inventory provides detailed information on the five major source categories associated with the marine activities, which are ocean-going vessels (OGVs), harbor vessels, cargo handling equipment (CHE), on-road heavy-duty vehicles (HDVs), and locomotive operations.

The maritime-related inventory must be viewed in context with the other sources of air emissions in the region. Maritime-related sources are one component of total air emissions sources present in the greater Georgia Basin/Puget Sound International Airshed. Other (non-marine) categories that contribute to emissions include point sources (refineries, manufacturing facilities, etc.), on-road mobile sources (cars, trucks, buses and motorcycles), non-road equipment (construction equipment, farming equipment, etc.), and stationary area sources (home wood heating, open burning, auto body shops etc.).

An emissions inventory by itself is a very useful tool to quantify mass emissions and track emission changes through time from a variety of sources of pollution in a geographic area and to help prioritize those sources for potential emission reductions. Furthermore, the regional emissions inventory, including the maritime-related portion, is a critical component of an overall air quality assessment and mitigation strategy development process employed by air regulatory agencies to ensure the area complies with local, state and national air quality standards.

In addition to assuring continued compliance with air quality standards, air agencies work to protect public health and the environment. Adverse health impacts can occur from toxic air emissions (e.g., diesel particulate matter) even if a region is in compliance with air quality standards. Environmental impacts such as visibility impairment can occur at levels significantly less than those standards. Since health impacts are directly related to the concentration and duration of public exposure to specific air pollutants, agencies use additional tools to help them understand the impacts of air pollution. Agencies operate air quality monitoring networks to measure ambient concentrations at representative locations. They also perform computer modeling based on local meteorological data to convert emissions inventory data to estimated ambient concentrations across specific areas. Air quality managers use the data from monitors and modeling to plan and select strategies that reduce emissions sufficiently to meet air quality standards and protect health and environmental goals everywhere in the greater airshed.

The greater Puget Sound region is a significant airshed encompassing a large population. A portion of the region located in Pierce County was designated as nonattainment with respect to U.S. Environmental Protection Agency's (EPA's) $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) in 2009 (known as the Tacoma, Pierce County Nonattainment Area).[3] The fine particle pollution ($PM_{2.5}$) in the Tacoma, Pierce County nonattainment area comes mainly from smoke due to burning in fireplaces and wood stoves, but maritime activities also contribute a portion of fine particle pollution in the designated area. The Puget Sound Clean Air Agency (PSCAA) worked with a group of community stakeholders and developed a set of strategies to reduce the fine particle pollution in the nonattainment area. The recommended strategies included reducing wood smoke emissions through replacing older, highly-polluting wood stoves and increasing the amount of enforcement of residential burn bans. In addition, the stakeholders supported reductions in other sources of pollution, including maritime-related diesel equipment through cleaner fuels and cleaner equipment.

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[3] In 2007, Ecology recommended to EPA that a portion of Pierce County, including Tacoma, be designated as nonattainment for $PM_{2.5}$ based on the 24hr standard applied to 2004-2006 Tacoma L-Street Monitoring data. EPA designated the area as nonattainment in 2009.

Diesel engines, like many other mobile, stationary, and area sources, are significant generators of criteria pollutants and toxic emissions. Excessive exposure to these pollutants can contribute to increased rates of lung cancer, chronic respiratory disease, impaired lung development in children, cardiovascular disease, and other health effects. Given the implications for public health, the reduction and minimization of these emissions are a top priority for the Forum. This emission inventory will support this effort by increasing the understanding of the emission contributions from the maritime-related sources, one component of the state's air quality concerns. Because the health impacts of toxic emissions can be proximity dependent, this inventory will contribute to a better understanding of where emission reductions could provide the best public health benefit. While the EPA has designated diesel emissions as a hazardous air pollutant, it is important to note that federal regulations are in places that require dramatically cleaner fuels and new diesel engines. In addition, in its Health Assessment Document for Diesel Engine Exhaust [EPA/600/8-90/057F May 2002, page ii, pdf p.3] EPA concludes that "long-term (i.e., chronic) inhalation exposure is likely to pose a lung cancer hazard to humans, as well as damage the lung in other ways depending on exposure."[4]

Forum participants are committed to proactively working to achieve early emissions reductions from maritime-related operations to protect public health and the environment.

The Forum proactively commissioned this 2011 air emissions inventory to document the progress made since 2005 in reducing Puget Sound maritime-related emissions and to better understand how the Forum may adjust its focus and continue its emission reduction efforts. During the inventory process, information on the nature, quantity, and sources of air pollutants released from maritime sources has been collected. As the understanding of maritime-related emissions sources improves, the maritime community will be better able to design, implement, and evaluate the effectiveness of fact-based air pollution control strategies and deliver air quality benefits to the region.

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[4] Email correspondence, Wayne Elson, Office of Air, Waste, and Toxics, EPA and Ron Stuart, Project Manager, Port of Tacoma, September 6, 2012.

## 1.2 Scope of Study

The scope of the study is described in terms of the pollutants quantified, the year of operations used as the basis of emission estimates (2011), the included and excluded source categories, and the geographical extent.

### *1.2.1 Pollutants*

Exhaust emissions of the following pollutants are estimated:

- Criteria pollutants, surrogates, and precursors
  - Oxides of nitrogen ($NO_x$)
  - Sulfur dioxide ($SO_2$)
  - Particulate matter (PM) (10-micron, 2.5-micron)
  - Volatile organic compounds (VOCs)
  - Carbon monoxide (CO)
- Toxic[5] air pollutant, diesel particulate matter (DPM), which is the particulate matter emitted from diesel internal combustion engines
- Greenhouse gases
  - Carbon dioxide equivalent ($CO_2e$)

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[5] In 1998, the California Air Resources Board(CARB) identified diesel particulate matter as a toxic air contaminant. CARB, Resolution 98-35, 27 August 1998. See: *http://www.arb.ca.gov/regact/diesltac/res98-35.pdf.*

Table 1.1: Pollutant Description

| Pollutant | Ambient Standard Compliance Status | Sources | Health & Environmental Effects |
|---|---|---|---|
| **Ozone ($O_3$)*** is a pungent-smelling, colorless gas produced in the atmosphere when nitrogen oxides ($NO_x$) and volatile organic compounds (VOC) chemically react under sunlight. The highest $O_3$ levels occur on hot summer afternoons. This inventory does not include $O_3$ because it is not directly emitted; this inventory does include the $O_3$ precursors nitrogen oxides and volatile organic compounds. | The region has not violated national ambient standards for $O_3$ since 1992, and in 1996 the region was re-designated to "attainment" status by EPA. $O_3$ levels have not decreased significantly. Concentrations often exceed, but don't violate, standards a few times each summer. | Most $O_3$-causing $NO_x$ and VOCs come from the transportation sector: cars and light trucks, marine vessels, and heavy-duty diesel vehicles. Other sources include gasoline-powered yard equipment, gasoline refueling, industrial solvents, and auto-body paint shops, among others. Natural emissions from biogenic (vegetation) sources also contribute to $O_3$ formation. | Exposure to ground-level $O_3$ can reduce lung function, cause respiratory irritation, aggravate asthma symptoms, and weaken the immune system. $O_3$ has environmental impacts as well; studies show that $O_3$ can damage agricultural crops and forests. |
| **Oxides of Nitrogen ($NO_x$)** is the generic term for a group of highly reactive gases; all of which contain nitrogen and oxygen in varying amounts. Most $NO_x$ are colorless and odorless. **Nitrogen dioxide ($NO_2$)*** is one form of $NO_x$. $NO_2$, along with particles in the air can often be seen as a reddish-brown layer over many urban areas. | $NO_2$ levels are below federal air quality standards in the Puget Sound Region. See above for information about the role of $NO_x$ in $O_3$ formation. | $NO_x$ form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of $NO_x$ are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. Other sources include industrial boilers and processes, home heaters, and gas stoves. $NO_x$ can also be formed naturally. | Exposure to $NO_2$ has been connected to a range of respiratory diseases and infections. $NO_2$ plays an essential role in the photochemical reactions that produce $O_3$, the major component in smog. $NO_x$ can react with other compounds in the air to form tiny particles adding to PM concentrations. |
| *** Indicates a criteria pollutant which National Ambient Air Quality Standards have been established by EPA.** | | | |

Table 1.1: Pollutant Description (cont'd)

| Pollutant | Ambient Standard Compliance Status | Sources | Health & Environmental Effects |
|---|---|---|---|
| **Volatile organic compounds (VOC)** VOC are included in the emissions inventory because they are an ozone ingredient, see ozone information above | No ambient standards. VOCs are not classified as criteria pollutants but can contribute to the formation of ozone. | See ozone information above. | In addition to contributing to the formation of ozone, some VOC are air toxics which can contribute to a wide range of adverse health effects. |
| **Carbon monoxide (CO)** Carbon monoxide is a colorless, odorless, toxic gas commonly formed when carbon-containing fuel is not burned completely. Motor vehicles are the predominant source of carbon monoxide in the Puget Sound region. | CO levels are well below federal standards and no longer considered a pollutant of concern in the Puget Sound area. This region was designated as "attainment" status in 1996 and has not violated the carbon monoxide standard since 1990. | CO forms during incomplete combustion of fuels. The majority of CO comes from on and off road vehicle engine exhaust. Other contributing CO source categories in the Puget Sound region include woodstoves and fireplaces, outdoor burning and industrial sources. | CO combines with hemoglobin in red blood cells and decreases the oxygen-carrying capacity of the blood. CO weakens heart contractions, reducing the amount of blood pumped through the body. It can affect brain and lung function. People with heart disease and pregnant women are especially at risk. |
| **Sulfur dioxide ($SO_2$)*** is a colorless, corrosive gas produced by burning fuel containing sulfur, such as coal and oil, and by industrial processes such as smelters, paper mills, power plants and steel manufacturing plants. Sulfur dioxide ($SO_2$)* is one form of $SO_x$. | $SO_2$ levels in the Puget Sound region are well below federal standards. | Over the past decade the area has experienced a significant decrease in $SO_2$ from sources such as pulp mills, cement plants, and smelters. Additionally, levels of sulfur in diesel and gasoline fuels are decreasing due to federal regulations set by the Environmental Protection Agency. | $SO_2$ is associated with a variety of respiratory diseases. Inhalation of $SO_2$can cause increased airway resistance by constricting lung passages. Some of the $SO_2$ become sulfate particles in the atmosphere adding to measured PM levels. |
| *** Indicates a criteria pollutant which National Ambient Air Quality Standards have been established by EPA.** | | | |

Table 1.1: Pollutant Description (cont'd)

| Pollutant | Ambient Standard Compliance Status | Sources | Health & Environmental Effects |
|---|---|---|---|
| **Particulate Matter ($PM_{10}$ * & $PM_{2.5}$*)** refers to tiny, discrete solid or aerosol particles in the air. Dust, dirt, soot, and smoke are considered particulate matter (PM). Two types of PM are included in this emissions inventory: $PM_{10}$, which consists of particles measuring up to 10 micrometers in diameter; and $PM_{2.5}$, which consists of fine particles measuring 2.5 micrometers in diameter or smaller. | The region is in attainment with federal air quality standards for $PM_{10}$. Excess wood smoke in the winter caused a portion of Pierce County around Tacoma to be designated nonattainment for the 24-hr $PM_{2.5}$ standard. | In the winter, most PM comes from wood burning in fireplaces and wood stoves particularly in residential neighborhoods. During the summer, vehicle exhaust (cars, trucks, buses, among others) are the predominant sources of fine particles in urban areas. In rural areas, land-clearing burning and backyard burning of yard waste contribute to summer time levels. | Fine particles are a concern because their very tiny size allows them travel more deeply into lungs, increasing the potential for health risks. Exposure to $PM_{2.5}$ is linked with respiratory disease, decreased lung function, asthma attacks, heart attacks and premature death. Home PM, such as diesel particulate matter, and smoke from wood and waste burning, are classified as toxic due to the concentrations of harmful chemicals bound to the particles. |
| **Diesel Particulate Matter (DPM)** is a significant component of PM. Diesel exhaust also includes more than 40 substances that are listed as hazardous pollutants. DPM is considered a surrogate for the effects of both the PM and gaseous component of diesel exhaust. Because of their microscopic size, DPM can become trapped in the small airways of the lungs. | No ambient standards - Air agencies have made it a priority to lower DPM emissions as soon and as much as is practical due to its relative toxicity, even though the total tons of DPM in this and other inventories are usually much lower than other pollutants. | Sources of diesel emissions include diesel-powered trucks, buses and cars (on-road sources); diesel-powered marine vessels, construction equipment, trains and aircraft support equipment (non-road sources). | DPM has been shown to contribute up to 80% of the carcinogenic health risk related to the portion of outdoor air pollutants classified as "toxics". DPM is linked with health effects typical of all PM, including heart problems, aggravated asthma, chronic bronchitis and premature death. |
| *** Indicates a criteria pollutant which National Ambient Air Quality Standards have been established by EPA.** | | | |

**Table 1.1: Pollutant Description (cont'd)**

| Pollutant | Ambient Standard Compliance Status | Sources | Health & Environmental Effects |
|---|---|---|---|
| **Greenhouse Gases (GHG)** included in this emissions inventory are carbon dioxide, methane, and nitrous oxide. Additional gases that are not significantly emitted by maritime-related sources or included in this inventory also contribute to climate change. | No ambient standards | GHG come from both natural processes and human activities, although increases of human-made GHG are most responsible for disrupting the balance of the atmosphere. Most GHG come from transportation and electricity generation. | Climate change, also referred to as global warming, occurs when excessive amounts of GHG accumulate in our atmosphere. These gases trap heat, causing the temperature of the earth to rise. |
| *** Indicates a criteria pollutant which National Ambient Air Quality Standards have been established by EPA.** | | | |

### *1.2.2 Temporal Extent*

The activity year for the Puget Sound Maritime Air Emissions Inventory is calendar year 2011. To the extent practicable, the emission estimates are based on activities that occurred during this period. If information specific to 2011 was not available, reasonable estimates of operational characteristics were developed; these cases are identified.

### *1.2.3 Emission Source Categories*

The Puget Sound Maritime Air Emissions Inventory includes the following source categories:

- Ocean-going vessels
- Harbor vessels, including commercial harbor vessels, government (non-military) vessels, and recreational vessels
- Cargo handling equipment
- Locomotives
- Heavy-duty vehicles
- Fleet vehicles

### *1.2.4 Geographical Extent*

The Puget Sound Maritime Air Emissions Inventory covers activities within delineated geographical areas depending on emission source type. In general, the area covered includes the U.S. portions of the Georgia Basin/Puget Sound International Airshed, as illustrated in Figure 1.1. The Georgia Basin airshed comprises mostly the Canadian portion of the Georgia Basin/Puget Sound International Airshed, plus Whatcom and San Juan Counties and the southern coastline of the Strait of Juan de Fuca in Washington State, while the Puget Sound airshed encompasses the counties to the south of Whatcom County in Washington State (see Figure 1.2). The solid red line is the boundary of the Georgia Basin/Puget Sound International Airshed.

The 2011 and 2005 emissions inventory domain, as agreed by Steering Committee decision, is the area bounded by the black dotted line to north and the red line to the south, as illustrated in Figure 1.1. The emissions inventory domain includes the U.S. portions Georgia Basin/Puget Sound International Airshed as well as the entire Straits of Juan de Fuca and the waters east of Vancouver Island (stopping at the U.S./Canada Boarder to the north). The specific emissions inventory over-water domain is detailed in Section 3.2.

For 2011, the Port of Tacoma and Port of Seattle increased the resolution from the previous report to get a better understanding of port-related emissions by allocating them into three geographical zones, compared to one zone in 2005. For comparison purposes the 2011 and 2005 emissions were allocated into the following three geographical zones for their port-specific emissions and comparisons:

- Port - emissions within port terminals and adjacent waterways
- Air district – emissions within the PSCAA boundaries (Pierce, King, Kitsap, and Snohomish Counties)
- Airshed – emission within the inventory domain

The other participating ports, their port specific emissions and comparisons are consistent with the 2005 approach.

**Figure 1.1: Georgia Basin/Puget Sound International Airshed**

The following twelve counties are located within the emissions inventory domain or airshed and some U.S. maritime-related activities for the six emissions source categories operating in these counties are included in the inventory, as shown in Figure 1.2:

- Clallam County
- Island County
- Jefferson County
- King County
- Kitsap County
- Mason County
- Pierce County
- San Juan County
- Skagit County
- Snohomish County
- Thurston County
- Whatcom County

**Figure 1.2: Puget Sound Counties and Major Ports**

The major ports in the inventory domain include:

- Port of Anacortes in Skagit County
- Port of Everett in Snohomish County
- Port of Olympia in Thurston County
- Port of Seattle in King County
- Port of Tacoma in Pierce County

The Port of Port Angeles and Port of Bellingham declined participation in the 2011 inventory update.

An overview of the geographical extent for each of the source categories is provided below.

*Ocean-going Vessels*

For OGVs, data was collected for the greater Puget Sound area and associated waterways, and the Strait of Juan de Fuca out to the JA buoy (located at the entrance to the Strait of Juan de Fuca).

Emissions have been estimated from OGVs that arrived at a U.S. berth from sea or departed to sea from a U.S. berth, regardless of whether the vessels traveled on the U.S. side or the Canadian side of the international border. For OGVs that shifted to Canadian berths, or shifted from Canadian berths to U.S. berths, this inventory includes emissions only in U.S. waters. Guidelines were established for both emissions inventories to follow for all vessel trips that transit through the over-water international boundary (see Section 3.2). After completion of the emission estimates, the results will be shared between Environment Canada and the Forum on a geographically specified basis, to allow appropriate allocation for modeling and other purposes.

*Harbor Vessels*

The geographical scope for harbor vessels is the same as for OGVs. Emissions from vessels such as ferries that routinely cross the international border have been estimated for the U.S. portions of their routes. Emissions from U.S.-based harbor vessels that traverse the Strait of Juan de Fuca are estimated regardless of whether the vessels travel on the U.S. side or the Canadian side of the international border, using the same approach as for OGVs.

*Cargo Handling Equipment*

The geographical scope for cargo handling equipment is the ports and associated terminals or other facilities on which they operate (for example, near-dock railroad switching yards).

*Locomotives*

Emissions from switching and line-haul locomotives were estimated for on-dock rail yards, off-dock rail yards, intermodal yards, the rail lines linking these facilities, and off-terminal port-related locomotive emissions to the edge of the study area.

*Heavy-duty Vehicles*
Emissions from heavy-duty on-road trucks hauling cargo were estimated for queuing at terminal entry gates, traveling and idling within the terminals, queuing at the terminal exit gates, and on-road port-related activity from point of pick-up in the case of port-bound cargo and to the first drop or the edge of the study area in the case of cargo outbound from a port.

Idling emissions from buses that transport cruise line customers between airports and/or hotels and the cruise terminals were also included in the HDV source category. Emissions were estimated for idling at terminal drop-offs or pick-ups, consistent with the 2005 PSEI. Trips to and from the airport and/or hotels were not included in the emission estimates.

*Fleet Vehicles*
Fleet vehicles consist primarily of light-duty vehicles and some on-terminal heavy-duty vehicles not associated with direct cargo movement. There are three categories of fleet vehicles: terminal fleet vehicles, cruise terminal vehicles, and import/export vehicles. There were approximately 805 terminal fleet vehicles were used on cargo terminals in 2011. Emissions from personal vehicles that are owned by employees and are not used in terminal operations were not included in the inventory.

## 1.3 Background Air Quality Conditions and Regulations

This section presents changes to air quality conditions and regulations since the development of the 2005 Puget Sound Maritime Air Emissions Inventory. The air quality changes include designation of $PM_{2.5}$ nonattainment status for Tacoma, located in Pierce County. There have also been changes to federal and state regulations such as EPA cleaner fuel regulations and Washington State updates to general regulation for air pollution sources and reporting of GHG emissions.

### *1.3.1 Air Quality Conditions*

Areas that have experienced persistent air quality problems are designated by the EPA as nonattainment areas. The federal Clean Air Act requires additional air pollution controls in these areas. Each nonattainment area is declared for a specific pollutant; however, nonattainment areas for different pollutants may overlap each other or share common boundaries. At the time of this 2011 study, the only nonattainment area is Tacoma, Pierce County for $PM_{2.5}$.

In 2009, Tacoma, Pierce County was designated by EPA as a $PM_{2.5}$ nonattainment area. The nonattainment designation was a result of a stronger air pollution limit set by the EPA in 2006 and spikes in fine particle pollution levels during the winter that violate the limit. The fine particle pollution in Tacoma, Pierce County is due to smoke from fireplaces, wood stoves, industrial sources, and exhaust from motor vehicles such as cars, trucks, buses, and ships. The Department of Ecology and PSCAA have worked with a community-based task force to evaluate possible solutions to improving air quality and prepared a report with the air task force findings[6].

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[6] PSCAA, *Tacoma-Pierce County Clean Air Task Force Report and Recommendations to Puget Sound Clean Air Agency*, December 2011.

Finally, on April 30, 2012, EPA finalized a rule that redirects the implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for ozone including the 0.075 ppb 8-hour ozone standards requirement in 2032[7]. The more stringent ozone standard may result in the region being designated as nonattainment for ozone.

### *1.3.2 Washington State Regulations*

On March 1, 2011, the Department of Ecology adopted the final rule to Chapter 173-400 WAC – General regulation for air pollution sources. The amendments brought the rule into compliance with the EPA regulations including standards for excess emissions; major stationary sources located in nonattainment areas, and updated the date of federal regulations adopted by reference. The rule set a new exemption level for GHG and $PM_{2.5}$ emissions in addition to housekeeping updates, corrections and changes.

On December 1, 2010, the Department of Ecology adopted Chapter 173-441 WAC-Reporting of Emissions of Greenhouse Gases. The rule became effective January 1, 2011 and the reporting requirement began January 1, 2012. The rule adopts mandatory GHG reporting for facilities that emit at least 10,000 metric tons of GHG per year in Washington and for suppliers of liquid motor vehicle fuel that supply products equivalent to at least 10,000 metric tons of $CO_2$ per year in Washington.

### *1.3.3 Federal Regulations*

EPA regulations governing the sulfur contents in the highway diesel fuel, fuel used in non-road equipment and locomotive, and marine diesel fuel play a significant impact in the 2011 PSEI emissions. Since 2005, the following changes have occurred:

- A 15 parts per million (ppm) sulfur specification, known as ultra-low sulfur diesel (ULSD), was phased in for highway diesel fuel from 2006-2010.
- Low sulfur (500 ppm) and ULSD fuel are being phased in for non-road, locomotive, and marine engines from 2007-2014.

EPA also finalized other regulations which are summarized below.

### *EPA's Final Regulation – Control of Emissions of Air Pollution from Locomotive and Marine Compression Ignited Engines Less than 30 Liters Per Cylinder*

On March 14, 2008, the EPA finalized a three part program designed to dramatically reduce emissions from marine diesel engines with displacement (i.e. swept volume) less than 30 liters per cylinder. EPA lists the following categories for compression ignition diesel marine engines based on engine displacement per cylinder:

- Category 1: less than 5 liters
- Category 2: equal to 5, less than 30 liters

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[7] EPA, *http://www.epa.gov/glo/actions.html.*

The EPA regulation impacts some marine propulsion engines and the marine auxiliary engines used on vessels. When fully implemented, this rule will cut PM emissions from these engines by as much as 90% and $NO_x$ emissions by as much as 80%.

The regulations introduced two tiers of standards – Tier 3 and Tier 4 – which apply to both new and remanufactured marine diesel engines, as follows:

- *Newly-built engines:* Tier 3 standards apply to engines used in commercial, recreational and auxiliary power applications (including those below 37 kW that were previously covered by non-road engine standards). The emission standards for newly-built engines are phasing in, beginning in 2009. Tier 4 standards apply to engines above 600 kW (800 hp) on commercial vessels based on the application of high-efficiency catalytic after-treatment technology, phasing in beginning in 2014.
- *Remanufactured engines:* The standards apply to commercial marine diesel engines above 600 kW when these engines are remanufactured and will take effect as soon as certified systems become available.

*EPA's Emission Standards for Marine Diesel Engines Above 30 Liters per Cylinder (Category 3 Engines)*
EPA is pursuing two parallel, related actions for establishing emission standards for Category 3 marine diesel engines: (1) EPA is a member of the United States delegation that participated in negotiations at the International Maritime Organization (IMO) with regard to amendments to Annex VI that were adopted in October 2008,including additional $NO_x$ limits for new engines, additional sulfur content limits for marine fuel, methods to reduce PM emissions, $NO_x$ and PM limits for existing engines, and volatile organic compounds (VOCs) limits for tankers; (2) In January 2003, EPA adopted Tier 1 standards for Category 3 marine engines, which went into effect in 2004, establishing $NO_x$ standards based upon internationally negotiated emissions rates and readily available emissions-control technology. In December 2009, EPA finalized emission standards for Category 3 marine diesel engines installed on U.S. flagged vessels as well as marine fuel sulfur limits which are equivalent to the amendments adapted by the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI in 2008. The final regulation establishes stricter standards for $NO_x$, in addition to standards for hydrocarbons and carbon monoxide.

The final near-term Tier 2 $NO_x$ standards for newly built engines applied beginning in 2011 and required more efficient use of current engine technologies, including engine timing, engine cooling, and advanced computer controls. The Tier 2 standards will result in a 15% to 25% $NO_x$ reduction below the current Tier 1 levels. The final long-term Tier 3 standards for newly built engines will apply beginning in 2016 in Emission Control Areas and will require the use of high efficiency emission control technology such as selective catalytic reduction to achieve $NO_x$ reductions 80% below the current levels. These standards are part of EPA's coordinated strategy for addressing emissions from ocean-going vessels. This strategy also includes implementation of recent amendments to MARPOL Annex VI and designation of U.S. coasts as an Emission Control Area.

### *EPA's Emission Standards for Harbor Vessel Engines*

On March 14, 2008, EPA finalized the latest regulation establishing new emission standards for new Category 1 and Category 2 diesel engines rated over 50 horsepower (hp) used for propulsion in most harbor vessels. The new Tier 3 engine standards began phasing in starting in 2009. The more stringent Tier 4 engine standards (based on the application of high-efficiency catalytic after-treatment technologies) will phase in beginning in 2014 and will apply only to commercial marine diesel engines greater than 800 hp. The regulation also includes requirements for remanufacturing commercial marine diesel engines greater than 800 hp.

### *Emission Standards for Non-road Diesel Powered Equipment*

The EPA's Tier 1, Tier 2, Tier 3, and Tier 4 (interim Tier 4 and final) emission standards for non-road diesel engines require compliance with progressively more stringent standards for hydrocarbon, CO, DPM, and $NO_x$. Tier 4 standards for non-road diesel powered equipment complement the 2007+ on-road heavy-duty engine standards which require 90% reductions in DPM and $NO_x$ compared to current levels. In order to meet these standards, engine manufacturers will produce new engines with advanced emissions control technologies similar to those already in place for on-road heavy-duty diesel vehicles. These standards for new engines are being phased in starting with smaller engines in 2008 until all but the very largest diesel engines meet $NO_x$ and PM standards in 2015. Currently, the interim Tier 4 standards include a 90% reduction in PM and a 60% reduction in $NO_x$.

### *EPA's Emission Standards for New and Remanufactured Locomotives and Locomotive Engines- Latest Regulation Finalized on 14 March 2008*[8]

In March 1998, EPA adopted Tier 0 (1973-2001), Tier 1 (2002-2004), and Tier 2 (2005+) emission standards applicable to newly manufactured and remanufactured railroad locomotives and locomotive engines. These standards require compliance with progressively more stringent standards for emissions of hydrocarbon, CO, $NO_x$, and DPM. Although the most stringent standard, Tier 2, results in over 40% reduction in $NO_x$ and 60% reduction in DPM compared to Tier 0, the full potential of these reductions will not be realized in the next five years because of the long life of diesel locomotive engines.

In March 2008, EPA finalized the regulation, "Control of Emissions of Air Pollution from Locomotive and Marine Compression Ignited Engines Less than 30 Liters per Cylinder." When fully implemented, this rule will cut PM emissions from these engines by as much as 90% and $NO_x$ emissions by as much as 80%.

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[8] EPA,*http://www.epa.gov/otaq/regs/nonroad/420f08004.htm.*

The regulation introduces two tiers of standards – Tier 3 and Tier 4 – which apply to new locomotives as well as standards for remanufactured locomotives, as follows:

- *Newly-Manufactured Locomotives:* The new Tier 3 emission standards will achieve 50% reduction in PM beyond the current Tier 2 standards and will become effective in 2012. The longer term Tier 4 emission standards which are based on the application of high efficiency catalytic after-treatment technologies for $NO_x$ and PM will become effective in 2015 and will achieve over 80% reduction in PM and $NO_x$ compared with the current Tier 2 standards.
- *Remanufactured Locomotives:* The regulation also establishes emission standards for remanufactured Tier 0, 1, and 2 locomotives which would achieve approximately 50% reduction in PM and up to 20% reduction in $NO_x$.

*Emission Standards for New 2007+ On-road Heavy-Duty Vehicles*
This regulation requires HDV engine manufacturers to meet a 0.01 gram per brake horsepower-hour (g/bhp-hr) PM standard starting in 2007, which is 90% lower than the 2004 PM standard of 0.1 g/bhp-hr. The regulation requires a phase-in of a 0.2 g/bhp-hr $NO_x$ standard between 2007 and 2010. Since 2010, all engines have been required to meet the 0.2 g/bhp-hr $NO_x$ standard, which represents a greater than 90% reduction compared to the 2004 $NO_x$ standard of 2.4 g/bhp-hr. It is assumed that between 2007 and 2010, on average, manufacturers produced HDV engines meeting a PM standard of 0.01 g/bhp-hr and a $NO_x$ standard of 1.2 g/bhp-hr. The latter is referred to as the 2007 interim standard.

### *1.3.4 International Regulations*
International regulations relating to ocean-going vessels come out of the IMO under the MARPOL convention, as discussed below.

*MARPOL Annex VI*
The worldwide fuel sulfur limitations under MARPOL Annex VI was lowered to 3.5% beginning in 2012 and 0.5% as early as 2020, but no later than 2025 (subject to a fuel availability study to be conducted in 2018). New NOx engine emission standards require vessels constructed after 2011 to meet Tier 2 levels (14.4 gm-NOx/kW-hr); a reduction of 20% from current levels. Vessels constructed after 2016 are required to meet Tier 3 levels (3.4 gram-NOx/kilowatt-hour [kW-hr]); a reduction of 80% below current Tier 1 standards.

*North American Emission Control Area*
The North American Emission Control Area (ECA) extends 200nm of shore of the United States and Canada. ECA Phase I began August 1, 2012 requiring 1.0% sulfur fuel oil for all vessels operating within the ECA. This will reduce sulfur oxide emissions by over 60% and particulate by over 75%.

ECA Phase II requirements begin on January 1, 2015. Phase 2 requires 0.1 sulfur fuel oil for all vessels operating within the ECA. This will reduce sulfur oxide (SOx) emissions by 99% and particulate by 75%.

MARPOL Annex VI also requires that vessels constructed after 2016 and operating within the ECA meet Tier 3 NOx levels; an 80%reduction in oxides of nitrogen (NOx) from current Tier 1 levels.

## 1.4 Emission Reduction Strategies

Emission reduction strategies identified during the inventory process are listed below for participating ports and maritime partners.

### *1.4.1 BNSF Railway Company (BNSF)*

BNSF has implemented a number of strategies system-wide to reduce emissions from rail operations. BNSF is committed to improving air quality across its system. The railway has been aggressively acquiring new locomotives and retiring older and less efficient ones. Between 2005 and the end of 2011, BNSF acquired 2,071 Tier II cleaner- burning and fuel-efficient locomotives.

*BNSF is also reducing emissions by:*

- Installing idle control mechanisms on switch engines, including auxiliary power units, diesel-driven heating system, and automatic start-stop technology on locomotives. Approximately 90% of the fleet has these systems.
- Increasing the number of cleaner-burning locomotives.
- Reducing train resistance (drag) through low torque bearings.
- Adjusting train speeds.
- Implementing the wheel/rail lubrication (especially on curved track and turnouts) to reduce friction and aerodynamic drag – rail lubrication extends rail and wheel life and increases fuel efficiency
- Implementing an operator incentive program to reward operators who save locomotive fuel
- Performing routine stack opacity tests on locomotives to ensure engines are in good operating condition.
- Monitoring the performance of locomotive engineers and rewards them for good fuel savings (and emissions) operations
- Working with several manufacturers on systems to aid in optimizing train operations.

*BNSF is also reducing emissions at intermodal yards by:*

- Being the first U.S. rail carrier to install electrically-powered wide-span cranes. These cranes produce zero emissions on site while generating power each time they lower a load. Additionally, the wide span design of these new cranes also reduces the numbers of diesel trucks (hostlers) for shuttling containers within the intermodal facility, reducing emissions and improving fuel efficiency. This system is currently operating at the Seattle International Gateway (SIG) Intermodal Facility.
- Installing semi-automated gate system for trucks as they enter and exit SIG Intermodal Facility, thereby reducing truck idling time and emissions by 50%.

### *1.4.2 Port of Everett*

The Port of Everett has implemented several emission reduction initiatives.

- Operated more than 20% of its cargo handling equipment (14 of 62 pieces) on non-diesel fuels, including six electric forklifts, five propane forklifts, and three gasoline forklifts.
- Purchased and took delivery, in 2006, of an electric vehicle for use by the Harbor Attendant in marina operations, replacing a fossil-fuel vehicle. The Global Electric vehicle is ideally suited for slow-speed, stop-and-go type travel.
- Obtained a local government heavy-duty diesel retrofit grant in 2006 from the Department of Ecology to retrofit a fleet vehicle with emission control technology. The Port retrofitted its boom truck with this grant.
- Specified the use of an electric rail mounted gantry crane for cargo at the Rail/Barge Transfer facility, instead of a diesel-powered crane.
- Obtained two electric gantry cranes in 2003, which are operating at Pacific Terminal.
- Developed an Environmental Management System (EMS) in 2008 through an American Association of Port Authorities-sponsored training program. The EMS program serves the purpose of integrating and managing existing environmental programs, including air emissions.

### *1.4.3 Port of Olympia*

The Port of Olympia has included the following Seaport (and some Port-wide) air quality elements:

- Used ultra-low sulfur diesel fuel in Port machinery.
- Received grant money in 2007 from the Olympic Region Clean Air Agency (ORCAA) to retrofit a log loader with a catalytic muffler.
- Purchased two electric vehicles and one hybrid vehicle.
- Installed an electric vehicle charging station adjacent to the seaport.
- Implemented a commute trip reduction policy offering alternative work schedules; partial reimbursement on monthly public transit tickets and in accordance with the Bicycle Commuter Benefits Act, providing monetary benefit to employees who bike to work.
- Encourage non-vehicle transportation by purchasing one men’s and one women’s bicycle for the use of interoffice commuting and errands. Bicycle racks are available around the public facilities.
- Built a 1.2 mile pedestrian path (East Bay Trail) adjacent to the seaport that connects restaurants, the Swantown Marina, Swantown Boatworks and other facilities.

### *1.4.4 Port of Seattle*

The Port of Seattle has implemented a variety of projects and programs, and is participating in several collaborative projects, to reduce emissions from maritime sources.

*Freight Mobility Emission Reduction Strategies*

The Port of Seattle has implemented a number of emission reduction strategies related to freight mobility:

- Completed radio frequency identification (RFID) pilot project with Stevedoring Services of America to equip 1,200-1,500 trucks with RFID tags and Terminal 18 with RFID readers, which can be used to reduce gate wait times and improve terminal efficiency.
- Terminal operators have initiated cargo handling equipment fleet modernization programs and are encouraged to purchase equipment with 2007 on-road standard engines.
- Coordinated draw bridge openings with truckers so they can route accordingly to minimize idling.
- Piloted computer tracking systems at cargo terminals to quickly locate containers and thus reduce truck wait times.
- Provided electric plug-ins instead of diesel units for refrigerated containers on the docks.
- Purchased bigger cranes to load and unload more efficiently, so ships are at the dock for less time.
- Partnered in a regional anti-idling effort.

*Clean Trucks Program*

- Adopted requirements for drayage trucks entering port terminals to have 1994 or newer engines, as of January 1, 2011. All trucks entering port terminals must be enrolled in the Port's Drayage Truck Registry, which documents these newer, cleaner trucks that service Seattle container terminals. A model year 1994 truck is 2.5 to 6 times cleaner than older trucks. Through a buy-back, scrap and replacement effort, and other fleet turnover, all pre-1994 engine trucks retired from the fleet as of January 2011.
- Begun planning for installation of RFID at all terminal in-gates, as well as a conversion from the clean truck sticker program to use of RFID tags. The tags will provide a way to gather more accurate information on trucks accessing the port terminal. The RFID program will be rolled out in 2012.
- Implemented Clean Truck benchmarks requiring 80% of all tucks entering Port of Seattle facilities to meet emission standards for engine-year 2007 by the end of 2015.
- Launched a truck scrappage and replacement program between November of 2007 and July 2011 resulting in the scrappage of 280 pre-1994 trucks.

*Cargo Handling Equipment Diesel Emissions Reduction Project*

- Received a grant from the Washington State Department of Ecology (WDOE) to initiate a pilot program to install idle reduction equipment on cargo handling equipment.
- Implemented retrofits (retrofit, replace, repower, repair, refuel) for diesel-powered vehicles and equipment.
- Purchased 169 diesel oxidation catalysts (DOCs) to retrofit cargo handling equipment. This represents all eligible cargo handling equipment that is operated on the container terminals and reduced DPM emissions from this equipment by 25%.

- Encouraged voluntary use of cleaner and alternative fuels.
- Implemented education and outreach programs to equipment owners/operators on strategies for reducing emissions.

*Ocean-Going Vessel Emission Reduction Efforts*

- Through its At-Berth Clean Fuels program, the Port of Seattle, in collaboration with the PSCAA, has provided incentives to shipping and cruise lines that burn reduced sulfur distillate fuel while at berth. Since 2009, this program has eliminated 626 metric tons of sulfur emissions. Out of 791 "frequent callers" vessel calls in 2011, 73% used cleaner fuels or shore power while at berth.
- The Port initiated the Green Gateway Partners' Awards which are given to selected cruise and container lines. In order to be eligible for an award, applicants must either participate in the ABC Fuel program or plug into shore power, and demonstrate environmental stewardship initiatives above and beyond existing regulations.

*Cruise Ships Emissions Reduction Efforts*

- *Cruise Vessel Shore Power Project* - Most Princess Cruises and Holland America Line cruise vessels home ported in Seattle now turn off their engines and "plug in" at berth effectively reducing emissions to zero while at the dock. If not using shore power, cruise ships are required through Port tariffs to burn a maximum 1.5% sulfur fuel while at berth. Several cruise lines continue to participate in the ABC Fuels program and burn fuel with 0.5% or lower sulfur content at berth.
- *Cruise Vessel Seawater Scrubber Study* - Holland America Line and Krystallon completed their sea water scrubber technology demonstration project after more than five years. The scrubber was installed on one of the five engines aboard the *Zaandam* in April 2007 to reduce sulfur and particulate matter from engine exhaust. The *Zaandam* was an important test-bed for sea water scrubbing technology and this project demonstrated that sea water scrubbing is a viable technology for removing sulfur dioxide and particulate matter from marine diesel engine exhaust. After project completion, the scrubber was decommissioned because its limited application could not sufficiently provide for ECA compliance.
- *North West & Canada Cruise Ship Association Use of Low Sulfur Fuel* - The members of the North West & Canada Cruise Association (NWCCA) have committed to procure and use low sulfur fuel while at berth in Seattle and at sea in Washington, British Columbia and in Alaska waters. In support of this study, NWCCA has received reports on fuel purchases from all the lines operating out of Seattle and reviewed those reports. NWCCA will continue to procure and burn low sulfur fuel while operating in the Pacific Northwest.

*Port Administration*

- Received a grant from the WDOE to retrofit all eligible heavy-duty diesel equipment at Seaport Maintenance with diesel oxidation catalysts.
- Installed Stage II Vapor Recovery Equipment at the Seaport Maintenance refueling station.
- Made biodiesel available at the Shilshole Bay Marina Fuel Dock, and boaters are encouraged by the Port to use it.

- Encouraged cleaner vehicle purchases. A hybrid electric vehicle is used for high vehicle-miles-traveled mail runs between Port facilities, and the Seaport Environmental Program staff replaced fleet minivans with hybrid vehicles.
- Implemented an award-winning employee trip reduction program.
- Built bike and pedestrian paths across and adjacent to terminals.
- Created programs to educate Port employees, tenants, and customers regarding actions they can take to protect air quality.

### *1.4.5 Port of Tacoma*

The Port of Tacoma has been actively pursuing projects to make immediate reductions in emissions from maritime-related sources. These include:

- The Port of Tacoma has been using ULSD fuel in port-operated equipment since 2005. This practice preceded EPA mandated use of ULSD fuel in non-road equipment by five years reducing diesel particulate emissions by 50%. Since 2008 the Port has been using biodiesel and is currently using 5% Biodiesel blend in port-operated diesel equipment.
- Since 2004, the Port of Tacoma's ocean carrier customers have voluntarily switched to the use of low sulfur distillate in the auxiliary engines for ocean going vessels while at berth. Between 2008 and 2011, 35% to 50% of frequently calling vessels routinely used low sulfur fuel reducing their diesel particulate emission by approximately 60%.
- In 2011, the Port installed EPA-verified diesel particulate filters (DPFs) on 13 port-owned and operated straddle carriers. The Port received a $490,000 WDOE's Clean Diesel Grant to fund the retrofits. The diesel particulate filters reduce emissions in excess of 85%.
- Prior to 2011, six Port of Tacoma heavy-duty forklifts were powered by old two cycle Detroit diesel engines. With assistance from $145,000 WDOE's Clean Diesel Grant, they were repowered with new low emission EPA Tier 3 diesel engines reducing particulate emission by nearly 1 ton per year.
- Between 2007 and 2011, Port of Tacoma's terminal operator tenants received over $525,000 in EPA and Ecology grant findings to install EPA-verified diesel particulate filters on 22 heavy-duty diesel cargo handling equipment reducing emissions in excess of 85% and 65 diesel oxidation catalysts reducing emissions by 25%.
- Since 2005 Port of Tacoma terminal operator tenants installed EPA-verified diesel oxidation catalysts on over 100 heavy-duty diesel cargo handling equipment reducing diesel particulate emissions in excess of 25%.
- The Port of Tacoma Clean Drayage Truck Program was established in 2008 to ban old diesel drayage trucks from serving marine terminals at the Port. In 2010, pre-1994 drayage trucks were banned from the port terminals reducing diesel particulate emissions between 1-2 tons per year. The port is currently working with the trucking community to ban pre-2007 trucks by 2017. The City of Tacoma, in collaboration with the Port of Tacoma, the Clean Air Agency, and WDOE, launched a Truck Scrappage Program in 2011. The goal of the program is to replace 135 regional trucks with newer low emission engine trucks. This program will work in synergy with the Port of Tacoma Clean Truck Program to further reduce drayage truck emissions at the Port.

- The Port and WDOE have collaborated to develop and implement a voluntary idle reduction program that reduces diesel engine idle time for vehicles and equipment operating on Port properties.

*Totem Ocean Trailer Express Terminal*

- In 2010, the Port of Tacoma partnered with Totem Ocean Trailer Express (TOTE) to provide ship-side retrofits and install a shorepower infrastructure at the TOTE Terminal. The shorepower project received $1.4 million EPA grant and leveraged funds through in-kind contributions from the Port of Tacoma and direct matching fund from TOTE. TOTE contributed $283,000 in matching funds in addition to $891,000 that has already been expended for the purchase of ship-side equipment.
- TOTE is currently conducting a diesel particulate filter retrofit trial on one diesel yard truck. Demonstration of a successful Level 3 retrofit on their equipment is may lead to further installations of diesel particulate filters on the fleet of over 30 yard trucks.

*Evergreen Marine at Pierce County Terminal (PCT)*

- The Evergreen Marine, the leaseholder at Pierce County Terminal installed diesel particulate filters on two side picks reducing diesel particulate emissions from these units by over 85%.
- Since 2004, all Evergreen Marine vessels have switched to using lower sulfur distillate in their vessel's auxiliary engines while at berth at the Pierce County Terminal.

*APM Terminal*

- APM Terminal retired the majority of their older, non-tiered engine cargo handling equipment and replaced new yard trucks with cleaner on-road engines.
- APM Terminal, with assistance from a PSCAA grant and a WDOE Clean Diesel Grant, retrofitted 36 pieces of heavy-duty cargo handling equipment with diesel oxidation catalysts, reducing diesel particulate emissions by 25%.

*Husky Terminal*

- Since 2006, all Kawasaki Kisen Kaisha (K-Line) vessels have switched to using lower sulfur distillate in their vessel's auxiliary engines while at berth at the Husky Terminal.
- Husky Terminal & Stevedoring has installed diesel particulate filters on seven top picks and one yard truck reducing diesel particulate emissions by over 85%.

*Washington United Terminal*

- Washington United Terminal (WUT) retrofitted 4 reach stackers, 2 top picks and 10 yard trucks with diesel particulate filters. The terminal also replaced an additional 6 yard trucks and 1 top pick with low emission EPA Tier 4 units.
- WUT is conducting an idle reduction equipment trial expected to significantly reduce diesel equipment idling and emissions from equipment cold starts.

*Horizon Lines*

- Horizon Lines replaced 30 model year 2000 drayage trucks with fleet of 30 new Tier 4 Class 8 trucks reducing diesel particulate emissions by over 85%.

*Pacific Rail Service*

- PRS with assistance from a Department of Ecology Grant retrofitted 11 pieces of cargo handling equipment with diesel oxidation catalysts reducing diesel particulate emissions by 25%.

*Northwest Container Services*

- Northwest Containers has retrofitted two reach stackers with diesel particulate filters reducing diesel particulate emissions by over 85%.

*TEMCO Grain Terminal*

- In 2011 three switching locomotives at the TEMCO were equipped with Automatic Engine Start Stop devices to limit excess idling. In addition to reducing GHG emissions the project eliminated approximately 3.4 tons per year of particulate emissions.

### *1.4.6 Tacoma Public Utilities – Locomotives*

- Since July 2006, ULSD has been used in the locomotives for switching operations at the Port of Tacoma. In the port sector, use of regular low-sulfur fuel containing up to 500 ppm sulfur in switching operation is standard; the use of ULSD eliminates up to 97% of sulfur oxides emission from the yard switching operations.
- Tacoma Rail partnered with PSCAA in 2007 to install idle reduction equipment on their locomotives. By 2011 Tacoma Rail reduced its fleet from 18 to 14 locomotives and installed idle reduction equipment on all but two locomotives. Tacoma Rail has saved more than 440,000 gallons of diesel fuel and reduced greenhouse gas emissions by 209 tons since 2007.
- Tacoma Rail partnered with EPA and PSCAA to retire three circa 1950's locomotives and replace them with remanufactured locomotives equipped with EPA Tier 2and Tier 3 compliant diesel engines. The repower project reduces NOx by 30 tons per year, CO by 25 tons per year, PM by 2 tons per year, and hydrocarbons (HC) by close to 7 tons per year.

### *1.4.7 Union Pacific*

- Union Pacific limits train speeds and shut down idle locomotives to save fuel. The locomotive shutdowns can save 15-24 gallons of fuel per locomotive, per day.
- All new Union Pacific locomotives have automatic stop-start equipment that eliminates unnecessary idling, and the company is retrofitting older locomotives with this technology as well. More than 70% of Union Pacific's locomotive fleet is now outfitted with automatic stop-start equipment.
- Union Pacific is performing additional aerodynamic tests and evaluations of the Aero Wedge, an aerodynamic structure placed on the top of the first rail car of a double-stack container train. Preliminary results from wind tunnel, computer and test track analyses are promising for fuel savings and corresponding emissions reductions.

- Union Pacific created and pioneered genset locomotive technology and has 165 genset locomotives in its system-wide fleet at present.

### *1.4.8 Washington State Ferries*

Since 2002, Washington State Ferries (WSF) has worked to reduce maritime air emissions through both internal programs and collaborative projects to upgrade engine equipment, convert to clean fuels and implement operational changes.

#### *Engine Equipment Upgrades*

In 2002, WSF initiated a program of engine equipment upgrades throughout the fleet to meet MARPOL standards. This effort has included upgrading fuel injectors, upgrading or replacing main engines and replacing ship-service generators. Upgrades completed include fuel injectors for 44 Electro-Motive-Diesel (EMD) engines, 12 General Electric engine replacements and 30 ship-service generator replacements.

#### *Clean Fuels*

In 2003, WSF began an ongoing process of evaluating, and adopting when practicable, the use of cleaner fuels in the ferry fleet.

- 2003 - Conducted preliminary operational and emissions tests of low sulfur diesel, ULSD and biodiesel.
- 2004 - Converted entire ferry fleet to low sulfur diesel.
- 2004 and 2005 - Undertook pilot test of B20 biodiesel (in partnership with PSCAA and Seattle City Light).
- 2004 and 2005 - Undertook pilot test of ULSD (in partnership with the PSCAA and the EPA).
- 2006 - Partnered with PSCAA and Seattle City Light on a biodiesel research project and second biodiesel pilot test.
- 2006 - Started conversion of the ferry fleet to ULSD.

#### *Operational Fuel Conservation Measures*

The majority (89%) of the ferry fleet power down main and auxiliary engines, and connect to shore-power during tie-up at night.

A WSF working group, focused on fuel conservation efforts fleet-wide, is exploring the following initiatives:

- Route profiling, identifying optimum speeds to meet schedules and save fuel.
- Positive restraint system while vessel is in dock alleviating need to run engines while loading/unloading.
- Reducing to two engine operation on certain vessel classes.
- Reducing on-board fuel storage to minimize weight load.
- Installation of heat recovery systems that would alleviate need for heating boilers.

# SECTION 2 SUMMARY RESULTS

This section presents the summary results for the 2011 Puget Sound Maritime Air Emissions Inventory. Detailed information and data on each source category, including the methodology for developing the emission estimates presented here, are provided in subsequent sections. Section 2.1 presents the results, Section 2.2 provides regional comparisons of the maritime-related emissions presented in this report to the agency regional emissions, Section 2.3 presents the emissions associated with selected entities, such as ports and petroleum facilities and comparisons of maritime and non-maritime related emissions for HDV and locomotives for the PSCAA Region, and Section 2.4 presents concluding remarks.

## 2.1 Results

This section presents the findings by source category (2.1.1) and by regional clean air agency and county (2.1.2).

### *2.1.1 U.S. Maritime-Related Emissions by Source Category*

The U.S. maritime-related source categories include all activities associated with U.S. related maritime operations and include the following source categories:

- Ocean-going vessels (including hotelling, maneuvering, and transiting modes)
- Harbor vessels (including commercial harbor vessels, government vessels, and recreational vessels)
- Cargo handling equipment
- Locomotives (including switch and line-haul operations)
- Heavy-duty vehicles (including on-terminal and first drop activities within the inventory domain)
- Fleet vehicles (including terminal fleet vehicles, cruise terminal vehicles, and import/export vehicles)

Table 2.1 and Figures 2.1 and 2.2 present the 2011 total (all sources inventoried) U.S. maritime-related airshed emissions by source category. Figures 2.3 through 2.10 illustrate the contribution of the various source categories to the maritime-related emissions for $NO_x$, VOC, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$, DPM and greenhouse gases, respectively. Greenhouse gases are presented in $CO_2e$ for carbon dioxide, nitrous oxide, and methane, combined.

**Table 2.1: 2011 Total Airshed Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, transit | 9,424 | 363 | 840 | 7,333 | 616 | 493 | 593 | 452,613 |
| OGV, hotelling & maneuvering | 2,234 | 79 | 196 | 4,376 | 264 | 211 | 118 | 285,028 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5 | 292 | 272 | 278 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 11 | 45 | 41 | 45 | 75,289 |
| Cargo handling equipment | 594 | 37 | 297 | 1 | 33 | 32 | 33 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3 | 55 | 44 | 55 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0 | 0 | 0 | 0 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,729** | **1,304** | **1,092** | **1,122** | **1,736,226** |

**Figure 2.1: 2011 Total Airshed Emissions, tpy**

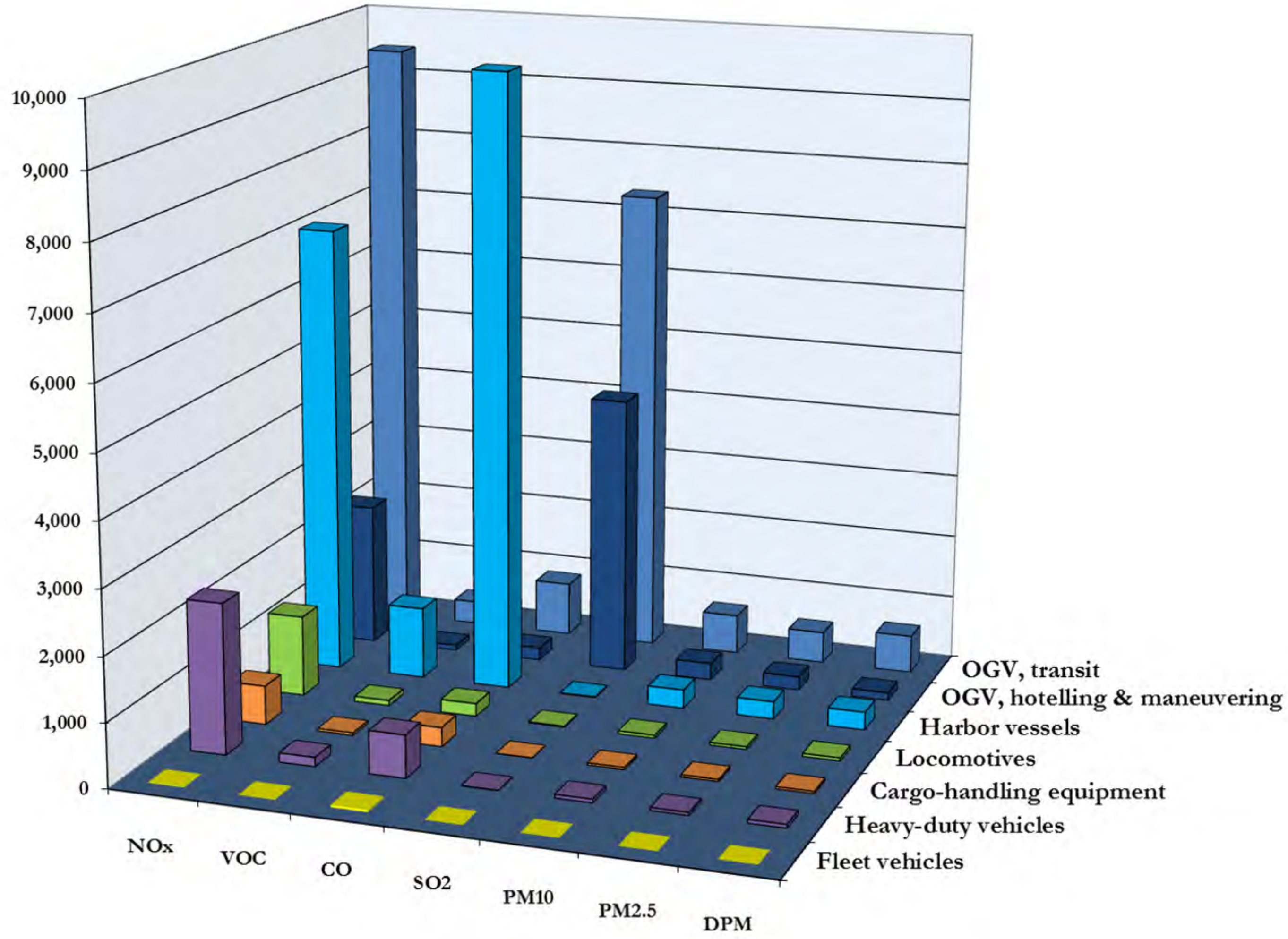
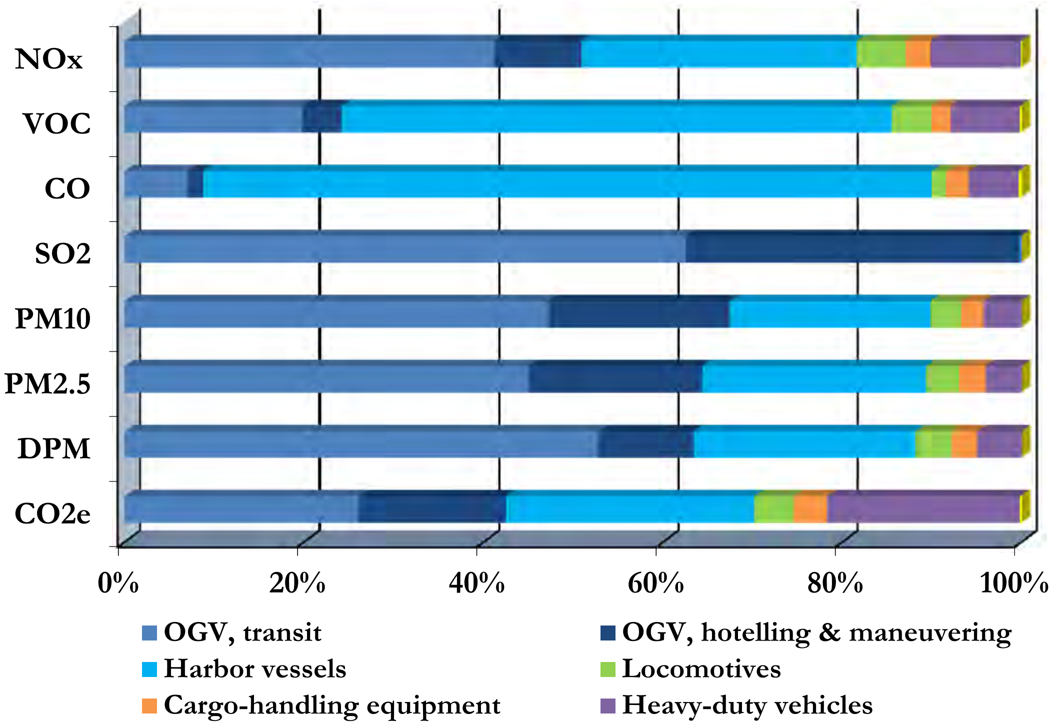


Table 2.2: Contirbution of 2011 Total Airshed Emissions by Source Category

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling & maneuvering | 10% | 4% | 2% | 37% | 20% | 19% | 11% | 16% |
| OGV, transit | 41% | 20% | 7% | 62% | 47% | 45% | 53% | 26% |
| Harbor vessels | 31% | 61% | 81% | 0% | 22% | 25% | 25% | 28% |
| Locomotives | 5% | 4% | 2% | 0% | 3% | 4% | 4% | 4% |
| Cargo handling equipment | <3% | <2% | <2% | 0% | <2% | <3% | <3% | <4% |
| Heavy-duty vehicles | 10% | 8% | 6% | 0% | 4% | 4% | 5% | 22% |
| Fleet vehicles | <1% | <1% | <1% | <1% | <1% | <1% | <1% | <1% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

Figure 2.2: Contribution of 2011 Total Airshed Emissions by Source Category



In the pie charts below, Figures 2.3 through 2.10, the fleet vehicles percentage is so small that it is hardly visible. Due to space constraints, it is not labeled in the pie charts.

**Figure 2.3: 2011 Total Airshed $NO_x$ Emissions by Source Category**

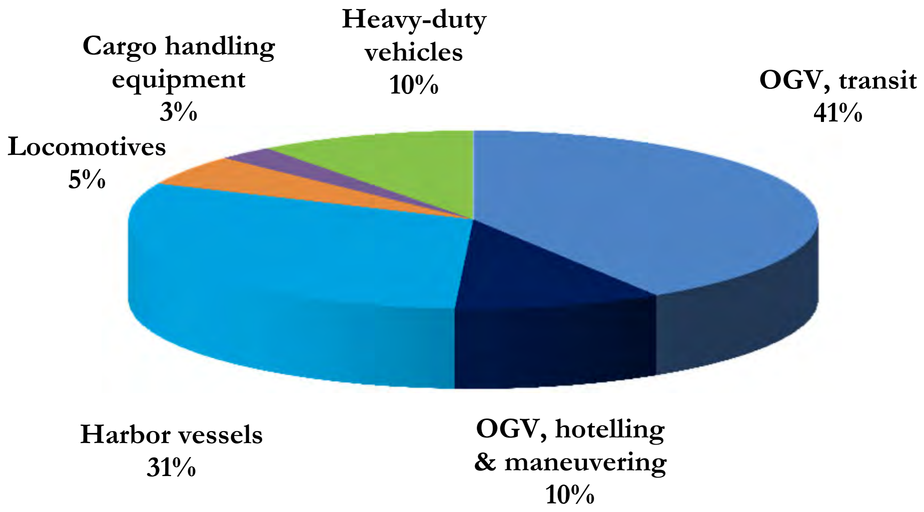


**Figure 2.4: 2011 Total Airshed VOC Emissions by Source Category**

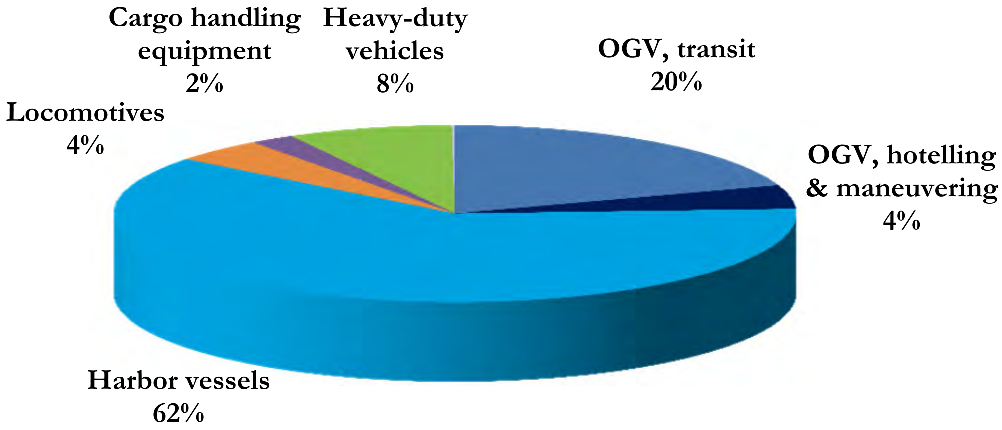


Figure 2.5: 2011 Total Airshed CO Emissions by Source Category

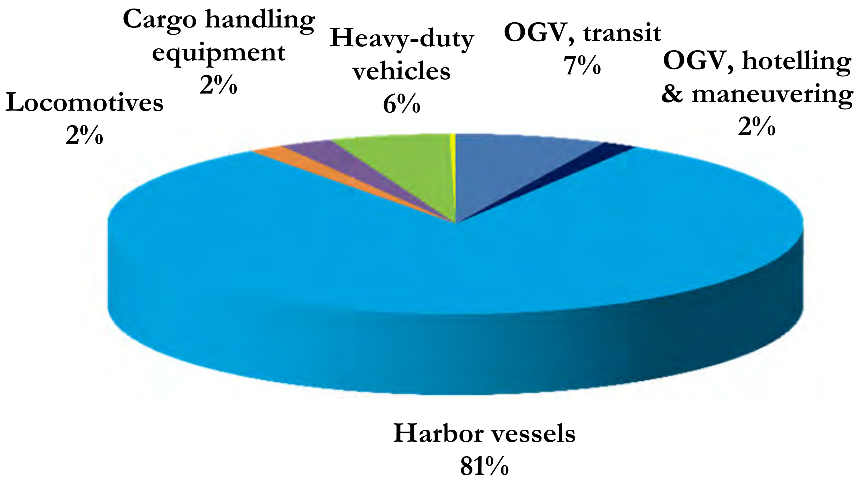


Figure 2.6: 2011 Total Airshed $SO_2$ Emissions by Source Category

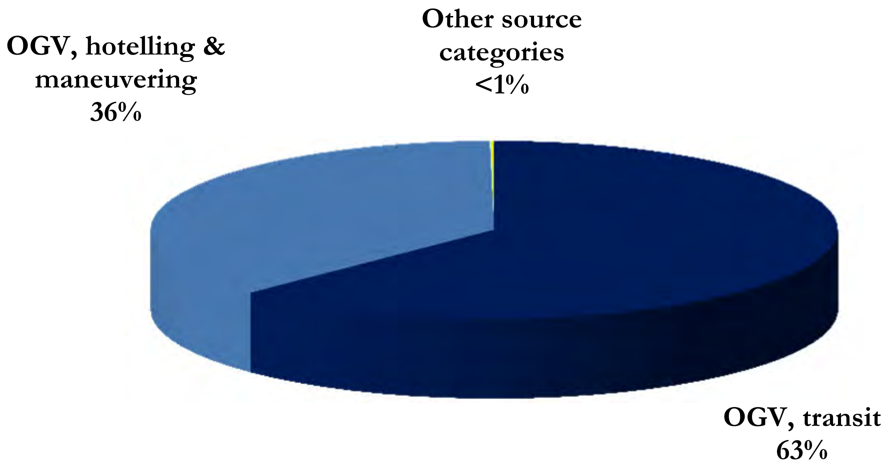


Figure 2.7: 2011 Total Airshed $PM_{10}$ Emissions by Source Category

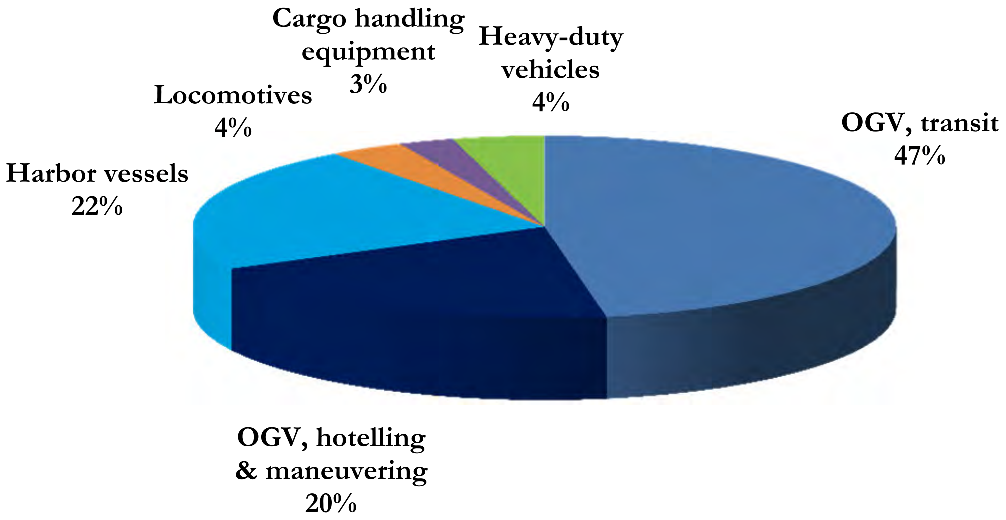


Figure 2.8: 2011 Total Airshed $PM_{2.5}$ Emissions by Source Category

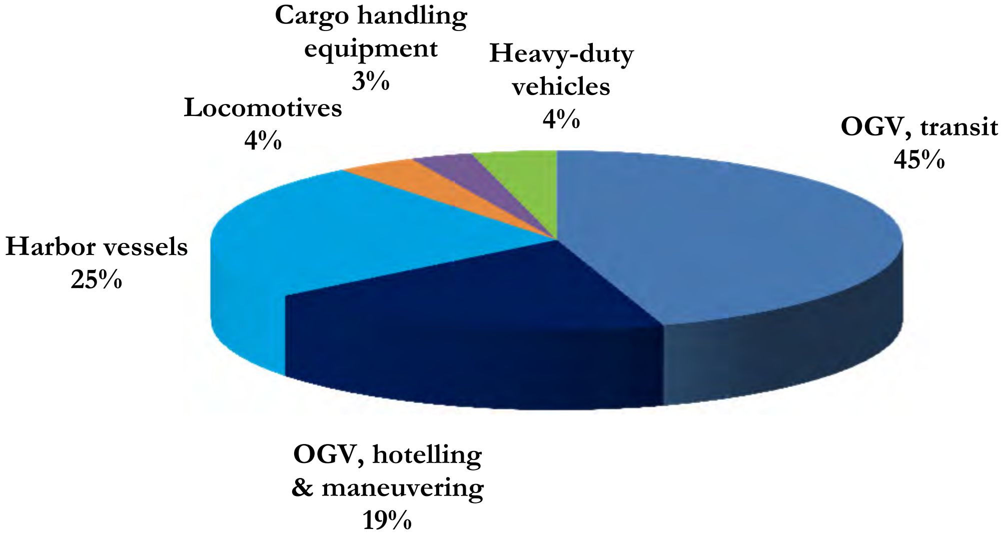


Figure 2.9: 2011 Total Airshed DPM Emissions by Source Category

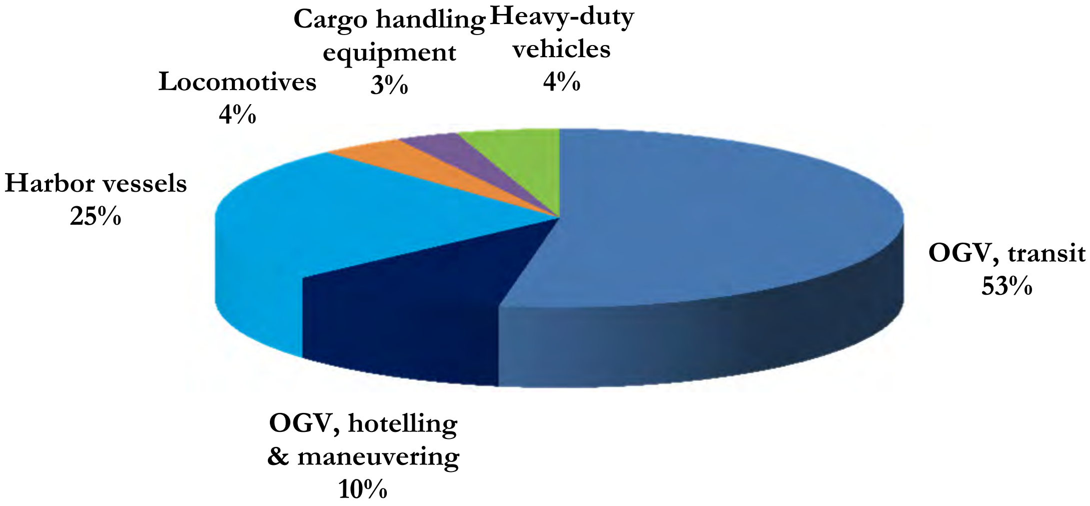
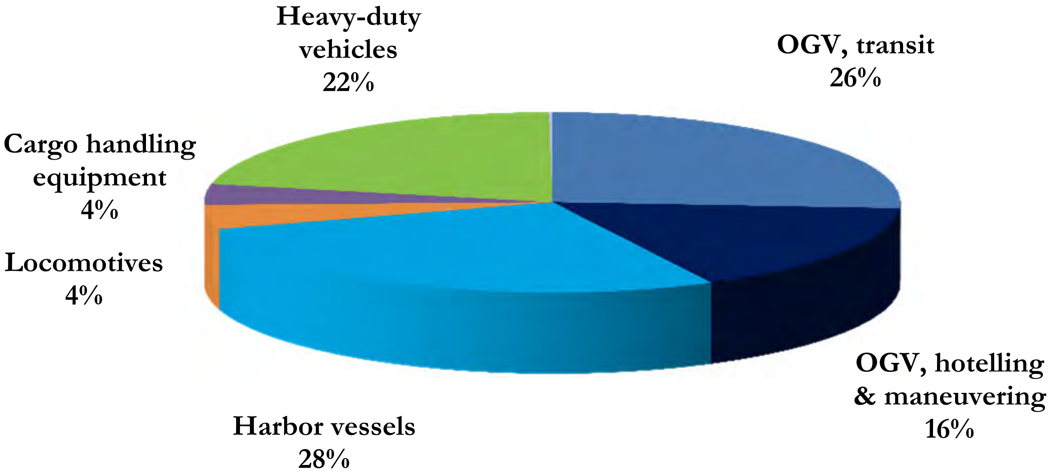


Figure 2.10: 2011 Total Airshed CO2e Emissions by Source Category



### *2.1.2 Maritime Emission by Regional Clean Air Agency*

Table 2.3 presents maritime-related emissions by regional clean air agency jurisdiction. Figures 2.11 through 2.18 illustrate emissions by regional clean air agency for $NO_x$, VOC, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$, DPM, and greenhouse gases, respectively. The regional clean air agencies, their acronyms as used in the tables that follow, and the counties within their jurisdictions are:

- Northwest Clean Air Agency (NWCAA) – Island, Skagit, Whatcom, San Juan
- Olympic Region Clean Air Agency (ORCAA) – Clallam, Jefferson, Mason, Thurston
- Puget Sound Clean Air Agency (PSCAA) – Pierce, King, Kitsap, and Snohomish

Maritime-related emissions for San Juan County are included in the totals for the Northwest Clean Air Agency (NWCAA) even though the air program in San Juan County is administered by the WDOE. Pacific and Grays Harbor Counties, which are in the ORCAA jurisdiction, are outside the Puget Sound airshed and this emissions inventory study area.

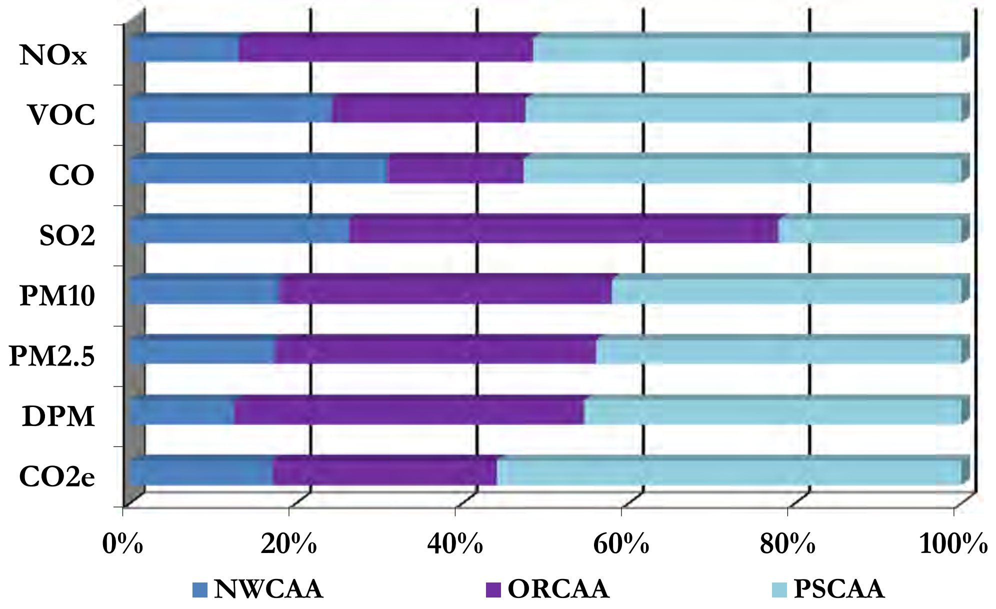
**Table 2.3: 2011 Total Airshed Emissions by Regional Clean Air Agency, tpy**

| Agency | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| NWCAA | 2,988 | 442 | 3,663 | 3,076 | 233 | 191 | 140 | 296,048 |
| ORCAA | 8,074 | 428 | 1,970 | 6,056 | 521 | 421 | 472 | 465,699 |
| PSCAA | 11,851 | 959 | 6,271 | 2,597 | 550 | 480 | 510 | 974,479 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,729** | **1,304** | **1,092** | **1,122** | **1,736,226** |

*Note: Total recreational vessel emissions were allocated based on the location of the marinas and the air district in which the marina is located in, consistent with 2005 allocation approach.*

The 2011 maritime-related emissions are distributed 13-31% for NWCAA, 16-52% for ORCAA, and 22-56% for PSCAA, depending on pollutant.

**Figure 2.11: Distribution of Total Airshed Emissions by Regional Clean Air Agency**



## 2.2 Emission Comparison, 2011 vs 2005

Table 2.4 compares the 2011 and 2005 ship inbound activity[9], cargo throughput in twenty-foot-equivalents (TEU), and total cargo tonnage in metric tons (tonnes) for the Ports of Anacortes, Everett, Olympia, Seattle, and Tacoma. Due to the worldwide economic downturn, the overall activity and throughput was down in 2011 for most of the Puget Sound Ports when compared to 2005. Two major container ports in Puget Sound, the Port of Seattle and Port of Tacoma, had lower vessel call counts and TEU throughput. The exceptions are the Port of Everett and Port of Olympia, which increased their vessel calls and tonnage in 2011 as compared to 2005. Overall, the ship inbound activity decreased 9%, TEU decreased 15% and tonnage decreased slightly by 1%.

**Table 2.4: 2011 vs 2005 Port Activity Comparison**

| Port | 2011 Inbound Activities | 2005 Inbound Activities | 2011 Throughput (TEU) | 2005 Throughput (TEU) | 2011 Cargo (tonnes) | 2005 Cargo (tonnes) |
|---|---|---|---|---|---|---|
| Anacortes | 38 | 29 | na | na | na | na |
| Everett | 103 | 47 | 20,918 | 9,561 | 152,995 | 103,757 |
| Olympia | 26 | 20 | 0 | 903 | 711,536 | 129,512 |
| Seattle | 1,136 | 1,197 | 2,033,535 | 2,087,929 | 22,762,678 | 20,564,860 |
| Tacoma | 875 | 1,093 | 1,488,795 | 2,070,000 | 17,270,252 | 20,400,000 |
| **Total** | **2,178** | **2,386** | **3,543,248** | **4,168,393** | **40,897,461** | **41,198,129** |
| **Change, %** | **-9%** | | **-15%** | | **-1%** | |

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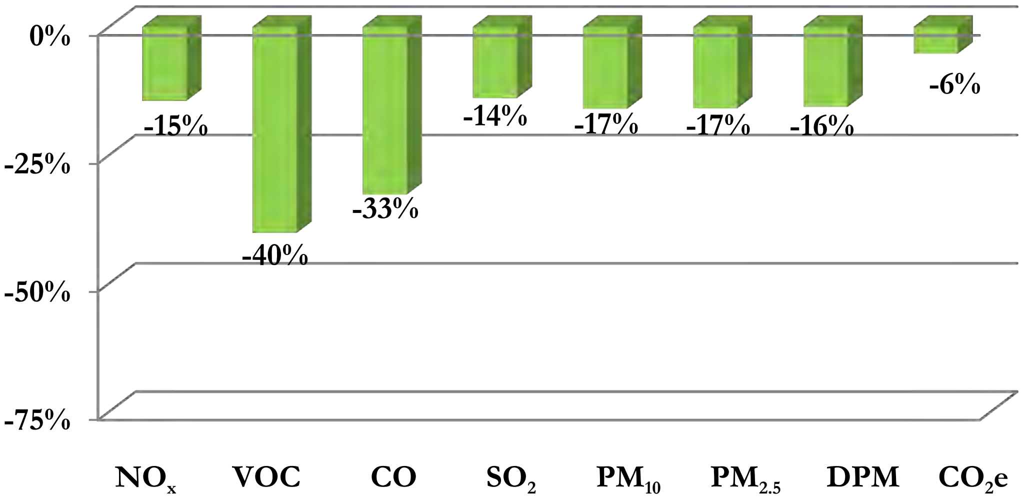
[9] Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

Table 2.5 and Figure 2.12 compares the total 2011 maritime-related airshed emissions to 2005 airshed emissions. Airshed emissions reductions ranged from 5% $CO_2e$ to 40% VOC in 2011 as compared to 2005.

**Table 2.5: 2011 vs 2005 Total Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 22,912 | 1,830 | 11,905 | 11,729 | 1,304 | 1,092 | 1,122 | 1,736,226 |
| 2005 | 27,059 | 3,070 | 17,708 | 13,621 | 1,565 | 1,310 | 1,342 | 1,845,912 |
| **Change, tpy** | **-4,146** | **-1,240** | **-5,804** | **-1,892** | **-261** | **-218** | **-220** | **-109,686** |
| **Change, %** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

**Figure 2.12: 2011 vs 2005 Total Airshed Emissions Change**



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

For some of the source categories, the emissions calculation methodology was different in 2011 than in 2005 due to improvements or updates to data collection or modeling methods. In order to compare 2011 emissions to 2005 emissions, for those source categories with methodology changes, the 2005 emissions were updated with the 2011 emissions modeling parameter changes, or were otherwise adjusted, in order to compare the directly. For example, 2005 cargo handling equipment and harbor vessel emissions were recalculated to include the updated 2011 load factors. Thus, the 2005 emissions included in this report are different from the published emissions in the 2005 PSEI report, but are more compatible with the 2011 estimates.

Table 2.6 summarizes the maritime related emissions by source category. The ocean-going vessel emissions decreased due to decreased vessel calls, use of shore power, and use of lower sulfur fuel by some vessels/shipping lines while at berth. For harbor vessels, which include commercial harbor, government (non-military), and recreational vessels, VOC and CO emissions decreased because the majority of VOC and CO is contributed by recreational vessels which have lower 2011 emissions due to assumed fleet turn over by the EPA model used to calculate emissions. The EPA's assumed fleet turnover was used because information on actual makeup of the fleet in the Puget Sound region was not available. The harbor vessel $SO_2$ and PM emissions decreased due to the use of ULSD. Emissions of $NO_{x,}$ DPM and $CO_2$ increased due to the increased activity for commercial harbor vessels especially for category 2 engines and assumed fleet turnover of recreation vessels with 2-stroke engines to 4-stroke engines by the EPA model used to calculate emissions. Locomotive emissions decreased due to lower throughput, improved fuel efficiency, and cleaner locomotive engines. Cargo handling equipment emissions decreased due to decreased activity, use of ULSD, emission reduction retrofits such as DPFs and diesel oxidation catalysts (DOCs), and equipment turnover. Heavy-duty vehicles emissions decreased, except for $CO_2e$, which remained essentially the same in 2011 as in 2005. The heavy-duty vehicles emissions decrease is due to fleet turnover, the implementation of the clean truck programs by the Ports of Tacoma and Seattle, and the use of ULSD. For fleet vehicles, the varying emission changes are due to the different fleet mix, reported activity levels, and vehicle fuel types included in the two inventories.

**Table 2.6: 2011 vs 2005 Total Airshed Emissions by Source Category, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| Ocean-going vessels | 11,658 | 442 | 1,036 | 11,709.00 | 879.65 | 703.72 | 711.12 | 737,640 |
| Harbor vessels | 7,050 | 1,124 | 9,672 | 5.34 | 291.52 | 271.64 | 277.72 | 481,123 |
| Locomotives | 1,264 | 80 | 200 | 10.51 | 45.15 | 41.35 | 45.15 | 75,289 |
| Cargo handling equipment | 594 | 37 | 297 | 0.60 | 32.60 | 31.70 | 32.60 | 64,275 |
| Heavy-duty vehicles | 2,340 | 143 | 666 | 3.40 | 55.00 | 43.50 | 55.00 | 375,071 |
| Fleet vehicles | 6 | 3 | 34 | 0.05 | 0.09 | 0.08 | 0.04 | 2,828 |
| **Total** | **22,912** | **1,830** | **11,905** | **11,728.90** | **1,304.01** | **1,092.00** | **1,121.63** | **1,736,226** |
| **2005** | | | | | | | | |
| Ocean-going vessels | 14,551 | 509 | 1,200 | 12,923.71 | 1,030.66 | 822.51 | 841.99 | 812,391 |
| Harbor vessels | 6,497 | 2,217 | 14,477 | 380.31 | 306.34 | 282.15 | 272.17 | 464,362 |
| Locomotives | 2,156 | 109 | 269 | 168.60 | 59.11 | 54.39 | 59.11 | 98,495 |
| Cargo handling equipment | 832 | 81 | 814 | 61.84 | 54.89 | 53.25 | 54.64 | 79,581 |
| Heavy-duty vehicles | 3,012 | 148 | 899 | 86.70 | 114.00 | 97.60 | 114.00 | 387,846 |
| Fleet vehicles | 10 | 5 | 50 | 0.04 | 0.08 | 0.08 | 0.08 | 3,237 |
| **Total** | **27,059** | **3,070** | **17,708** | **13,621.18** | **1,565.08** | **1,309.97** | **1,341.99** | **1,845,912** |
| **% Change** | | | | | | | | |
| Ocean-going vessels | -20% | -13% | -14% | -9% | -15% | -14% | -16% | -9% |
| Harbor vessels | 9% | -49% | -33% | -99% | -5% | -4% | 2% | 4% |
| Locomotives | -41% | -27% | -25% | -94% | -24% | -24% | -24% | -24% |
| Cargo handling equipment | -29% | -54% | -64% | -99% | -41% | -40% | -40% | -19% |
| Heavy-duty vehicles | -22% | -3% | -26% | -96% | -52% | -55% | -52% | -3% |
| Fleet vehicles | -34% | -48% | -31% | 24% | 8% | 3% | -47% | -13% |
| **Total** | **-15%** | **-40%** | **-33%** | **-14%** | **-17%** | **-17%** | **-16%** | **-6%** |

## 2.3 Port and Petroleum Facility Summaries

This section includes summaries of U.S. maritime-related emissions associated with the Ports of Anacortes, Everett, Olympia, Seattle, Tacoma, and the petroleum facilities group. For these summaries, the source category emissions were tabulated to be consistent with the 2005 PSEI report format, with the specifics for each port described below.

For the Port of Anacortes, Port of Everett, Port of Olympia, and petroleum facilities comparisons, the source category emissions are tabulated similar to the 2005 report, as follows:

- Port – emissions within port terminals, adjacent rail yards, and adjacent waterways
  - Ocean-going vessel emissions (hotelling and maneuvering activities)
  - Harbor vessel emissions (includes only 10% of total recreational vessel emissions related to port-owned marinas – Ports of Anacortes, Everett, and Olympia)
  - Cargo handling equipment emissions
  - Locomotive emissions (switching activities on-terminal and adjacent rail yards)
  - Heavy-duty vehicle emissions (queuing and on-terminal activities)
  - Fleet vehicle emissions (on-terminal activities)

The following were not included in the Port of Anacortes, Port of Everett, Port of Olympia, and petroleum facilities summaries:

- Ocean-going vessels transiting mode emissions and emissions from activities that are not directly associated with the operations at port terminals or petroleum facilities.
- Harbor vessel emissions from activities that are not directly associated with the operations at Ports of or Anacortes, Everett, or Olympia terminals or petroleum facilities.
- Line-haul locomotive emissions (line-haul activities were not identified at these ports).
- Heavy-duty vehicles on-road emissions outside the ports' terminals.

For 2011, the Port of Seattle and Port of Tacoma increased the resolution from the previous report to get a better understanding of port-related emissions allocating them into three geographical zones, compared to one zone in 2005. For comparison purposes the 2011 and 2005 emissions were allocated into the following three geographical zones:

- Port - emissions within port terminals, adjacent rail yards, and adjacent waterways
  - Ocean-going vessel emissions (hotelling and maneuvering activities)
  - Harbor vessel emissions (port-related commercial harbor and government vessel activities)
  - Harbor vessel emissions (10% of total recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions

  - Locomotive emissions (switching and line haul activities)
  - Heavy-duty vehicle emissions (queuing and on-terminal activities)
  - Fleet vehicle emissions (on-terminal activities)

- Air District - emissions within PSCAA four county boundary (Pierce, King, Kitsap, and Snohomish Counties)
  - Ocean-going vessel emissions (hotelling, maneuvering, and transit emissions)
  - Harbor vessel emissions (port-related commercial harbor and government vessel activities)
  - Harbor vessel emissions (50% of total recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions
  - Locomotive emissions
  - Heavy-duty vehicle emissions
  - Fleet vehicle emissions

- Airshed – emissions within the entire emissions inventory domain
  - Ocean-going vessel emissions (hotelling, maneuvering, and transit emissions)
  - Harbor vessel emissions (port-related commercial harbor and government vessel activities)
  - Harbor vessel emissions (100% of recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions
  - Locomotive emissions
  - Heavy-duty vehicle emissions
  - Fleet vehicle emissions

The following were not included in the Port of Seattle and Port of Tacoma summaries:

- Ocean-going vessel emissions from activities that are not directly associated with the operations at either the Port of Tacoma or Port of Seattle terminals.
- Harbor vessel emissions from activities that are not directly associated with the operations at either the Port of Tacoma or Port of Seattle terminals

Each port above is highlighted in the following subsections.

### *2.3.1 Port of Anacortes*

Table 2.7 and Figures 2.13 presents 2011 emissions associated with the Port of Anacortes.

**Table 2.7: Port of Anacortes 2011 Port Emissions, tpy**

| Source Category | NO$_x$ | VOC | CO | SO$_2$ | PM$_{10}$ | PM$_{2.5}$ | DPM | CO$_2$e |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 9.5 | 0.3 | 0.8 | 11.37 | 0.82 | 0.65 | 0.66 | 653 |
| OGV, maneuvering | 0.1 | 0.0 | 0.0 | 0.06 | 0.01 | 0.00 | 0.01 | 3 |
| Recreational vessels | 3.4 | 3.7 | 36.4 | 0.01 | 0.08 | 0.08 | 0.02 | 420 |
| Locomotives | na | na | na | na | na | na | na | na |
| Cargo handling equipment | 0.4 | 0.1 | 1.4 | 0.00 | 0.00 | 0.00 | 0.00 | 22 |
| Heavy-duty vehicles | 0.1 | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 0.00 | 8 |
| Terminal fleet vehicles | 0.1 | 0.0 | 0.4 | 0.00 | 0.00 | 0.00 | 0.00 | 22 |
| **Total** | **13.5** | **4.1** | **39.0** | **11.43** | **0.91** | **0.74** | **0.69** | **1,129** |

**Figure 2.13: Port of Anacortes 2011 Port Emissions**

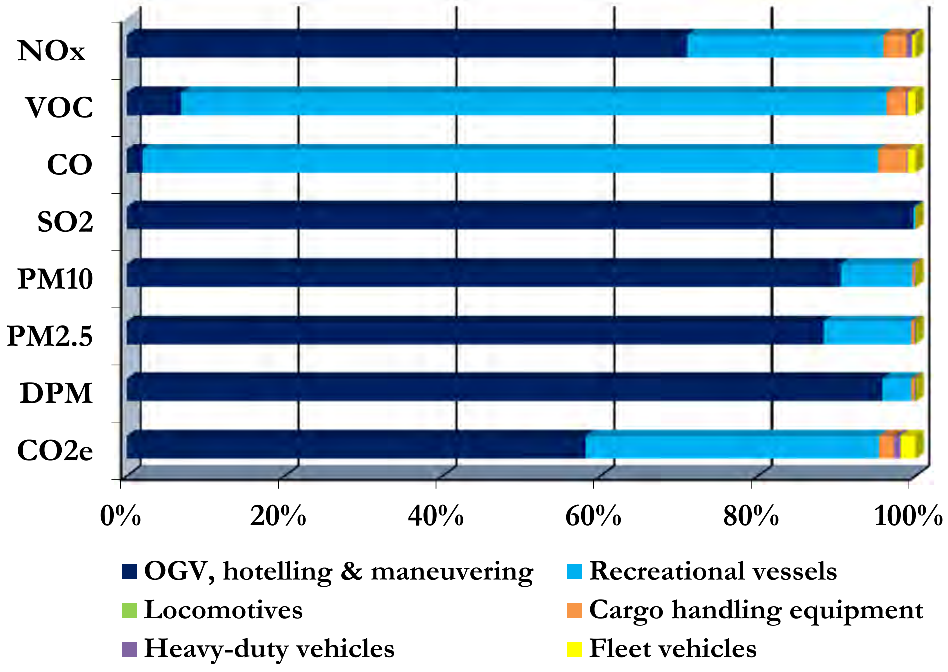


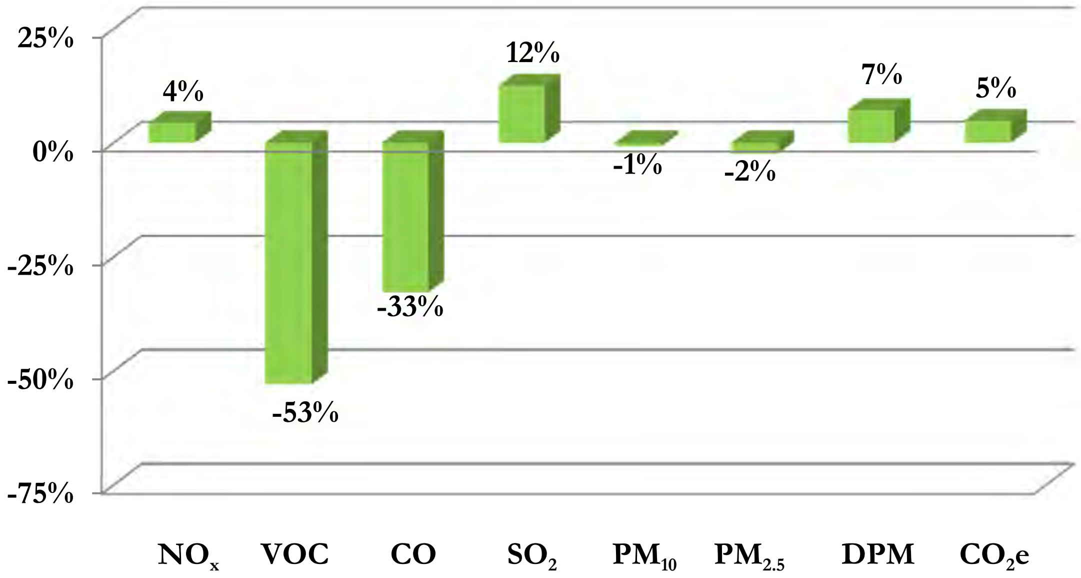
Table 2.8 presents 2011 and 2005 emissions comparison for the Port of Anacortes. For Port of Anacortes, there are no switching locomotive emissions associated with the port, thus not applicable or "na" for locomotives.

**Table 2.8: Port of Anacortes 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 9.57 | 0.29 | 0.77 | 11.427 | 0.822 | 0.657 | 0.663 | 657 |
| Recreational vessels | 3.35 | 3.69 | 36.39 | 0.007 | 0.081 | 0.075 | 0.024 | 420 |
| Locomotives | na | na | na | na | na | na | na | na |
| Cargo handling equipment | 0.40 | 0.10 | 1.40 | 0.000 | 0.003 | 0.003 | 0.003 | 22 |
| Heavy-duty vehicles | 0.10 | 0.01 | 0.06 | 0.000 | 0.001 | 0.001 | 0.001 | 8 |
| Terminal fleet vehicles | 0.06 | 0.04 | 0.40 | 0.000 | 0.001 | 0.001 | 0.000 | 22 |
| **Total** | **13.48** | **4.13** | **39.02** | **11.434** | **0.907** | **0.737** | **0.691** | **1,129** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 8.62 | 0.26 | 0.70 | 10.054 | 0.731 | 0.585 | 0.603 | 577 |
| Recreational vessels | 3.87 | 8.41 | 56.40 | 0.091 | 0.171 | 0.159 | 0.029 | 453 |
| Locomotives | na | na | na | na | na | na | na | na |
| Cargo handling equipment | 0.24 | 0.04 | 0.40 | 0.019 | 0.010 | 0.009 | 0.009 | 15 |
| Heavy-duty vehicles | 0.14 | 0.01 | 0.09 | 0.003 | 0.003 | 0.003 | 0.003 | 13 |
| Terminal fleet vehicles | 0.06 | 0.06 | 0.48 | 0.000 | 0.000 | 0.000 | 0.000 | 19 |
| **Total** | **12.92** | **8.77** | **58.06** | **10.166** | **0.914** | **0.755** | **0.644** | **1,077** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | 11% | 11% | 11% | 14% | 12% | 12% | 10% | 14% |
| Recreational vessels | -13% | -56% | -35% | -93% | -53% | -52% | -19% | -7% |
| Locomotives | na | na | na | na | na | na | na | na |
| Cargo handling equipment | 68% | 174% | 252% | -98% | -70% | -69% | -69% | 43% |
| Heavy-duty vehicles | -28% | -13% | -36% | -100% | -66% | -63% | -66% | -36% |
| Terminal fleet vehicles | -8% | -30% | -17% | na | na | na | na | 18% |
| **Total** | **4%** | **-53%** | **-33%** | **12%** | **-1%** | **-2%** | **7%** | **5%** |

Figure 2.14 presents the Port of Anacortes's port emissions change for 2011 vs 2005.

**Figure 2.14: Port of Anacortes 2011 vs 2005 Port Emissions Change**



### *2.3.2 Port of Everett*

Table 2.9 and Figure 2.15 present emissions associated with the Port of Everett.

**Table 2.9: Port of Everett 2011 Port Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 46 | 1 | 4 | 52.60 | 3.88 | 3.11 | 3.30 | 3,019 |
| OGV, maneuvering | 1 | 0 | 0 | 0.71 | 0.06 | 0.05 | 0.06 | 41 |
| Recreational vessels | 8 | 8 | 83 | 0.02 | 0.18 | 0.17 | 0.05 | 956 |
| Locomotives | 62 | 5 | 9 | 0.50 | 2.20 | 2.00 | 2.20 | 3,298 |
| Cargo handling equipment | 23 | 2 | 25 | 0.01 | 2.30 | 2.20 | 2.30 | 1,375 |
| Heavy-duty vehicles | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 12 |
| Terminal fleet vehicles | 1 | 1 | 7 | 0.00 | 0.01 | 0.01 | 0.00 | 273 |
| **Total** | **141** | **18** | **128** | **53.85** | **8.64** | **7.53** | **7.92** | **8,972** |

**Figure 2.15: Port of Everett 2011 Port Emissions**

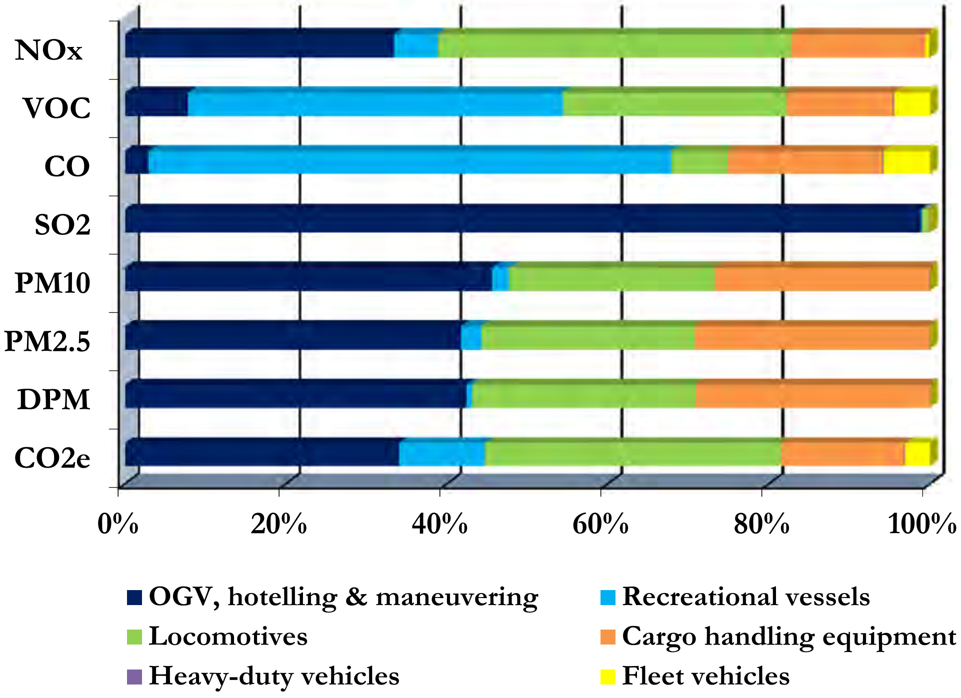


Table 2.10 presents 2011 and 2005 emissions comparison for the Port of Everett.

**Table 2.10: Port of Everett 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 47.2 | 1.4 | 3.8 | 53.31 | 3.94 | 3.15 | 3.36 | 3,059 |
| Recreational vessels | 7.6 | 8.4 | 82.8 | 0.02 | 0.18 | 0.17 | 0.05 | 956 |
| Locomotives | 62.1 | 5.0 | 9.0 | 0.50 | 2.20 | 2.00 | 2.20 | 3,298 |
| Cargo handling equipment | 23.4 | 2.4 | 24.6 | 0.01 | 2.30 | 2.20 | 2.30 | 1,375 |
| Heavy-duty vehicles | 0.1 | 0.0 | 0.1 | 0.00 | 0.00 | 0.00 | 0.00 | 12 |
| Terminal fleet vehicles | 0.8 | 0.8 | 7.4 | 0.00 | 0.01 | 0.01 | 0.00 | 273 |
| **Total** | **141.2** | **18.0** | **127.7** | **53.85** | **8.64** | **7.53** | **7.92** | **8,972** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 21.7 | 0.7 | 1.7 | 33.64 | 2.20 | 1.76 | 1.38 | 1,983 |
| Recreational vessels | 7.9 | 17.2 | 115.6 | 0.19 | 0.35 | 0.33 | 0.06 | 929 |
| Locomotives | 79.8 | 4.6 | 8.4 | 4.91 | 2.03 | 1.87 | 2.03 | 3,057 |
| Cargo handling equipment | 23.0 | 2.4 | 22.1 | 1.66 | 2.46 | 2.38 | 2.45 | 1,406 |
| Heavy-duty vehicles | 1.0 | 0.1 | 0.7 | 0.02 | 0.02 | 0.02 | 0.02 | 90 |
| Terminal fleet vehicles | 0.7 | 0.4 | 3.1 | 0.01 | 0.01 | 0.01 | 0.01 | 126 |
| **Total** | **134.2** | **25.4** | **151.6** | **40.42** | **7.07** | **6.36** | **5.95** | **7,590** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | 117% | 114% | 121% | 59% | 79% | 79% | 143% | 54% |
| Recreational vessels | -4% | -51% | -28% | -92% | -48% | -47% | -10% | 3% |
| Locomotives | -22% | 8% | 7% | -90% | 8% | 7% | 8% | 8% |
| Cargo handling equipment | 2% | 1% | 11% | -99% | -6% | -8% | -6% | -2% |
| Heavy-duty vehicles | -88% | -88% | -91% | -100% | -90% | -95% | -90% | -87% |
| Terminal fleet vehicles | 8% | 96% | 138% | 0% | -10% | -20% | -78% | 116% |
| **Total** | **5%** | **-29%** | **-16%** | **33%** | **22%** | **18%** | **33%** | **18%** |

Figure 2.16 presents the Port of Everett's port emissions change for 2011 vs 2005, while Figure 2.17 presents a simple metric of tons of emissions (excluding port-related recreational vessels) per 10,000 tonnes of cargo in 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005.

**Figure 2.16: Port of Everett 2011 vs 2005 Port Emissions Change**

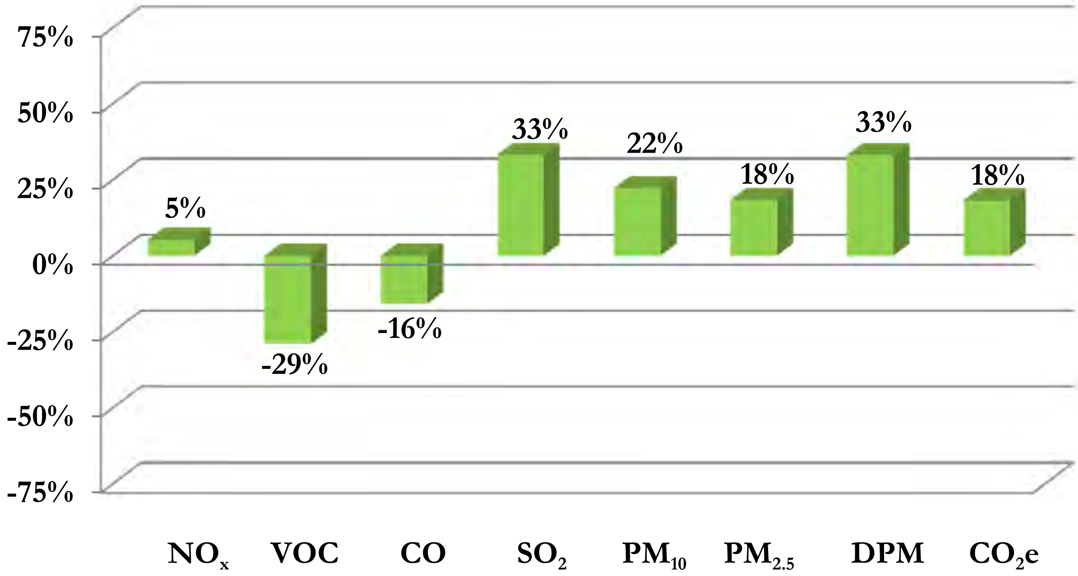
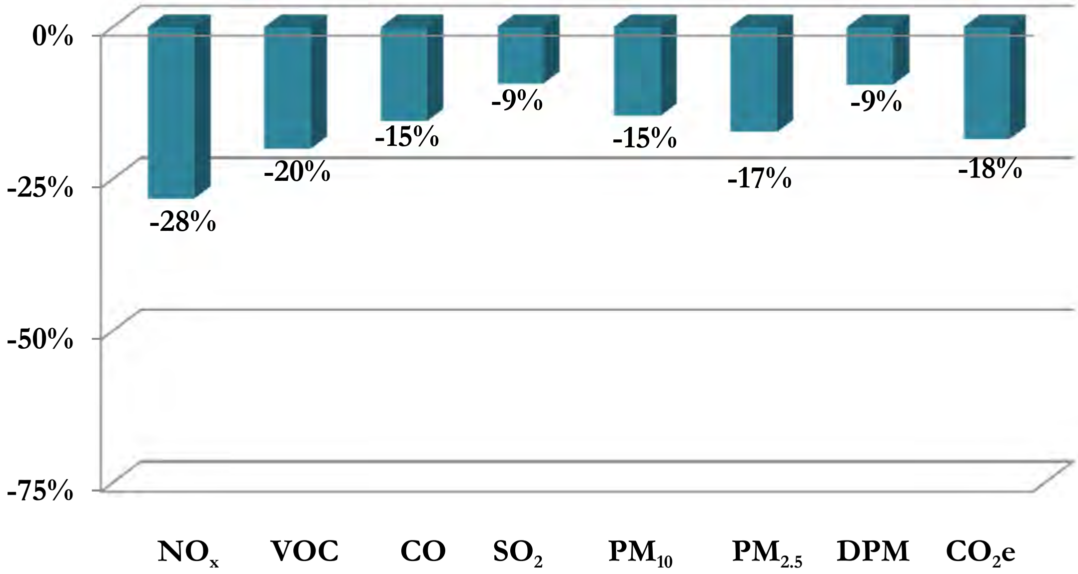


**Figure 2.17: Port of Everett 2011 vs 2005 Port Emissions 10,000 Tonnes of Cargo Change**



### *2.3.3 Port of Olympia*

Table 2.11 and Figures 2.18 present emissions associated with the Port of Olympia.

**Table 2.11: Port of Olympia 2011 Port Emissions, tpy**

| Source Category | NO$_x$ | VOC | CO | SO$_2$ | PM$_{10}$ | PM$_{2.5}$ | DPM | CO$_2$e |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 7.39 | 0.24 | 0.63 | 13.18 | 0.84 | 0.67 | 0.50 | 771 |
| OGV, maneuvering | 0.16 | 0.00 | 0.01 | 0.14 | 0.01 | 0.01 | 0.01 | 8 |
| Recreational vessels | 2.35 | 2.58 | 25.48 | 0.00 | 0.06 | 0.05 | 0.02 | 294 |
| Locomotives, near-port | 3.70 | 0.20 | 0.40 | 0.00 | 0.10 | 0.10 | 0.10 | 164.0 |
| Cargo handling equipment | 42.90 | 2.70 | 17.40 | 0.04 | 2.60 | 2.50 | 2.60 | 4,408 |
| Heavy-duty vehicles, on-terminal | 0.09 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 8 |
| Terminal fleet vehicles | 0.01 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 2 |
| **Total** | **56.58** | **5.73** | **44.02** | **13.37** | **3.61** | **3.34** | **3.23** | **5,654** |

**Figure 2.18: Port of Olympia 2011 Port Emissions**

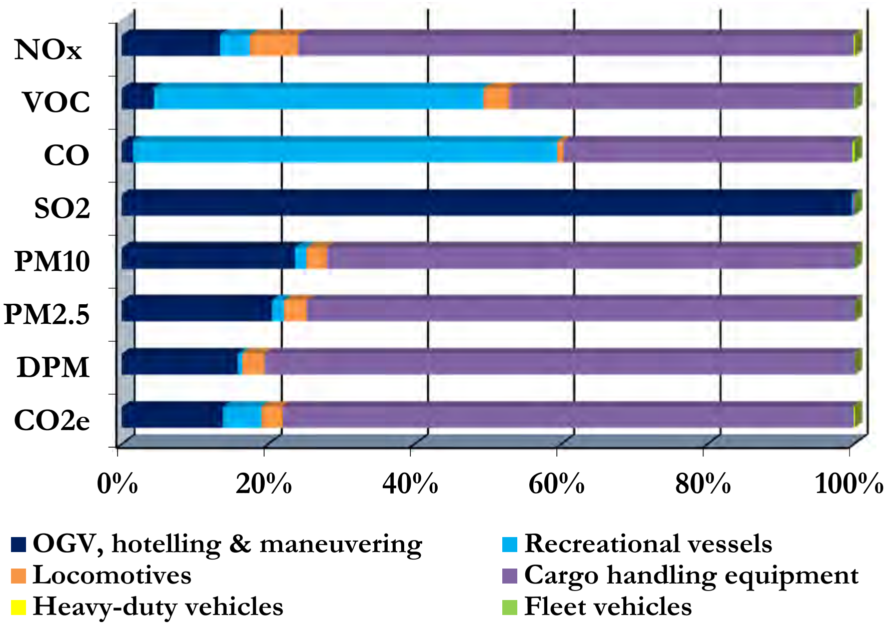


Table 2.12 presents 2011 and 2005 emissions comparison for the Port of Olympia.

**Table 2.12: Port of Olympia 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 7.5 | 0.2 | 0.6 | 13.33 | 0.853 | 0.682 | 0.511 | 779 |
| Recreational vessels | 2.3 | 2.6 | 25.5 | 0.00 | 0.056 | 0.053 | 0.017 | 294 |
| Locomotives | 3.7 | 0.2 | 0.4 | 0.00 | 0.100 | 0.100 | 0.100 | 164 |
| Cargo handling equipment | 42.9 | 2.7 | 17.4 | 0.04 | 2.600 | 2.500 | 2.600 | 4,408 |
| Heavy-duty vehicles | 0.1 | 0.0 | 0.1 | 0.00 | 0.001 | 0.001 | 0.001 | 8 |
| Terminal fleet vehicles | 0.0 | 0.0 | 0.0 | 0.00 | 0.000 | 0.000 | 0.000 | 2 |
| **Total** | **56.6** | **5.7** | **44.0** | **13.37** | **3.610** | **3.336** | **3.229** | **5,654** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 10.7 | 0.3 | 0.8 | 14.60 | 0.990 | 0.792 | 0.700 | 846 |
| Recreational vessels | 2.7 | 5.9 | 39.5 | 0.06 | 0.120 | 0.111 | 0.021 | 317 |
| Locomotives | 15.0 | 0.9 | 1.6 | 0.92 | 0.381 | 0.350 | 0.381 | 574 |
| Cargo handling equipment | 25.8 | 2.7 | 17.5 | 3.23 | 2.256 | 2.188 | 2.253 | 1,774 |
| Heavy-duty vehicles | 1.3 | 0.1 | 0.9 | 0.02 | 0.027 | 0.025 | 0.027 | 119 |
| Terminal fleet vehicles | na | na | na | na | na | na | na | na |
| **Total** | **55.5** | **9.9** | **60.2** | **18.84** | **3.773** | **3.466** | **3.381** | **3,630** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -30% | -22% | -23% | -9% | -14% | -14% | -27% | -8% |
| Recreational vessels | -13% | -56% | -35% | -93% | -53% | -52% | -19% | -7% |
| Locomotives | -75% | -77% | -75% | -100% | -74% | -71% | -74% | -71% |
| Cargo handling equipment | 66% | 0% | 0% | -99% | 15% | 14% | 15% | 148% |
| Heavy-duty vehicles | -93% | -100% | -93% | -100% | -96% | -96% | -96% | -93% |
| Terminal fleet vehicles | na | na | na | na | na | na | na | na |
| **Total** | **2%** | **-42%** | **-27%** | **-29%** | **-4%** | **-4%** | **-4%** | **56%** |

Figure 2.19 presents the Port of Olympia's port emissions change for 2011 vs 2005, while Figure 2.20 presents a simple metric of tons of emissions (excluding port-related recreational vessels) per 10,000 tonnes of cargo in 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo significantly decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005.

**Figure 2.19: Port of Olympia 2011 vs 2005 Port Emissions Change**

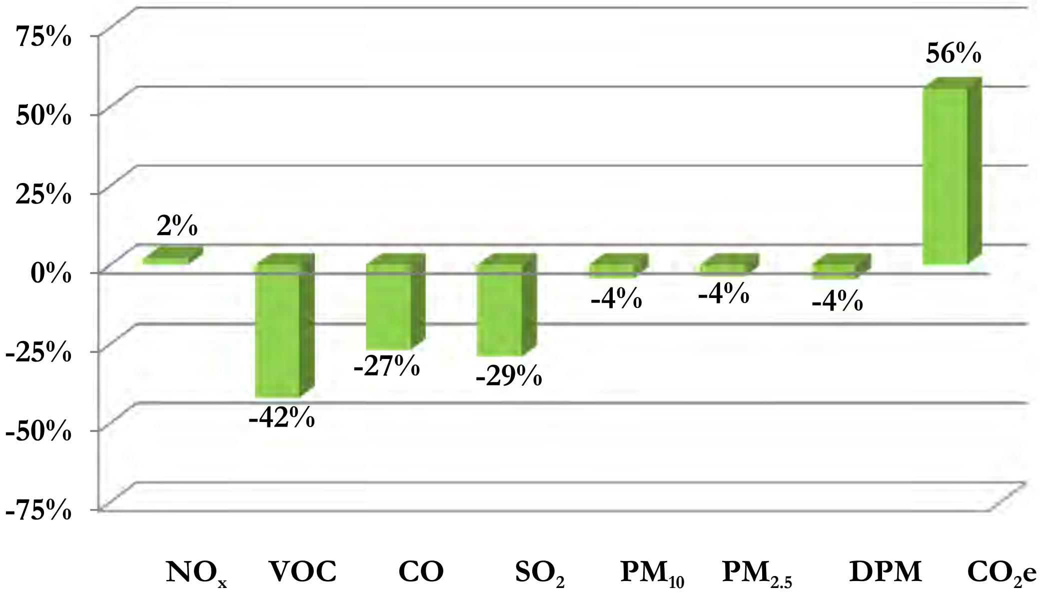
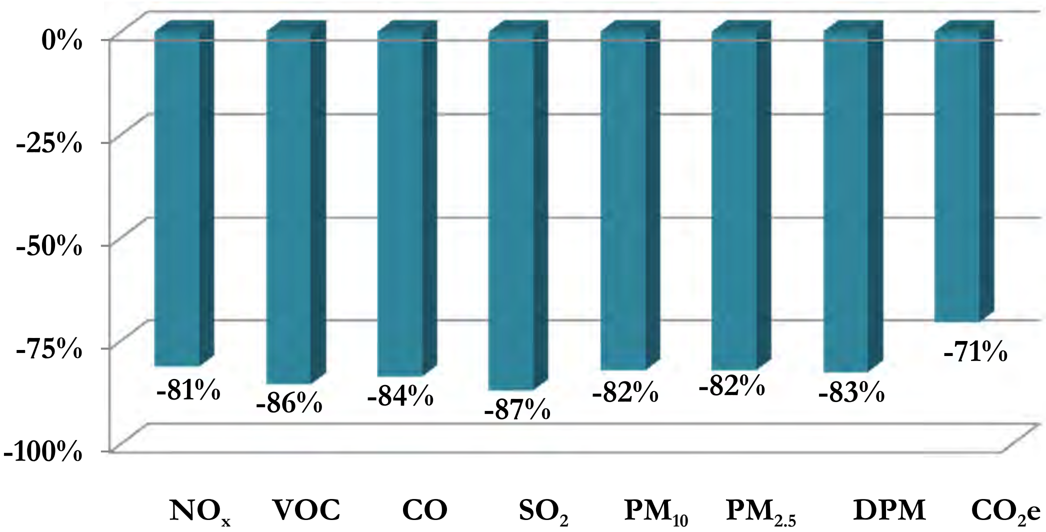


**Figure 2.20: Port of Olympia 2011 vs 2005 Port Emissions per 10,000 Tonnes of Cargo Metric Change**



### *2.3.4 Port of Seattle*

Table 2.13 and Figures 2.21 present the 2011 port emissions associated with the Port of Seattle operations.

**Table 2.13: Port of Seattle 2011 Port Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 679 | 22 | 59 | 551.53 | 42.38 | 33.90 | 33.32 | 51,492 |
| OGV, maneuvering | 69 | 4 | 8 | 48.98 | 5.31 | 4.25 | 5.30 | 2,986 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Harbor vessels | 334 | 22 | 72 | 0.21 | 13.24 | 12.21 | 13.04 | 20,415 |
| Recreational vessels | 6 | 6 | 61 | 0.01 | 0.14 | 0.13 | 0.04 | 708 |
| Locomotives | 290 | 20 | 45 | 2.54 | 10.50 | 9.60 | 10.50 | 16,828 |
| Cargo handling equipment | 306 | 18 | 158 | 0.30 | 16.70 | 16.20 | 16.70 | 34,561 |
| Heavy-duty vehicles | 68 | 6 | 38 | 0.07 | 0.82 | 0.76 | 0.82 | 7,038 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0.02 | 0.03 | 0.03 | 0.02 | 1,053 |
| **Total** | **1,754** | **99** | **454** | **603.65** | **89.13** | **77.08** | **79.74** | **135,083** |

**Figure 2.21: Port of Seattle 2011 Port Emissions Contribution by Source Category**

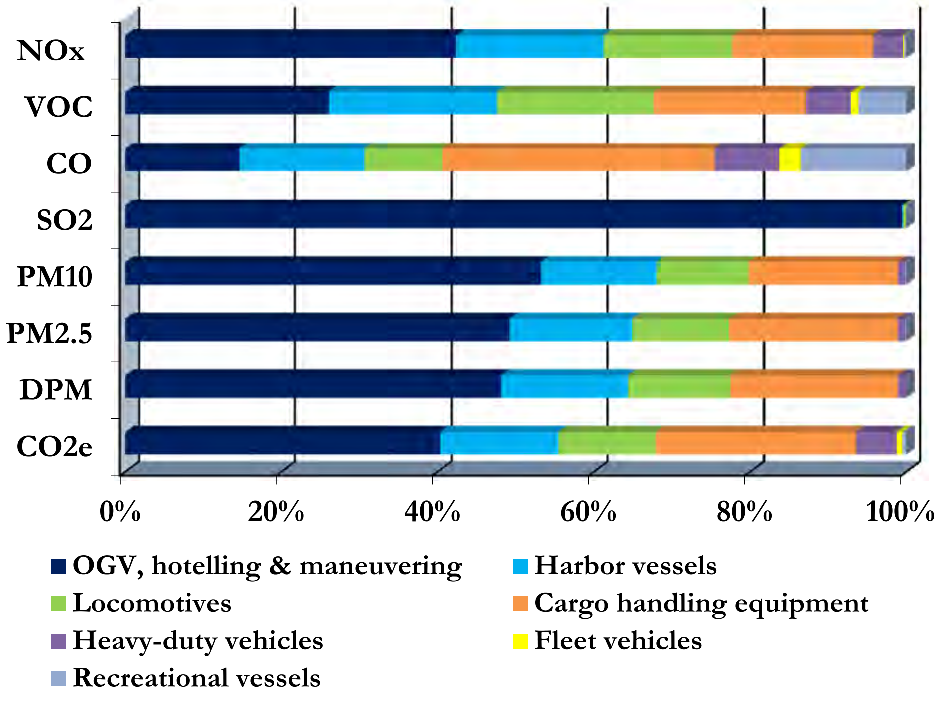


Table 2.14 presents 2011 and 2005 port emissions comparisons for the Port of Seattle.

**Table 2.14: Port of Seattle 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 748 | 26 | 66 | 600.51 | 47.69 | 38.15 | 38.62 | 54,479 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 334 | 22 | 72 | 0.21 | 13.24 | 12.21 | 13.04 | 20,415 |
| Recreational vessels | 6 | 6 | 61 | 0.05 | 0.14 | 0.14 | 0.04 | 708 |
| Locomotives | 290 | 20 | 45 | 2.54 | 10.50 | 9.60 | 10.50 | 16,828 |
| Cargo handling equipment | 306 | 18 | 158 | 0.30 | 16.70 | 16.20 | 16.70 | 34,561 |
| Heavy-duty vehicles | 68 | 6 | 38 | 0.07 | 0.82 | 0.76 | 0.82 | 7,038 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0.02 | 0.03 | 0.03 | 0.02 | 1,053 |
| **Total** | **1,754** | **99** | **454** | **603.69** | **89.12** | **77.09** | **79.75** | **135,083** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 861 | 28 | 72 | 978.73 | 73.84 | 59.08 | 58.86 | 60,474 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 316 | 22 | 66 | 33.74 | 13.79 | 12.71 | 13.58 | 18,073 |
| Recreational vessels | 7 | 15 | 104 | 0.17 | 0.31 | 0.29 | 0.05 | 832 |
| Locomotives | 448 | 25 | 55 | 40.22 | 13.27 | 12.21 | 13.27 | 20,561 |
| Cargo handling equipment | 418 | 51 | 616 | 52.27 | 27.62 | 26.80 | 27.40 | 38,135 |
| Heavy-duty vehicles | 96 | 8 | 67 | 1.82 | 1.99 | 1.83 | 1.99 | 8,884 |
| Terminal fleet vehicles | 5 | 3 | 31 | 0.02 | 0.02 | 0.02 | 0.02 | 1,403 |
| **Total** | **2,151** | **152** | **1,012** | **1,106.95** | **130.85** | **112.93** | **115.18** | **148,362** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -13% | -7% | -8% | -39% | -35% | -35% | -34% | -10% |
| OGV, transit | na | na | na | na | na | na | na | na |
| Commercial harbor vessels | 6% | -1% | 9% | -99% | -4% | -4% | -4% | 13% |
| Recreational vessels | -20% | -60% | -41% | -71% | -55% | -52% | -14% | -15% |
| Locomotives | -35% | -19% | -18% | -94% | -21% | -21% | -21% | -18% |
| Cargo handling equipment | -27% | -64% | -74% | -99% | -40% | -40% | -39% | -9% |
| Heavy-duty vehicles | -29% | -28% | -43% | -96% | -59% | -59% | -59% | -21% |
| Terminal fleet vehicles | -43% | -70% | -60% | 20% | 67% | 60% | -19% | -25% |
| **Total** | **-18%** | **-35%** | **-55%** | **-45%** | **-32%** | **-32%** | **-31%** | **-9%** |

Figure 2.22 presents the Port of Seattle's port emissions changes 2011 vs 2005, while Figures 2.23 and 2.24 present the 2011 and 2005 change in a simple metric of TEU and cargo emissions efficiency, expressed in tons of emissions per 10,000 TEU and 10,000 tonnes of cargo basis, respectively. It should be noted that although port-related recreational vessel emissions are included in Table 2.14, they are not included in Figures 2.22, 2.23, and 2.24 because they are not associated with the movement of cargo and that port-related cruise ship emissions are included in these simple metrics.

**Figure 2.22: Port of Seattle 2011 vs 2005 Port Emissions Change**

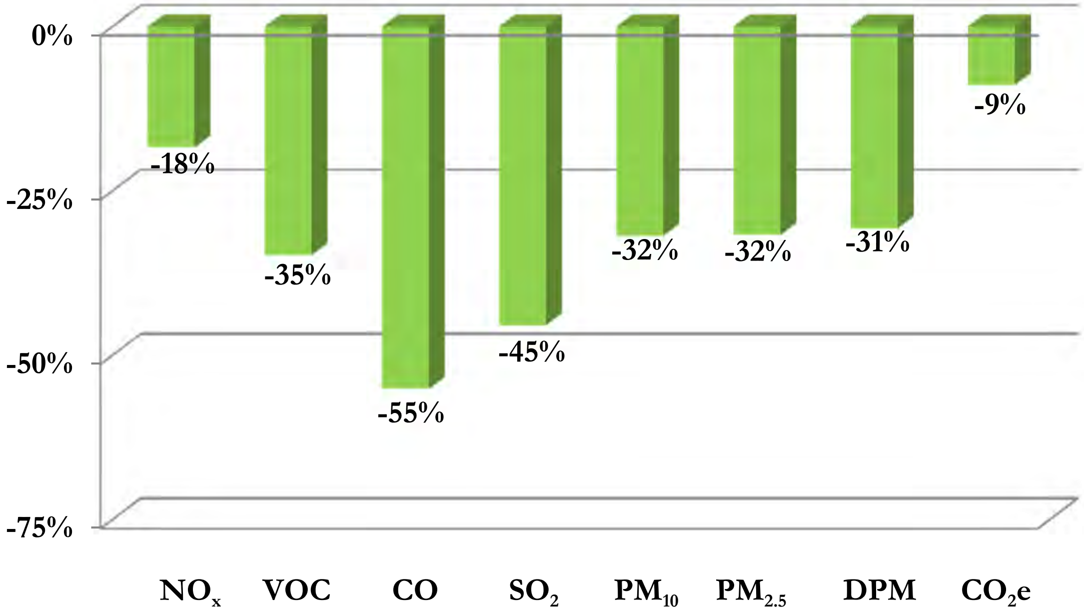


**Figure 2.23: Port of Seattle 2011 vs 2005 Port Emissions per 10,000 TEU Change**

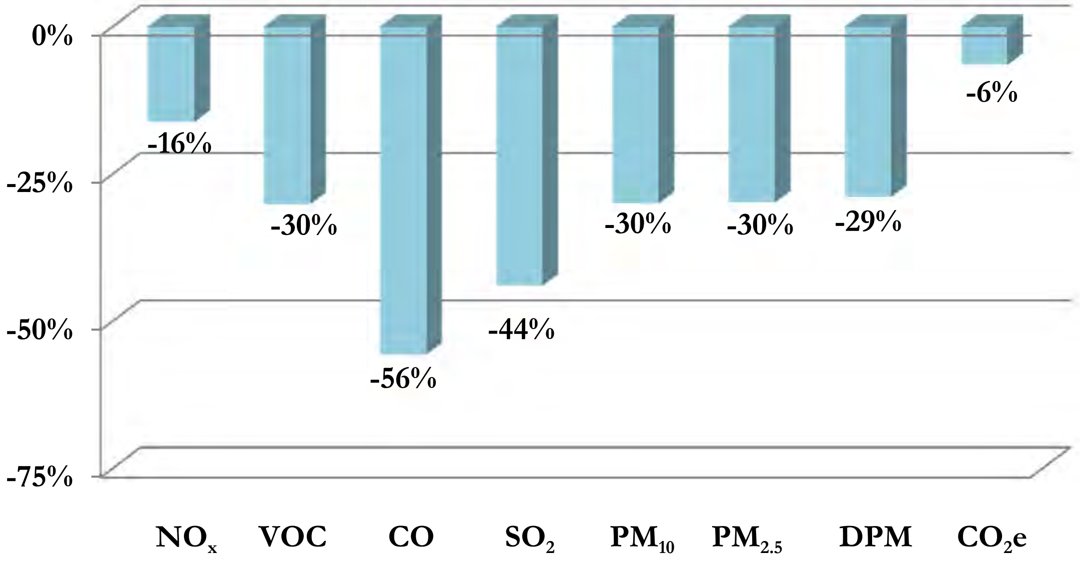


**Figure 2.24: Port of Seattle 2011 vs 2005 Port Emissions per 10,000 Tonnes of Cargo Change**

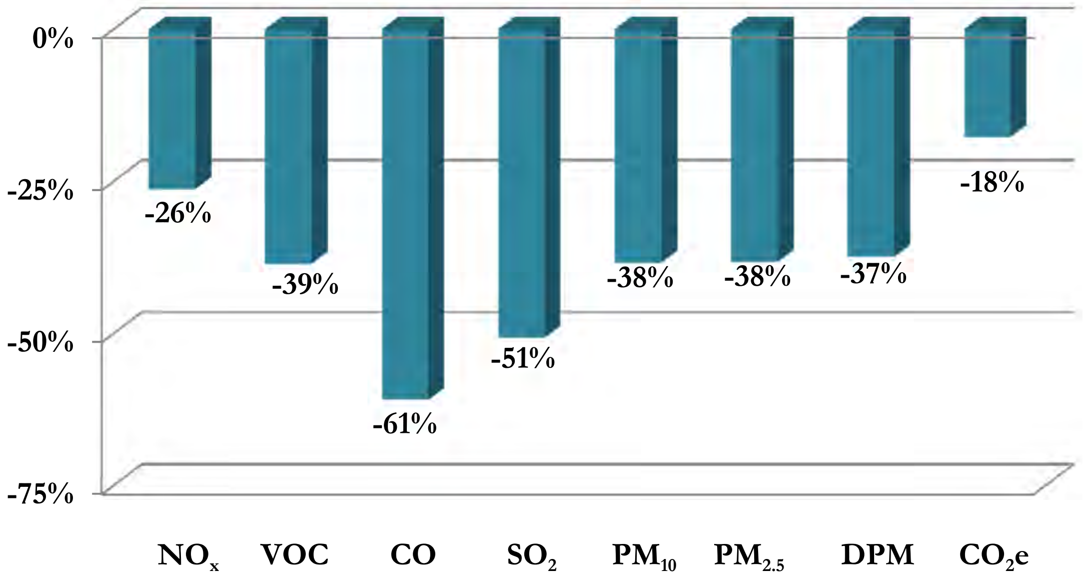


Table 2.15 presents the Port of Seattle's 2011 air district emissions by source category.

**Table 2.15: Port of Seattle 2011 Air District Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 679 | 22 | 59 | 552 | 42 | 34 | 33 | 51,492 |
| OGV, maneuvering | 69 | 4 | 8 | 49 | 5 | 4 | 5 | 2,986 |
| OGV, transit | 570 | 22 | 52 | 449 | 38 | 30 | 37 | 29,033 |
| Commercial harbor vessels | 371 | 23 | 77 | 0 | 15 | 14 | 14 | 22,474 |
| Recreational vessels | 28 | 31 | 307 | 0 | 1 | 1 | 0 | 3,541 |
| Locomotives | 617 | 38 | 100 | 6 | 23 | 21 | 23 | 37,829 |
| Cargo handling equipment | 306 | 18 | 158 | 0 | 17 | 16 | 17 | 34,561 |
| Heavy-duty vehicles | 1,052 | 70 | 331 | 2 | 20 | 18 | 20 | 171,303 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0 | 0 | 0 | 0 | 1,053 |
| **Total** | **3,695** | **230** | **1,103** | **1,058** | **160** | **138** | **149** | **354,274** |

Table 2.16 presents a per-county resolution of the Port of Seattle's 2011 ocean-going vessel emissions in the PSCAA air district.

**Table 2.16: Port of Seattle 2011 Air District OGV Emissions by County by Mode, tpy**

| County | Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| King | hotelling & maneuvering | 748 | 26 | 66 | 601 | 48 | 38 | 39 | 54,479 |
| | transit | 152 | 6 | 15 | 119 | 10 | 8 | 10 | 7,597 |
| Kitsap | transit | 382 | 14 | 34 | 302 | 25 | 20 | 24 | 19,672 |
| Pierce | transit | 4 | 0 | 1 | 2 | 0 | 0 | 0 | 143 |
| Snohomish | transit | 33 | 1 | 3 | 26 | 2 | 2 | 2 | 1,622 |
| **Total** | | **1,318** | **49** | **118** | **1,050** | **85** | **68** | **75** | **83,512** |

Table 2.17 presents the 2011 airshed emissions associated with the Port of Seattle.

**Table 2.17: Port of Seattle 2011 Airshed Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 679 | 22 | 59 | 552 | 42 | 34 | 33 | 51,492 |
| OGV, maneuvering | 69 | 4 | 8 | 49 | 5 | 4 | 5 | 2,986 |
| OGV, transit | 4,106 | 158 | 366 | 3,151 | 265 | 212 | 258 | 202,078 |
| Commercial harbor vessels | 418 | 24 | 82 | 0 | 16 | 15 | 16 | 25,048 |
| Recreational vessels | 57 | 62 | 614 | 0 | 1 | 1 | 0 | 7,083 |
| Locomotives | 679 | 42 | 111 | 6 | 25 | 23 | 25 | 41,797 |
| Cargo handling equipment | 306 | 18 | 158 | 0 | 17 | 16 | 17 | 34,561 |
| Heavy-duty vehicles | 1,270 | 83 | 390 | 2 | 25 | 23 | 25 | 206,887 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0 | 0 | 0 | 0 | 1,053 |
| **Total** | **7,586** | **414** | **1,799** | **3,760** | **397** | **328** | **380** | **572,986** |

Table 2.18 presents 2011 and 2005 airshed emissions comparison for the Port of Seattle.

**Table 2.18: Port of Seattle 2011 vs 2005 Airshed Emissions Comparison, tpy**

| | NO$_x$ | VOC | CO | SO$_2$ | PM$_{10}$ | PM$_{2.5}$ | DPM | CO$_2$e |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 748 | 26 | 66 | 600.51 | 47.69 | 38.15 | 38.62 | 54,479 |
| OGV, transit | 4,106 | 158 | 366 | 3,150.77 | 264.57 | 211.66 | 257.71 | 202,078 |
| Commercial harbor vessels | 418 | 24 | 82 | 0.25 | 16.43 | 15.15 | 16.23 | 25,048 |
| Recreational vessels | 57 | 62 | 614 | 0.11 | 1.36 | 1.27 | 0.40 | 7083 |
| Locomotives | 680 | 42 | 111 | 6.15 | 24.85 | 22.85 | 24.85 | 41,870 |
| Cargo handling equipment | 306 | 18 | 158 | 0.30 | 16.70 | 16.20 | 16.70 | 34,561 |
| Heavy-duty vehicles | 1,270 | 83 | 390 | 1.81 | 25.27 | 22.55 | 25.27 | 206,887 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0.02 | 0.03 | 0.03 | 0.02 | 1,053 |
| **Total** | **7,588** | **414** | **1,799** | **3,759.93** | **396.90** | **327.86** | **379.80** | **573,059** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 861 | 28 | 72 | 978.73 | 73.84 | 59.08 | 58.86 | 60,474 |
| OGV, transit | 5,639 | 198 | 461 | 3,521.17 | 336.38 | 269.11 | 327.21 | 226,887 |
| Commercial harbor vessels | 534 | 26 | 96 | 55.46 | 22.36 | 20.59 | 22.14 | 29,737 |
| Recreational vessels | 71 | 154 | 1,035 | 1.67 | 3.14 | 2.91 | 0.54 | 8317 |
| Locomotives | 1,026 | 52 | 131 | 84.31 | 28.90 | 26.59 | 28.90 | 47,898 |
| Cargo handling equipment | 418 | 51 | 616 | 52.27 | 27.62 | 26.80 | 27.40 | 38,135 |
| Heavy-duty vehicles | 1,506 | 75 | 465 | 42.94 | 53.60 | 48.25 | 53.60 | 192,389 |
| Terminal fleet vehicles | 5 | 3 | 31 | 0.02 | 0.02 | 0.02 | 0.02 | 1,403 |
| **Total** | **10,060** | **587** | **2,907** | **4,736.54** | **545.87** | **453.34** | **518.69** | **605,240** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -13% | -7% | -8% | -39% | -35% | -35% | -34% | -10% |
| OGV, transit | -27% | -20% | -21% | -11% | -21% | -21% | -21% | -11% |
| Commercial harbor vessels | -22% | -8% | -14% | -100% | -27% | -26% | -27% | -16% |
| Recreational vessels | -20% | -60% | -41% | -93% | -57% | -56% | -26% | -15% |
| Locomotives | -34% | -19% | -15% | -93% | -14% | -14% | -14% | -13% |
| Cargo handling equipment | -27% | -64% | -74% | -99% | -40% | -40% | -39% | -9% |
| Heavy-duty vehicles | -16% | 10% | -16% | -96% | -53% | -53% | -53% | 8% |
| Terminal fleet vehicles | -43% | -70% | -60% | 20% | 67% | 60% | -19% | -25% |
| **Total** | **-25%** | **-29%** | **-38%** | **-21%** | **-27%** | **-28%** | **-27%** | **-5%** |

Figure 2.25 presents the Port of Seattle's airshed emissions change for 2011 vs 2005, while Figures 2.26 and 2.27 present the 2011 and 2005 change in a simple metric of TEU and cargo emissions efficiency, expressed in tons of emissions per 10,000 TEU and 10,000 tonnes of cargo basis, respectively. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo and that port-related cruise ship emissions are included in these simple metrics.

**Figure 2.25: Port of Seattle 2011 vs 2005 Airshed Emissions Change**

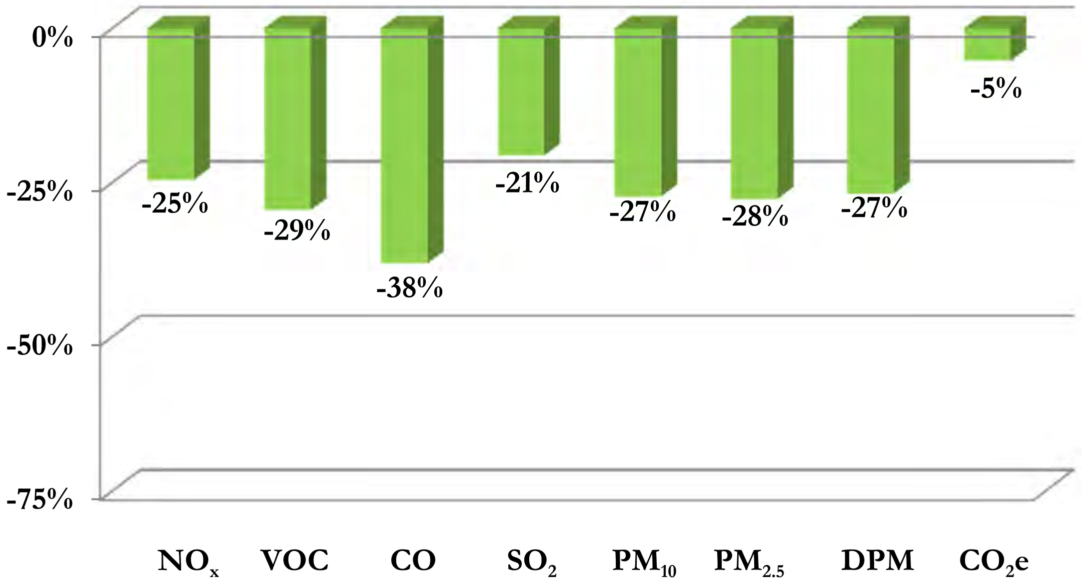


**Figure 2.26: Port of Seattle 2011 vs 2005 Airshed Emissions per 10,000 TEU Change**

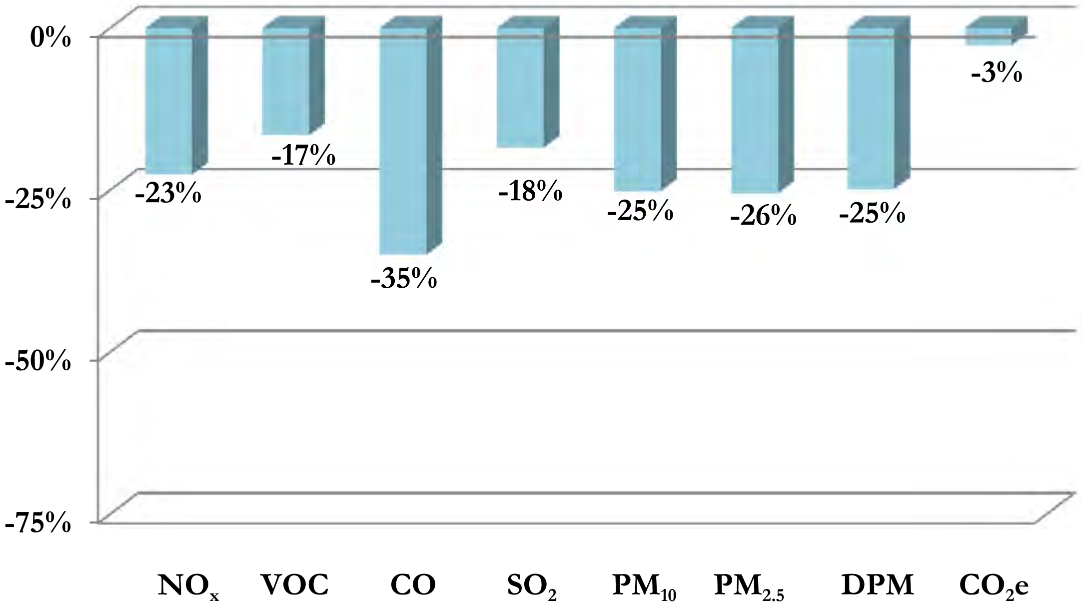
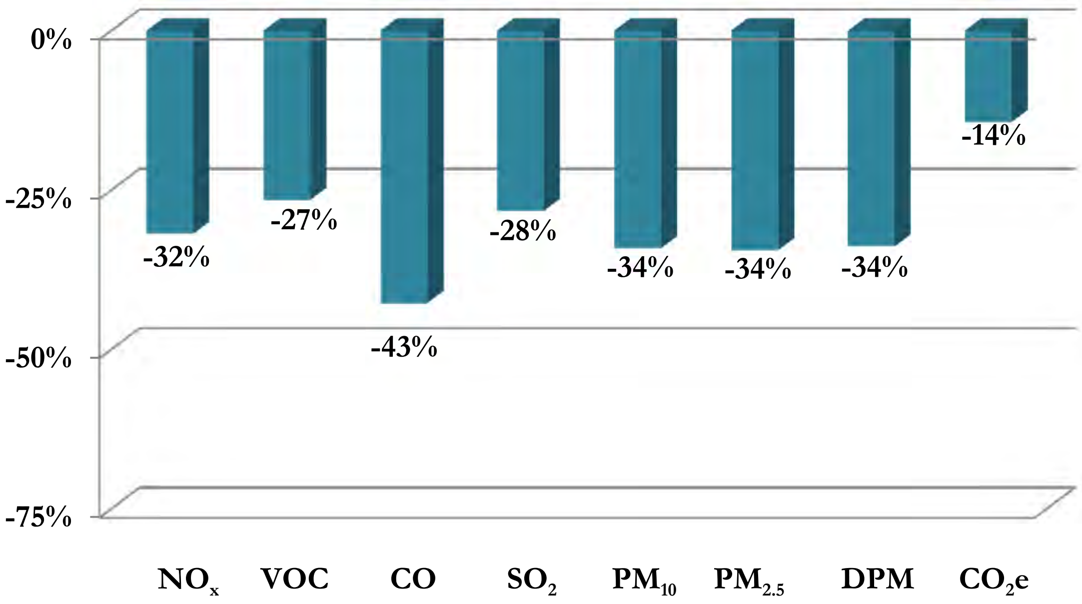


Figure 2.27: Port of Seattle 2011 vs 2005 Airshed Emissions per 10,000 Tonnes of Cargo Change



### *2.3.5 Port of Tacoma*

Table 2.19 and Figures 2.28 represent port emissions associated with the Port of Tacoma.

**Table 2.19: Port of Tacoma 2011 Port Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 339 | 11 | 28 | 381 | 26 | 21 | 18 | 28,582 |
| OGV, maneuvering | 36 | 1 | 3 | 30 | 3 | 2 | 3 | 1,690 |
| OGV, transit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Commercial harbor vessels | 291 | 10 | 44 | 0 | 12 | 11 | 12 | 17,485 |
| Locomotives | 364 | 25 | 54 | 2 | 12 | 11 | 12 | 20,015 |
| Cargo handling equipment | 206 | 13 | 88 | 0 | 10 | 10 | 10 | 22,486 |
| Heavy-duty vehicles | 24 | 2 | 13 | 0 | 0 | 0 | 0 | 2,505 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0 | 0 | 0 | 0 | 1,429 |
| **Total** | **1,263** | **62** | **245** | **413** | **64** | **55** | **56** | **94,192** |

**Figure 2.28: Port of Tacoma 2011 Port Emissions**

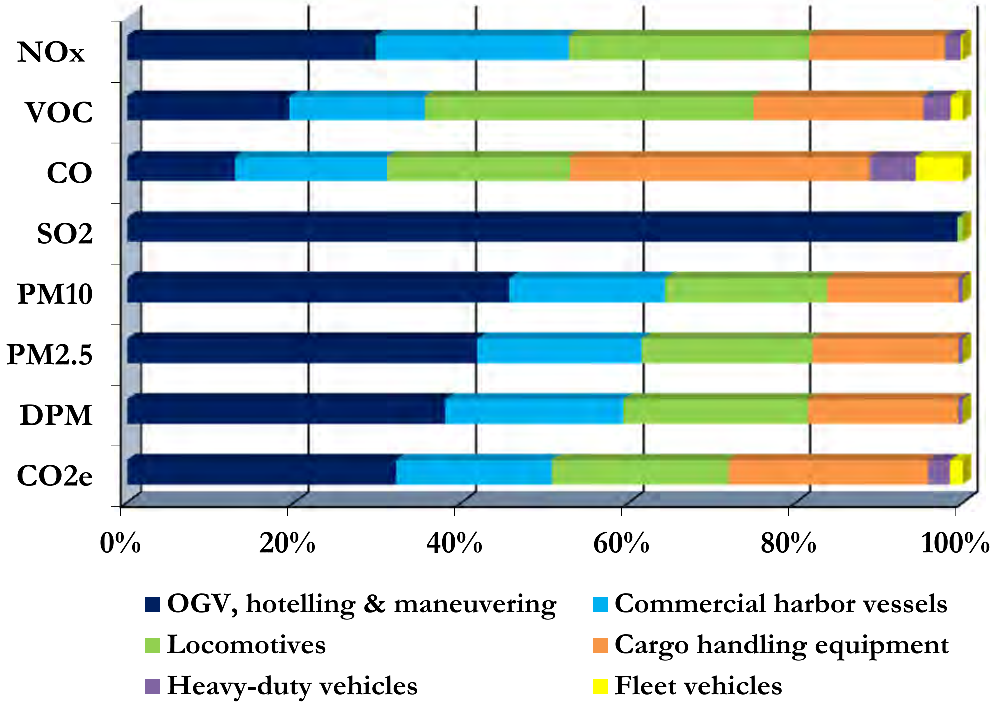


Table 2.20 presents 2011 and 2005 emissions comparison for the Port of Tacoma.

**Table 2.20: Port of Tacoma 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 375 | 12 | 32 | 410.18 | 29.00 | 23.20 | 21.12 | 30,273 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 291 | 10 | 44 | 0.16 | 11.82 | 10.88 | 11.82 | 17,485 |
| Locomotives | 364 | 25 | 54 | 2.37 | 12.35 | 11.35 | 12.35 | 20,015 |
| Cargo handling equipment | 206 | 13 | 88 | 0.20 | 10.00 | 9.70 | 10.00 | 22,486 |
| Heavy-duty vehicles | 24 | 2 | 13 | 0.02 | 0.29 | 0.27 | 0.29 | 2,505 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0.02 | 0.04 | 0.04 | 0.02 | 1,429 |
| **Total** | **1,263** | **62** | **245** | **412.96** | **63.50** | **55.44** | **55.60** | **94,192** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 645 | 21 | 54 | 676.17 | 47.05 | 37.64 | 33.79 | 47,465 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 278 | 6 | 38 | 29.45 | 12.20 | 11.23 | 12.20 | 15,815 |
| Locomotives | 589 | 33 | 71 | 45.66 | 17.09 | 15.72 | 17.09 | 25,500 |
| Cargo handling equipment | 370 | 26 | 160 | 5.40 | 22.92 | 22.26 | 23.01 | 38,646 |
| Heavy-duty vehicles | 21 | 2 | 13 | 0.42 | 0.46 | 0.42 | 0.46 | 2,049 |
| Terminal fleet vehicles | 4 | 2 | 15 | 0.02 | 0.04 | 0.04 | 0.04 | 1,689 |
| **Total** | **1,907** | **88** | **352** | **757.13** | **99.76** | **87.31** | **86.59** | **131,163** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -42% | -41% | -41% | -39% | -38% | -38% | -38% | -36% |
| OGV, transit | na | na | na | na | na | na | na | na |
| Commercial harbor vessels | 4% | 64% | 17% | -99% | -3% | -3% | -3% | 11% |
| Locomotives | -38% | -25% | -24% | -95% | -28% | -28% | -28% | -22% |
| Cargo handling equipment | -44% | -51% | -45% | -96% | -56% | -56% | -57% | -42% |
| Heavy-duty vehicles | 16% | 21% | -1% | -95% | -37% | -36% | -37% | 22% |
| Terminal fleet vehicles | -36% | -45% | -9% | 33% | 0% | -5% | -50% | -15% |
| **Total** | **-34%** | **-30%** | **-30%** | **-45%** | **-36%** | **-37%** | **-36%** | **-28%** |

Figure 2.29 presents the Port of Tacoma's port emissions change for 2011 vs 2005, while Figures 2.30 and 2.31 present the change in port emission efficiencies on a ton of emissions per TEU and tonnes of cargo basis, respectively. Due to a notable decrease in containers volume in 2011 while throughput of non-containerized cargo increased during the same time, the emission based on a tonnes of cargo may be a better representation of emissions related efficiencies.

**Figure 2.29: Port of Tacoma 2011 vs 2005 Port Emissions Change**

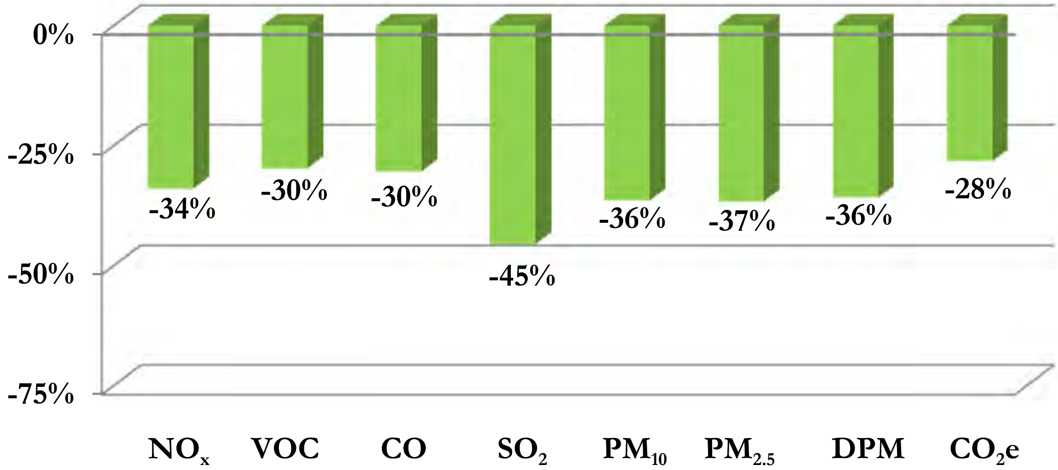


**Figure 2.30: Port of Tacoma 2011 vs 2005 Port Emissions per 10,000 TEU Change**

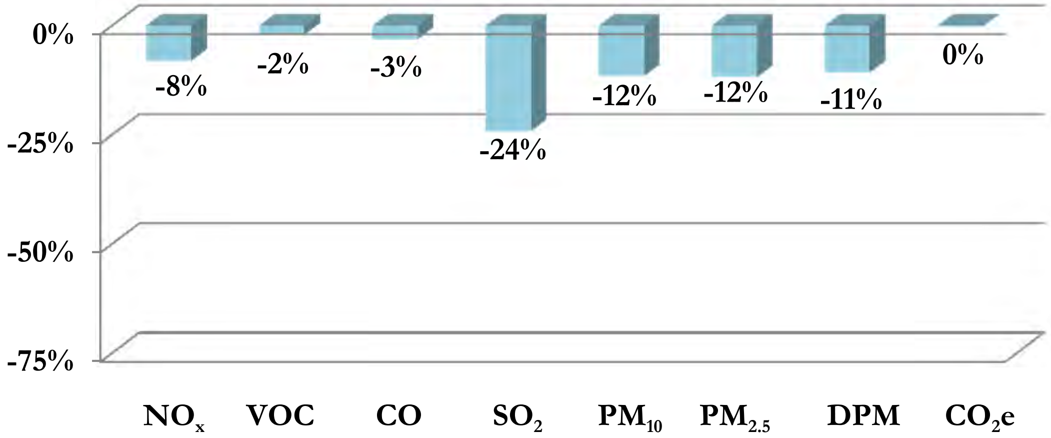


**Figure 2.31: Port of Tacoma 2011 vs 2005 Port Emissions per 10,000 Tonnes of Cargo Change**

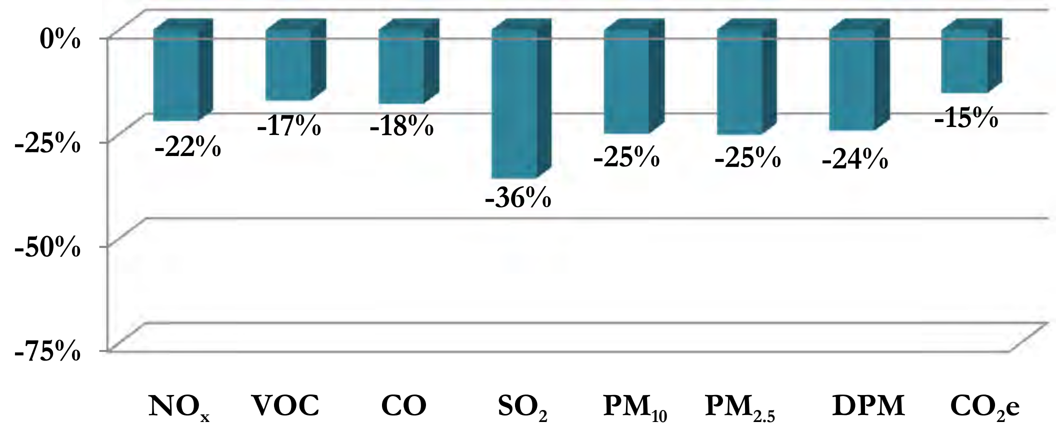


Table 2.21 presents the air district zone emissions associated with the Port of Tacoma.

**Table 2.21: Port of Tacoma 2011 Air District Zone Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 339 | 11 | 28 | 381 | 26 | 21 | 18 | 28,582 |
| OGV, maneuvering | 36 | 1 | 3 | 30 | 3 | 2 | 3 | 1,690 |
| OGV, transit | 738 | 28 | 64 | 579 | 49 | 39 | 46 | 34,676 |
| Commercial harbor vessels | 291 | 10 | 44 | 0 | 12 | 11 | 12 | 17,485 |
| Locomotives | 489 | 32 | 75 | 4 | 17 | 15 | 17 | 28,067 |
| Cargo handling equipment | 206 | 13 | 88 | 0 | 10 | 10 | 10 | 22,486 |
| Heavy-duty vehicles | 730 | 41 | 184 | 1 | 13 | 12 | 13 | 114,620 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0 | 0 | 0 | 0 | 1,429 |
| **Total** | **2,831** | **136** | **502** | **994** | **130** | **111** | **119** | **249,035** |

Table 2.22 presents in greater resolution the Port of Tacoma's OGV emissions for the four counties in the air district zone.

**Table 2.22: Port of Tacoma 2011 Air District Zone OGV Emissions by County, tpy**

| County | Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| King | transit | 283 | 11 | 24 | 224 | 19 | 15 | 18 | 13,411 |
| Kitsap | transit | 428 | 16 | 37 | 335 | 28 | 23 | 27 | 20,044 |
| Pierce | hotelling & maneuvering | 375 | 12 | 32 | 410 | 29 | 23 | 21 | 30,273 |
|  | transit | 13 | 1 | 2 | 9 | 1 | 1 | 1 | 548 |
| Snohomish | transit | 14 | 1 | 1 | 11 | 1 | 1 | 1 | 673 |
| **Total** |  | **1,113** | **40** | **96** | **989** | **78** | **62** | **67** | **64,948** |

Table 2.23 presents the airshed zone emissions associated with the Port of Tacoma.

**Table 2.23: Port of Tacoma 2011 Airshed Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 339 | 11 | 28 | 381 | 26 | 21 | 18 | 28,582 |
| OGV, maneuvering | 36 | 1 | 3 | 30 | 3 | 2 | 3 | 1,690 |
| OGV, transit | 3,257 | 122 | 280 | 2,562 | 216 | 173 | 203 | 153,472 |
| Commercial harbor vessels | 291 | 10 | 44 | 0 | 12 | 11 | 12 | 17,485 |
| Locomotives | 520 | 33 | 80 | 4 | 18 | 16 | 18 | 30,030 |
| Cargo handling equipment | 206 | 13 | 88 | 0 | 10 | 10 | 10 | 22,486 |
| Heavy-duty vehicles | 895 | 51 | 229 | 1 | 17 | 15 | 17 | 141,618 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0 | 0 | 0 | 0 | 1,429 |
| **Total** | **5,546** | **241** | **768** | **2,977** | **303** | **249** | **281** | **396,792** |

Table 2.24 presents 2011 and 2005 airshed emissions comparison for the Port of Tacoma.

**Table 2.24: Port of Tacoma 2011 vs 2005 Airshed Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 375 | 12 | 32 | 410.18 | 29.00 | 23.20 | 21.12 | 30,273 |
| OGV, transit | 3,257 | 122 | 280 | 2,561.76 | 216.39 | 173.12 | 202.75 | 153,472 |
| Commercial harbor vessels | 291 | 10 | 44 | 0.16 | 11.82 | 10.88 | 11.82 | 17,485 |
| Locomotives | 520 | 33 | 80 | 3.87 | 18.05 | 16.45 | 18.05 | 30,030 |
| Cargo handling equipment | 206 | 13 | 88 | 0.20 | 10.00 | 9.70 | 10.00 | 22,486 |
| Heavy-duty vehicles | 895 | 51 | 229 | 1.24 | 17.37 | 15.48 | 17.37 | 141,618 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0.02 | 0.04 | 0.04 | 0.02 | 1,429 |
| **Total** | **5,546** | **241** | **768** | **2,977.43** | **302.68** | **248.86** | **281.13** | **396,792** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 645 | 21 | 54 | 676.17 | 47.05 | 37.64 | 33.79 | 47,465 |
| OGV, transit | 4,069 | 143 | 332 | 2,736.89 | 245.01 | 196.01 | 234.39 | 166,921 |
| Commercial harbor vessels | 278 | 6 | 38 | 29.45 | 12.20 | 11.23 | 12.20 | 15,815 |
| Locomotives | 1,035 | 52 | 128 | 78.45 | 27.80 | 25.58 | 27.80 | 46,082 |
| Cargo handling equipment | 370 | 26 | 160 | 5.40 | 22.92 | 22.26 | 23.01 | 38,646 |
| Heavy-duty vehicles | 1,307 | 63 | 376 | 37.79 | 47.49 | 42.58 | 47.49 | 168,846 |
| Terminal fleet vehicles | 4 | 2 | 15 | 0.02 | 0.04 | 0.04 | 0.04 | 1,689 |
| **Total** | **7,709** | **312** | **1,103** | **3,564.18** | **402.52** | **335.33** | **378.72** | **485,463** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -42% | -41% | -41% | -39% | -38% | -38% | -38% | -36% |
| OGV, transit | -20% | -15% | -15% | -6% | -12% | -12% | -13% | -8% |
| Commercial harbor vessels | 4% | 64% | 17% | -99% | -3% | -3% | -3% | 11% |
| Locomotives | -50% | -36% | -37% | -95% | -35% | -36% | -35% | -35% |
| Cargo handling equipment | -44% | -51% | -45% | -96% | -56% | -56% | -57% | -42% |
| Heavy-duty vehicles | -32% | -20% | -39% | -97% | -63% | -64% | -63% | -16% |
| Terminal fleet vehicles | -36% | -45% | -9% | 33% | 0% | -5% | -50% | -15% |
| **Total** | **-28%** | **-23%** | **-30%** | **-16%** | **-25%** | **-26%** | **-26%** | **-18%** |

Figure 2.32 presents the Port of Tacoma's airshed emissions change for 2011 vs 2005, while Figures 2.33 and 2.34 present the change in airshed emission efficiencies on a ton of emissions per 10,000 TEU and 10,000 tonnes of cargo basis, respectively. Due to a notable decrease in containers volume in 2011 while throughput of non-containerized cargo increased during the same time, the emission based on a tonnes of cargo may be a better representation of emissions related efficiencies.

**Figure 2.32: Port of Tacoma 2011 vs 2005 Airshed Emissions Change**

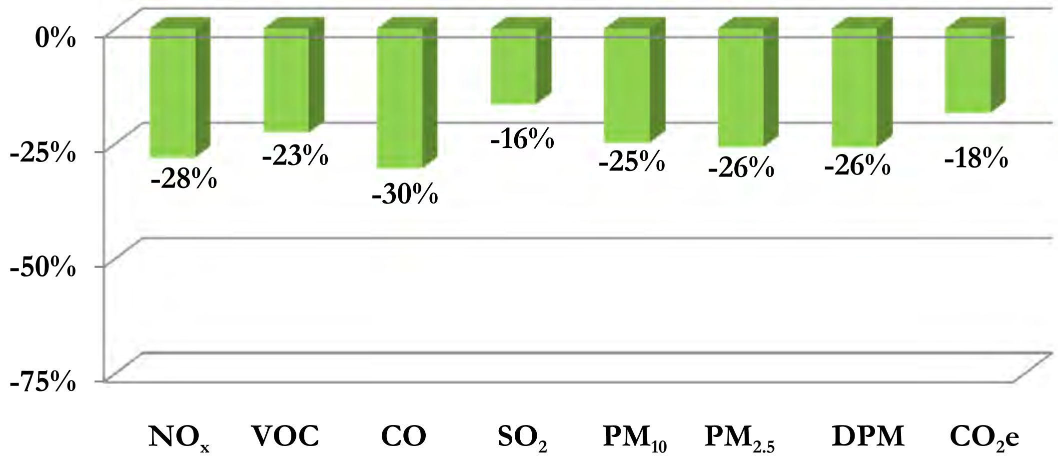


**Figure 2.33: Port of Tacoma 2011 vs 2005 Airshed Emissions per 10,000 TEU Change**

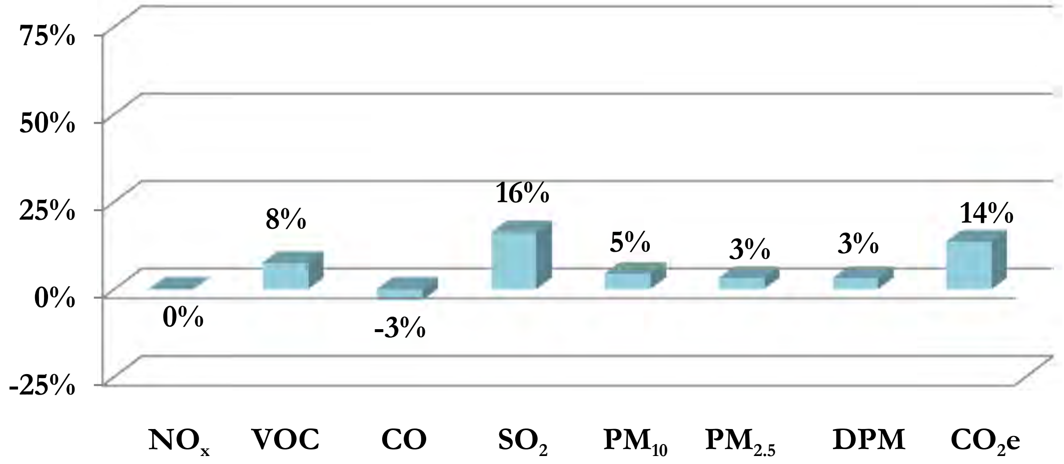
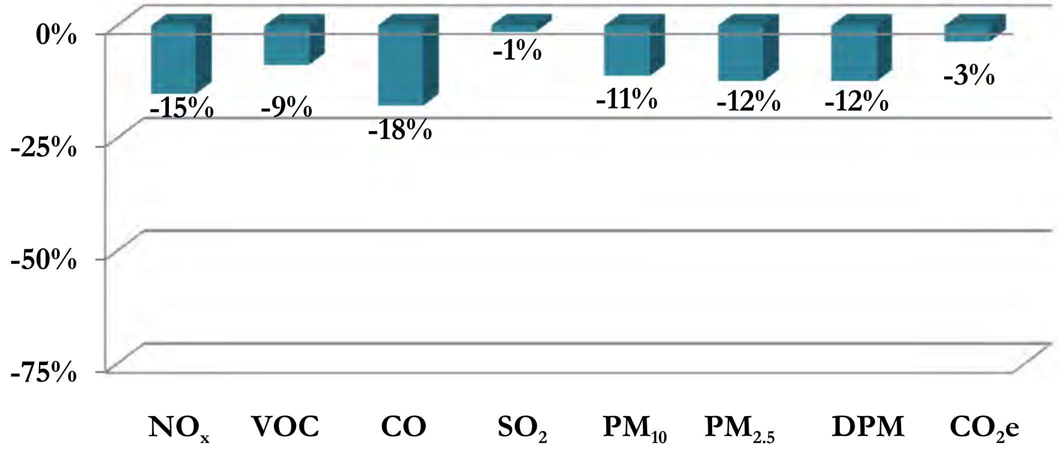


**Figure 2.34: Port of Tacoma 2011 vs 2005 Airshed Emissions 10,000 Tonnes of Cargo Change**



### *2.3.6 Petroleum Facilities*

Table 2.25 presents emissions associated with the petroleum facilities, which involves only ocean going vessels. For this inventory, that is the only source category that was included for refinery related emissions and is the most significant since there are no recreational vessels associated with the refineries and cargo handling equipment are minimal due to nature of liquid bulk.

**Table 2.25: Refinery Related 2011 Port Emissions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| OGV, hotelling | 669 | 25 | 59 | 2,360 | 127 | 102 | 32 | 140,710 |
| OGV, maneuvering | 29 | 2 | 4 | 21 | 2 | 2 | 2 | 1,213 |
| Recreational vessels | na | na | na | na | na | na | na | na |
| Locomotives | na | na | na | na | na | na | na | na |
| Cargo handling equipment | na | na | na | na | na | na | na | na |
| Heavy-duty vehicles | na | na | na | na | na | na | na | na |
| Terminal fleet vehicles | na | na | na | na | na | na | na | na |
| **Total** | **698** | **27** | **63** | **2,381** | **130** | **104** | **34** | **141,923** |

# SECTION 3 OCEAN-GOING VESSELS

Section 3 provides an overview of the ocean-going vessels calling at U.S. maritime facilities located within the Georgia Basin/Puget Sound International Airshed. A description of the methodology used to estimate emissions is provided in this section, as well as the emission estimates for this source category.

## 3.1 Source Category Description and Operational Characteristics

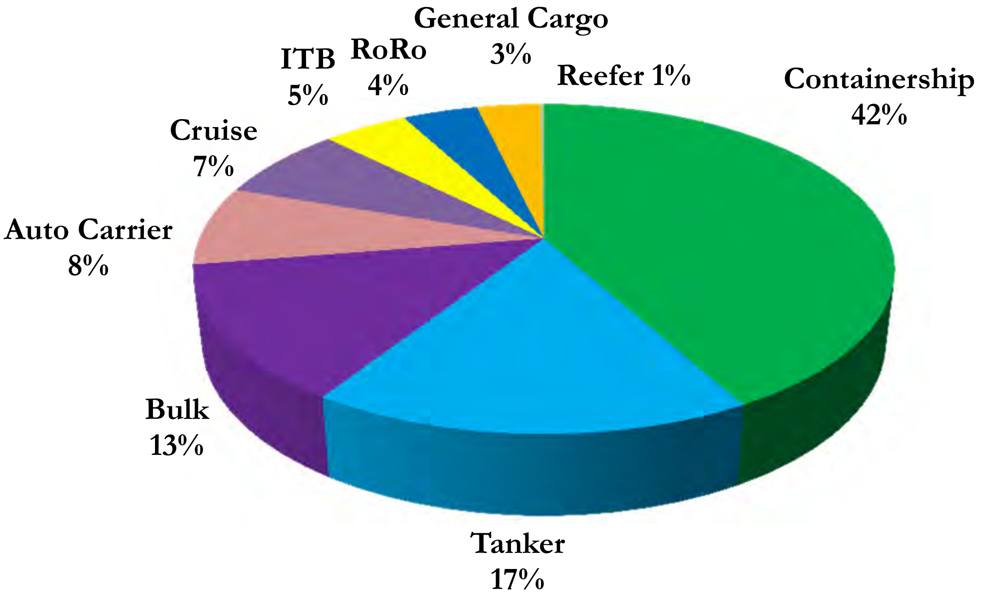
The ocean-going vessel source category typically consists of cargo carrying vessels equipped with large marine propulsion engines known as slow speed engines. These are in contrast to harbor vessels, which are typically equipped with medium speed and high speed propulsion engines, which are discussed in Section 4. Ocean-going vessels are categorized by the following main vessel types for purposes of this emissions inventory:

- Auto carriers
- Bulk carriers
- Containerships
- Passenger cruise vessels
- General cargo vessels
- Integrated tug-barge (ITB) and articulated tug-barge (ATB)
- Miscellaneous vessels
- Refrigerated vessels (Reefers)
- Roll-on/roll-off vessels (RoRo)
- Tankers

The main vessel types are further subdivided for more accurate emissions estimates, as needed. Military vessels, such as aircraft carriers, U.S. Coast Guard vessels, and submarines, are not included in the inventory due to security considerations.

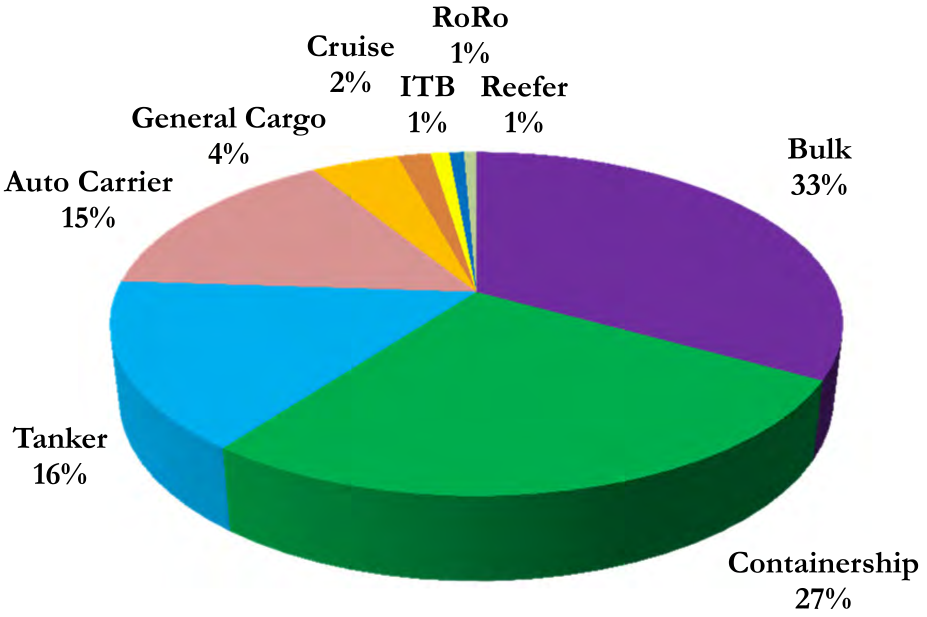
Based on 2011Marine Exchange of Puget Sound (MarEx) data (see Section 3.3.1), there were a total of 2,705 inbound calls of ocean-going vessels making 1,422 shifts in the Puget Sound region in 2011. Containerships made the majority (~42%) of the calls followed by tankers (~17%), bulk carriers (~13%), auto carriers (~8%), cruise vessels (~7%), RoRo (~4%), and general cargo vessels (~3%). Ocean-going tugboats (ITB and ATB only) account for ~5% of the total calls. The reefer vessels account for less than 1% of the vessels. Figure 3.1 presents the percentage of ocean-going vessels for the inbound calls in 2011 in Puget Sound.

Figure 3.1: Puget Sound 2011 Distribution of OGV by Inbound Calls



There were a total of 910 discrete vessels that called the Puget Sound study area in 2011. Figure 3.2 presents the distribution of discrete vessels by vessel type.

Figure 3.2: Puget Sound 2011 Distribution of Discrete OGV Types



Most OGVs are foreign flagged ships, whereas harbor vessels are almost exclusively domestic. Approximately 94% of the OGVs that visited Puget Sound in 2011 were registered outside the U.S. Although only 6% of the individual OGVs are registered in the U.S., they comprise 27% of all calls. This is most likely because the U.S.-flagged OGVs make shorter, more frequent stops within Puget Sound. Some examples of U.S. vessels that make more than one stop are tankers and ocean-going tugboats.

Figure 3.3 presents the distribution of the ships' registered country or flag by the number of calls. Figure 3.4 presents the distribution of the ships' registered country or flag by discrete vessel. The remaining 35% of "other" ships represents 317 discrete ships from 32 countries. The remaining 24% of "other" vessel calls represents 663 calls from 32 other countries.

**Figure 3.3: 2011 Distribution of Ships' Flags by Vessel Call**

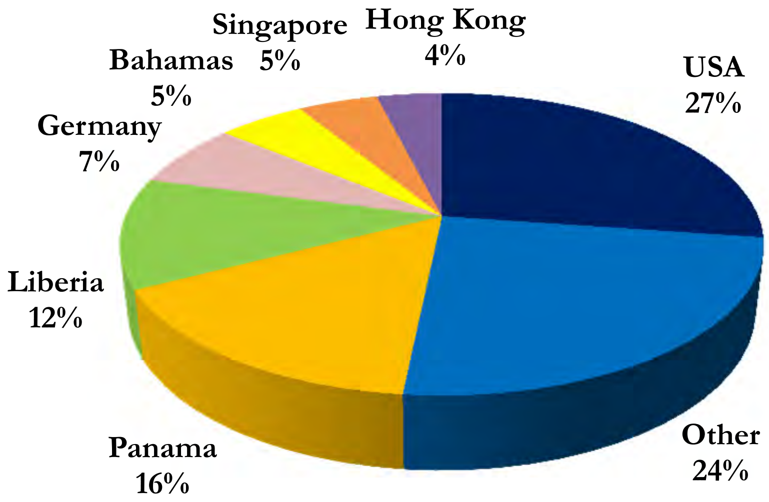
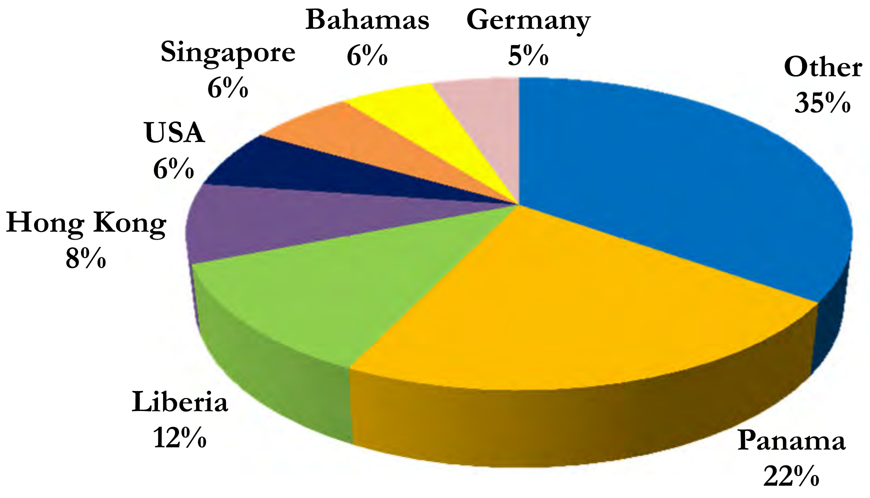


**Figure 3.4: 2011 Distribution of Ships' Flags by Discrete Vessel**



### *3.1.1 Auto Carriers*

Transportation of imported vehicles is the primary use of the auto carrier, although a few domestic vehicles are exported overseas. Auto carriers are very similar in design to RoRos (discussed below) because they have drivable ramps. Both can have substantial ventilation systems so as to prevent vehicle fuel vapors from pooling in the lower decks, which could present a major risk for explosion or fire. Emissions related to vessel cargo are outside the scope of the study. Auto carriers are typically configured with direct drive propulsion engines and separate auxiliary engines to supply electrical needs. Figure 3.5 presents a typical car carrier.

**Figure 3.5: Auto Carrier**

### *3.1.2 Bulk Carriers*

Bulk carriers have open holds with giant hatches to carry dry goods that can be loaded from a conveyor belt and chute, such as coal, coke, salt, sugar, cement, gypsum, lime mix, agricultural products, alumina, and other similar fine-grained commodities that can be poured, scooped or augured. Bulk carriers span the range between small "tramp" ships and the Panamax (approximately 50,000+ deadweight tonnes (1,000 kilograms) or DWT) and Capesize (approximately 140,000+ DWT) bulk carriers that can also haul containers as well as general cargo. Bulk carriers are typically configured with direct drive propulsion engines and separate auxiliary engines to supply electrical needs. Figure 3.6 presents a typical bulk carrier.

**Figure 3.6: Bulk Carrier**

### *3.1.3 Containerships*

Ships that carry 20- and 40-foot containers on their decks are known as containerships. These ships are the fastest, largest, and most common OGVs in Puget Sound. These vessels are primarily used by shipping lines to transport retail goods across the Pacific Rim, mostly originating in Asia. Because of their efficiency as a mode of ocean transportation, containership traffic will continue to grow. Cargo types include almost everything that can be made to fit in the 20- or 40-foot containers. The container business operates on tight margins and high volume so OGVs need to be fast and efficient to compete in the market place, thus the trend to newer, larger containerships. The container vessels have been divided into ten subtypes based on their TEU capacity, between 1,000 and 10,000+ TEU. Figure 3.7 presents a typical containership.

**Figure 3.7: Containership**

### *3.1.4 Passenger Cruise Vessels*

There is a significant passenger cruise service operating from the Port of Seattle. In 2011, shore power was provided for both Holland America Line and Princess Cruises at Terminal 91. Cruise vessels are known not only for their speed but also their heavy auxiliary engine demands, since they often provide heating and electricity for over 1,000 to 3,000 passengers at a time. Cruise vessels vary significantly in overall size, onboard auxiliary power, engine configuration, fuel type and characteristics, and frequency of calls. Typically, newer cruise ships work on a diesel-electric configuration with some using turbines to generate electricity, while older cruise ships use direct drive and auxiliary engines. Figure 3.8 presents a passenger cruise vessel.

**Figure 3.8: Cruise Vessels**

### *3.1.5 General Cargo Vessels*

Like the bulk carriers, general cargo ships tend to be slower. They can carry diverse cargoes such as steel, palletized goods, turbines, a few containers (usually on the top deck), large excavating machinery, and other heavy loads. Most general cargo ships have electric boom cranes for loading and unloading. General cargo ships are typically configured with direct drive propulsion engines and separate auxiliary engines to supply electrical needs. Figure 3.9 presents a general cargo vessel.

**Figure 3.9: General Cargo Vessel**

### *3.1.6 Ocean-Going Tugboats*

Ocean-going towboats and tugboats, which are considered harbor vessels, are not included in this section and are discussed in Section 4 of this report. ITB and ATB vessels, however, are included in this section since they are seen as a specialized single vessel. The barge stern is notched to accept a special tug which can be rigidly connected to the barge in the form of a normal ship's hull. The tugboats, like all other ocean-going tugs, are typically configured with two propulsion engines and separate auxiliary engines to supply electrical needs. ITB and ATB may have larger horsepower in their engines than the typical ocean-going tug. Figure 3.10 presents an integrated tug and barge.

**Figure 3.10: Integrated Tug and Barge**

### *3.1.7 Refrigerated Vessels*

Refrigerated vessels, often called "reefers," are dominated by fruit carriers, which require cooling to prevent cargo spoilage. These are similar to bulk or general cargo carriers, but these ships typically carry fruits, vegetables, meats, and other perishable cargos. Most of the cargo is stored below deck on pallets or transported inside refrigerated containers that are placed on top of the closed cargo hold. Reefers are typically configured with direct drive propulsion engines and separate auxiliary engines to supply electrical needs for the vessel and the refrigeration units. Figure 3.11 presents a typical refrigerated vessel.

**Figure 3.11: Refrigerated Vessel**

### *3.1.8 RoRo Vessels*

These OGVs are similar to the automobile carrier but can accommodate larger wheeled equipment such as excavators, bulldozers, trucks, and loaders. RoRo ships are typically configured with direct drive propulsion engines and separate auxiliary engines to supply electrical needs. Figure 3.12 presents a typical RoRo vessel.

**Figure 3.12: RoRo Vessel**

### *3.1.9 Tanker Vessels*

The tanker activity in Puget Sound is comprised mainly of crude oil tankers, as well as a few chemical tankers. Tankers range from approximately 12,000 to over 190,000 DWT. Tankers are typically configured with direct drive propulsion engines, separate auxiliary engines to supply electrical needs, and large boilers that power steam plants to power discharge pumps. The tankers have been divided into subcategories of tanker by size. All tankers calling the Puget Sound fall into one of the following size categories depending on their DWT:

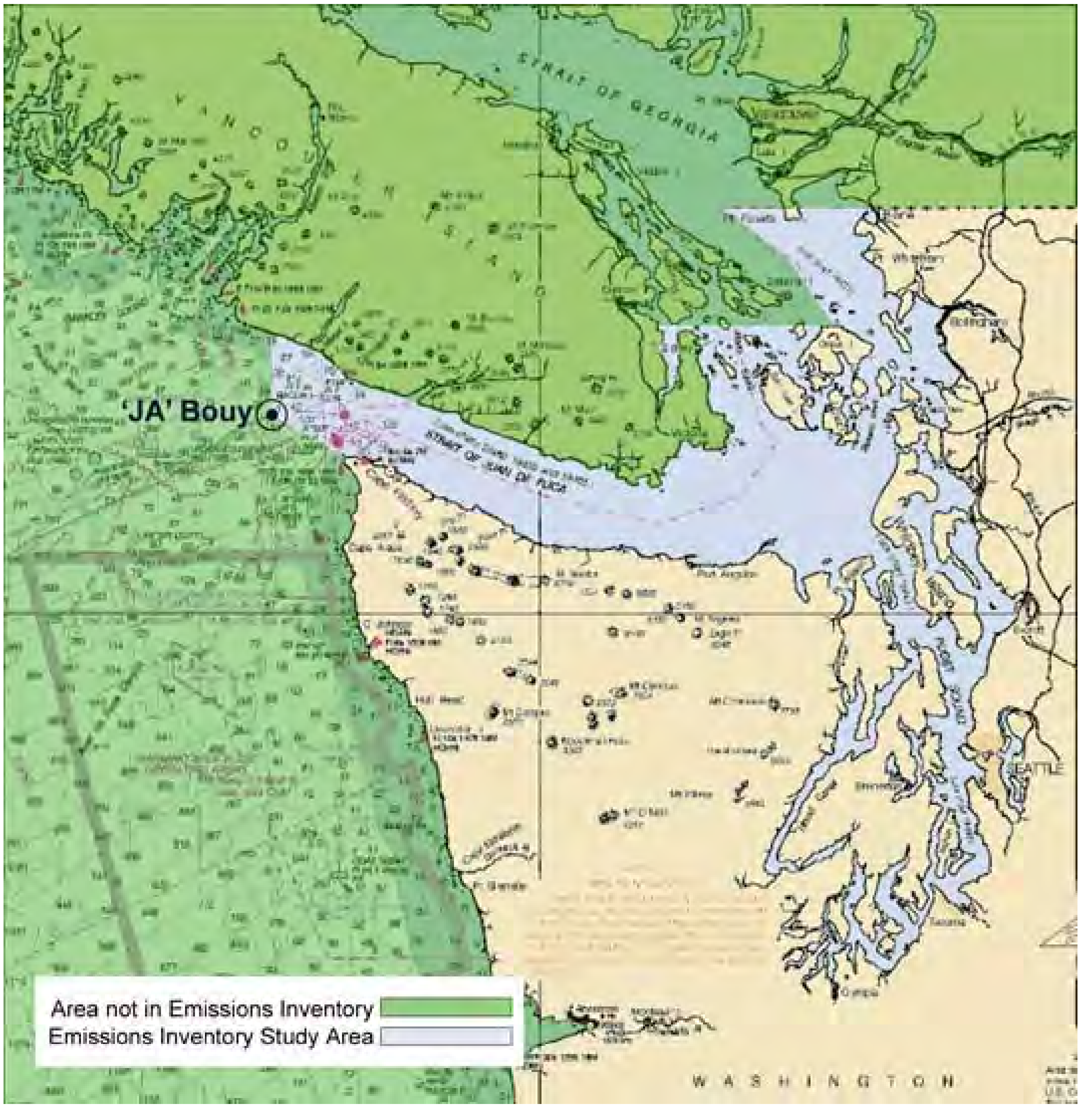
- Handysize–up to 50,000 DWT
- Panamax - 50,000 to 80,000 DWT
- Aframax - 80,000 to 120,000 DWT
- Suezmax - 120,000 to 200,000 DWT

**Figure 3.13: Tanker**

## 3.2 Geographical Delineation

The geographical area for ocean-going vessels for the 2011 emissions inventory includes a portion the Georgia Basin/Puget Sound International Airshed as presented in Figure 3.14.

**Figure 3.14: 2011 OGV Inventory Boundary**



This area includes the twelve counties and six ports described in Section 1.2.4. Other maritime facilities within the geographical boundary are included in this inventory. These facilities include privately-owned facilities, anchorages, ferry terminals and smaller ports in the study area. There are also oil and chemical facilities in the study area located in Cherry Point, Ferndale, March Point, Point Wells, Sandy Point, and Vendovi Island.

Data from the MarEx (see Section 3.3.2) and the Vessel Traffic System (VTS) was used to determine the shipping routes for the purposes of this study within the inventory's geographical area. During the 2005 inventory, the British Columbia Chamber of Shipping (BCCOS) conducted an emissions inventory associated with OGVs calling at Canadian ports in the Georgia Basin/Puget Sound International Airshed. The inventory was coordinated with Environment Canada and the Vancouver-Fraser Port Authority (now known as Port Metro Vancouver), and others, as well as the Forum to assure quality and consistency and avoid duplication and omissions between the two inventories. Using the MarEx data, it was determined that there were five general types of common routing. In an effort to reduce double counting or omissions of ship activity and emissions, an agreement was reached on which inventory would account for which emissions and where those emissions would be counted. The same agreed approach was used for 2011 and is detailed below.

Inbound and outbound vessels travel on specific VTS travel lanes. Since the U.S./Canadian border generally lies between the inbound and outbound vessel travel lanes (i.e., inbound lane lies on the U.S. side of the border, while the outbound lane lies on the Canadian border in Strait of San Juan de Fuca), the agreement included discussion on inbound and outbound transit emissions. Figure 3.15 presents the U.S./Canadian border in the Strait of San Juan de Fuca and the domain captured by U.S. maritime-related activities.

The agreements reached for the five general types of trans-boundary routing included are:

1) All inbound ship transits from sea buoy (JA Buoy) to the arrival point be assigned with U.S. or Canadian transit leg for the whole transit based on the arrival point. For example, a vessel that transits from sea to a U.S. marine facility will be assigned as a U.S. transit regardless of which side of the international boundary the ship transits.

2) All outbound ship transits from the last departure point to the sea buoy (JA Buoy) will be assigned with U.S. or Canadian transit legs for the whole transit based on the departure point. For example, a vessel that leaves a U.S. maritime facility and transits out to sea will be assigned a U.S. transit regardless of which side of the international boundary the ships transits.

Figure 3.15: 2011 OGV Inventory Boundary – JA Buoy to/from U.S. Marine Facilities

3) All ship transits between Victoria, Canada and a U.S. port will be split between both inventories in the following ways as shown in Figure 3.16:

***Victoria ->U.S. Marine Facility***

a) The BCCO inventory will estimate emissions from Victoria Harbor to the international boundary in the Strait of Juan de Fuca (en-route to Port Angeles to pick up a U.S. Pilot).

b) The Puget Sound Maritime Air Emissions Inventory will estimate emissions from the international boundary to the pickup of U.S. Pilots (north of Port Angeles) and to the arrival point.

***U.S. Port -> Victoria***

a) The Puget Sound Maritime Air Emissions Inventory will estimate emissions from the departure point to Port Angeles (to drop off Pilots) and north to the international boundary (heading to Victoria).

b) The BCCO inventory will estimate emissions on the Canadian side international boundary to Victoria Harbor.

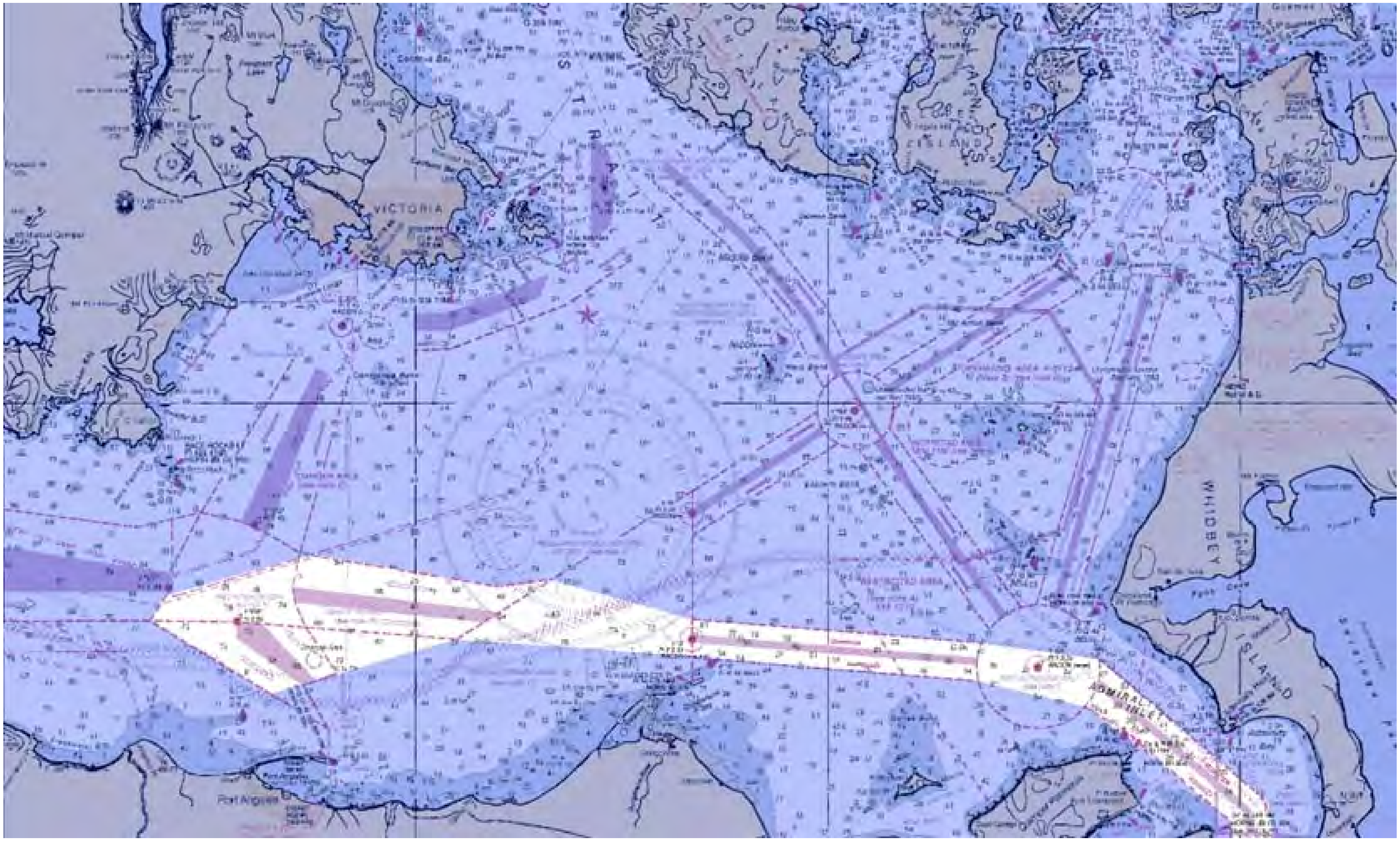
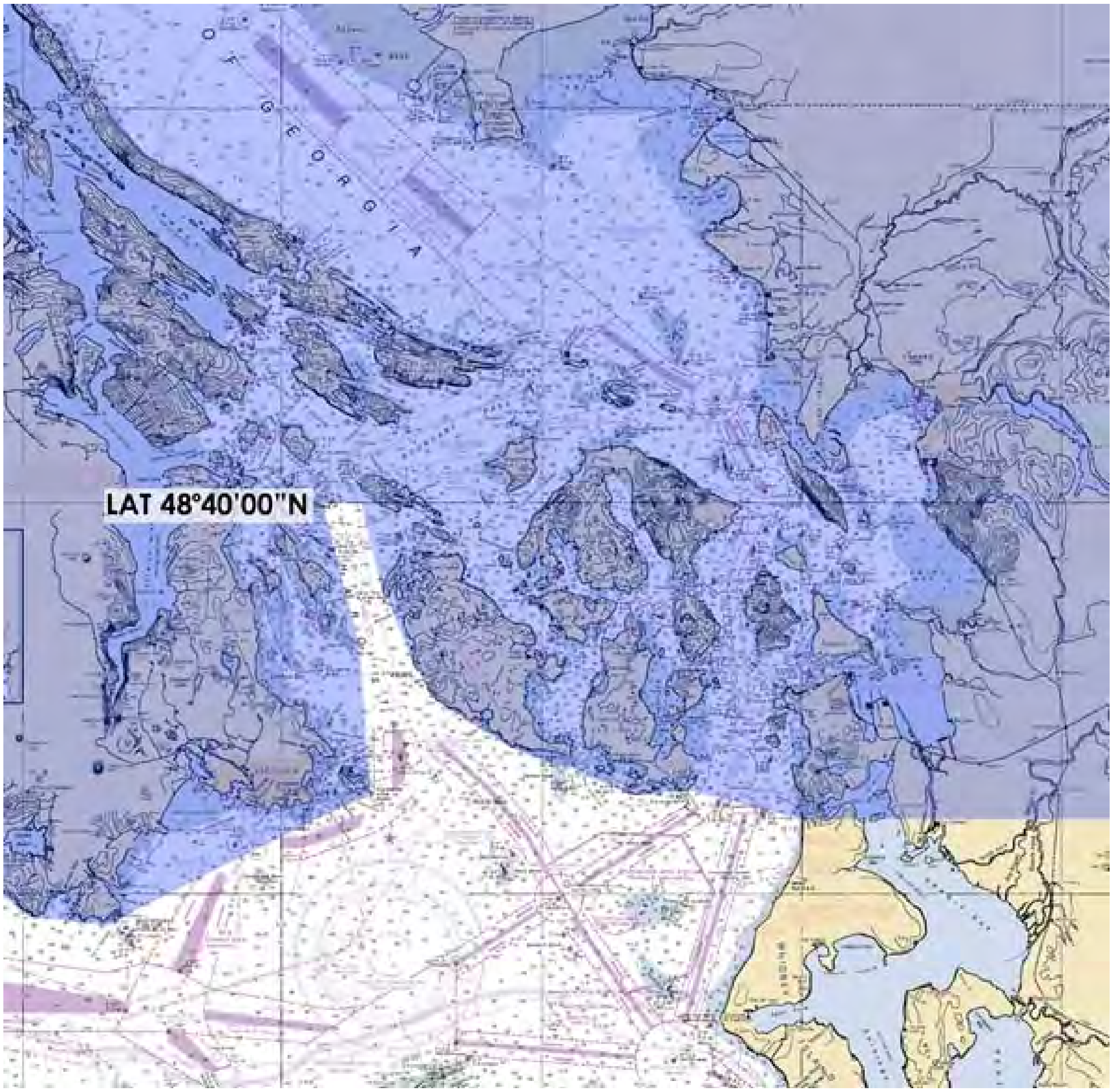


Figure 3.16: 2011 OGV Inventory Boundary – Victoria to/from U.S. Marine Facilities

4) All non-tanker ships transiting between a Canadian marine facility (other than Victoria) and a U.S. marine facility), in either direction, will be divided at latitude 48° 40' 00" north in the Haro Strait. All emissions north of this line will be included in the BCCO inventory and all emissions south of this line will be included in the Puget Sound Maritime Air Emissions Inventory, as shown in Figure 3.17.

**Figure 3.17: 2011 OGV Inventory Boundary – Vancouver to/from U.S. Marine Facilities**



5) All tanker ships calling to or from Anacortes, Cherry Point, Ferndale, and March Point, to Vancouver, British Columbia will be divided at latitude 48° 55' 08" in the shipping lanes located in the Strait of Georgia. All emissions south of this line will be included in the Puget Sound Maritime Air Emissions Inventory and all emissions north of this line will be included in the BCCO inventory, as shown in Figure 3.18.

**Figure 3.18: 2011 OGV Inventory Boundary – Vancouver to/from Anacortes, Cherry Point, Ferndale, March Point, and Sandy Point**

For 2011, the Port of Tacoma and Port of Seattle increased the resolution from the previous report to get a better understanding of port-related emissions by allocating them into three geographical zones, compared to one zone in 2005. For comparison purposes the 2011 and 2005 emissions were allocated into the following three geographical zones for their port-specific emissions and comparisons:

- Port - emissions within port terminals and adjacent waterways
- Air district – emissions within the PSCAA boundaries (Pierce, King, Kitsap, and Snohomish Counties)
- Airshed – emission within the inventory domain

The other participating ports, their port specific emissions and comparisons are consistent with the 2005 approach.

## 3.3 Data and Information Acquisition

In the development of the 2005 inventory, there was an extensive data collection effort undertaken relating to OGVs. The routing system was developed, ship operational profiles developed, and other information relating to ship parameters and operations were collected. The 2011 update inventory utilizes the 2005 information as a foundation with updates relating to 2011 operations. There were several sources used to compile the data necessary to define activities and operational profiles which are then used to estimate emissions. These sources included:

- 2005 Puget Sound Maritime Air Emissions Inventory
- MarEx
- Lloyd's Register of Ships
- Puget Sound Pilots
- Vessel operational data

Each data source is detailed in the following subsections.

### *3.3.1 2005 Puget Sound Maritime Air Emissions Inventory*

The 2011 update builds on the foundation established for the 2005 inventory. The following elements were incorporated and updated:

- Puget Sound system vessel routing and speeds by category (fast, medium, slow)
- Vessel operational profiles
- Spatial allocation of emissions by county and clean air agency
- Berth specific operational profiles
- Port maneuvering profiles
- Reduced speed zones, where applicable

The 2005 data was updated with data from the Marine Exchange, Puget Sound Pilots, vessel operators/owners, and other operational data sources.

### *3.3.2 Marine Exchange of Puget Sound (MarEx)*

The MarEx is a non-profit organization established in 1981 to provide comprehensive communication services for the maritime industry. MarEx maintains a complete database that captures information on every vessel arriving in Puget Sound. It is a founding member of the Maritime Information Service of North America, which is the national organization of the marine exchanges.

MarEx provided 2011 activity data that included: vessel IMO numbers, arrival, shift, and departure dates and times, route information, and berth information. Starcrest took this information and developed unique voyage numbers linking data points into inbound, shift, and outbound activities. Starcrest associated the proper routing and associated port with each activity. From the berth/anchorage arrival and departure records, hotelling times at berths and anchorages were established. This information was then used to estimate all vessel related emissions during transit, maneuvering, and hotelling operational modes.

### *3.3.3 Lloyd's Register of Ships*

The information source commonly known as Lloyd's Register of Ships[10] (Lloyd's) is considered to be the leading resource for obtaining ship characteristics such as tonnage, vessel speed, propulsion engine power, propulsion configuration, age, and other parameters. The company is known as a classification society for the purpose of insuring many of the vessels on an international basis. The data are quite complete for vessels classified by Lloyd's; however; for other ships using a different insurance certification authority, the data are less complete and/or accurate. Lloyd's was used for obtaining information such as main engine power and vessel speed ratings because it is the best available source of such information. Lloyd's data sets for auxiliary engines and boilers are mostly incomplete and other data were used to enhance these source categories. The company IHS has the rights to Lloyd's ship data and sells data containing information on commercial marine vessels, which includes ocean-going vessels.

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[10] Lloyd's, *Lloyd's Register of Ships*, January 2012.

### *3.3.4 Puget Sound Pilots*

The Puget Sound Pilots (PSP) provided information on operational changes associated with ship movements since 2005. During the 2005 inventory process, the PSP provided detailed route speed information for various types of ships and details on wake reduction areas. The PSP was engaged to identify any operational changes in the Puget Sound system from 2005 to 2011. The PSP stated that operations were fairly consistent, with some local changes associated with 2011 compared to 2005 which include:

- Inbound large container ships were typically slower just north of Point No Point to Elliott Bay to reduce impact of wake waves. The routing from 2005 was checked for the affected segments and the change in speed was within 1 to 2 knots. This change was not implemented due to the near alignment of the 2005 data.
- Cruise ship departures were typically slower from Elliott bay to Edmonds due to high numbers of recreational vessels during the summer months in the Puget Sound. This change was not included in the inventory which means that some of the cruise ship emissions along this reach are overestimated. Starcrest does not believe that this overestimate is significant compared to all cruise ship emissions.
- Inbound speeds from the ocean to Port Angeles were typically slightly slower due to slow steaming by the shipping lines trying to save on fuel prices. The percentage of vessels slowing down during this portion of the reach was not known and the MarEx data typically started at Port Angeles. To remain conservative, the speeds were not adjusted in 2011 and therefore most likely providing an overestimate of ship transit emissions in this reach. Starcrest believes that the magnitude of the overestimate will depend on the number of vessels slowing down and by how much.

### *3.3.5 Vessel Operational Data*

Vessel operational data focuses on the operational profiles relating to main engines, auxiliary engines, and auxiliary boilers. A number of sources were used to update these parameters.

The Port of Tacoma and the Port of Seattle provided information relating to 2011 shore power events and fuel switching at-berth relating to their emissions reduction efforts under their CAS.

Main engine operational profiles developed in 2005 were reviewed and used for main engine operation. The most significant of these profiles is at the Ports of Seattle and Tacoma where various narrow channels and restricted waterways require tugs to move the ships without main engine assist. These profiles were used in 2011 as they are still valid.

Auxiliary engine data by operational mode is typically the most difficult data to source as it is not published by traditional data providers. Starcrest has been conducting Vessel Boarding Programs (VBPs) in various ports for the past 13 years including Puget Sound ports, Port of Los Angeles, Port of Long Beach, Port of Houston Authority, and Port Authority of New York & New Jersey. The data collected since the 2005 report data has been significant. During the 2011, limited funding was available to update vessel specific information. The most robust datasets published, which also share several common vessels, are the data presented in the Port of Long Beach (POLB) and Port of Los Angeles (POLA) inventories.

For the 2011 PSEI, the 2010 published data for both POLB and POLA was averaged and used. In addition, specific data collected from Holland America Lines, Maersk, TOTE, Evergreen, K-Line, and CMA-CGM was used.

Based on various vessel boardings conducted by Starcrest since the 2005 inventory, it has been identified that the auxiliary boilers on most ships are not used when main engine loads are at or above 20%. This is due to waste heat recovery systems on ships that take the hot engine exhaust from the main engine and use it to heat water. The resulting rule for auxiliary boilers for most ships is if the main engine load is above 20% then the boilers are considered off. Therefore, most boiler emissions occur during maneuvering and at-berth/at-anchorage modes. This change has been implemented for the 2011 update.

Further information on operational profiles is provided in Section 3.4.

## 3.4 Operational Profiles

The operational profiles for OGVs are based on vessel activity and routing, as discussed below.

### *3.4.1 Vessel Activity*

Vessel activity is defined as the number of ship trips by trip type and segment. Trip types include arrivals, departures, and shifts. Shifts are vessel movements from one berth within the Puget Sound area to another. The MarEx data was processed to identify arrivals, departures and shifts in a logical sequence. Arrivals were assumed to come from the "last port of call" or from the sea. For departures, vessels were assumed to depart from the designated port and pier and travel to the "next port of call" or travel out to sea. Shifts which involved trips internal to the area of study were processed as being from the last arrival to the next departure. One result of the data processing was the creation of three variables: trip origin, trip destination, and elapsed time (for hotelling estimates).

There are a variety of definitions for "ship call" or "vessel call". For the purpose of this report, the basic definition of a ship call is an arrival from the sea, Canada or another port to a berth or anchorage. Inbound calls to anchorages associated with maritime facilities are also included, and thus the number of calls described in this report may not completely match the port statistics on ship calls for 2011. The arrivals, as determined by this study, approximate the true number of ship calls, but underestimates the number of terminal calls typically reported for port statistics, which include shifts or movements within a port facility. This study separates shifts from arrivals and departures since shifts do not have a "transit" component as do arrivals and departures. Ship movements are tracked as to:

- Arrivals (vessels arriving from the sea or from another facility to a terminal).
- Departures (vessels leaving a terminal to go out to sea or to another facility).
- Shift (vessels that move within the Puget Sound to another terminal, berth, anchorage, or from one port to another port within the airshed domain).
- Total movements (sum of all the above).

While many vessels make only one arrival and departure at a time, some vessels make multiple terminal calls within a port or maritime facility. There are two broad categories of shifts:

- Inter-port shifts – movements within a port from one terminal or berth to another.
- Anchorage shifts – movements between a terminal and anchorage. One example is: a vessel went to a terminal, loaded a partial load, went to anchorage, and then came back to the terminal to complete loading.
- Intra-port shifts – shifts from one port to another port in the airshed domain.

Table 3.1 presents the arrivals, departures, shifts and total movements for the Puget Sound study area in 2011 by vessel type. Due to the complexity of the study area, the number of inbound and outbound trips does not match. For example, in Table 3.1, the total inbound trips are less than the total outbound trips. This is because vessels that shifted from another dock, anchorage or terminal within the port(s) or maritime facilities are counted as shifts instead of arrivals from the sea or another port or maritime facility.

**Table 3.1: 2011 OGV Movements by Vessel Type**

| Vessel Type | Inbound | Outbound | Shift | Movements |
|---|---|---|---|---|
| Auto Carrier | 210 | 213 | 18 | 441 |
| Bulk | 341 | 342 | 293 | 976 |
| Bulk - Heavy Load | 3 | 2 | 6 | 11 |
| Bulk - Self Discharging | 16 | 17 | 14 | 47 |
| Bulk - Wood Chips | 1 | 1 | 0 | 2 |
| Container - 1000 | 223 | 223 | 17 | 463 |
| Container - 2000 | 142 | 142 | 26 | 310 |
| Container - 3000 | 45 | 45 | 1 | 91 |
| Container - 4000 | 141 | 141 | 6 | 288 |
| Container - 5000 | 243 | 243 | 9 | 495 |
| Container - 6000 | 115 | 115 | 51 | 281 |
| Container - 7000 | 87 | 86 | 1 | 174 |
| Container - 8000 | 137 | 136 | 8 | 281 |
| Container - 9000 | 2 | 2 | 0 | 4 |
| Container - 10000 | 1 | 1 | 0 | 2 |
| Cruise | 196 | 196 | 0 | 392 |
| General Cargo | 94 | 95 | 56 | 245 |
| ITB | 127 | 126 | 216 | 469 |
| Reefer | 6 | 6 | 7 | 19 |
| RoRo | 112 | 110 | 2 | 224 |
| Tanker - Aframax | 56 | 54 | 129 | 239 |
| Tanker - Chemical | 169 | 169 | 144 | 482 |
| Tanker - Handysize | 38 | 39 | 47 | 124 |
| Tanker - Panamax | 22 | 22 | 32 | 76 |
| Tanker - Suezmax | 179 | 174 | 340 | 693 |
| **Total** | **2,706** | **2,700** | **1,423** | **6,829** |

Figure 3.19 presents the distribution of 2011 inbound calls by facility type, with 73% of the inbound calls were to the six main public ports in the area. Other maritime facilities, such as privately-owned terminals and anchorages throughout the study area had 13% of the inbound calls in 2011. Petroleum terminals and their associated anchorages had 14% of the inbound calls in 2011.

**Figure 3.19: 2011 OGV Inbound Calls by Facility Type**

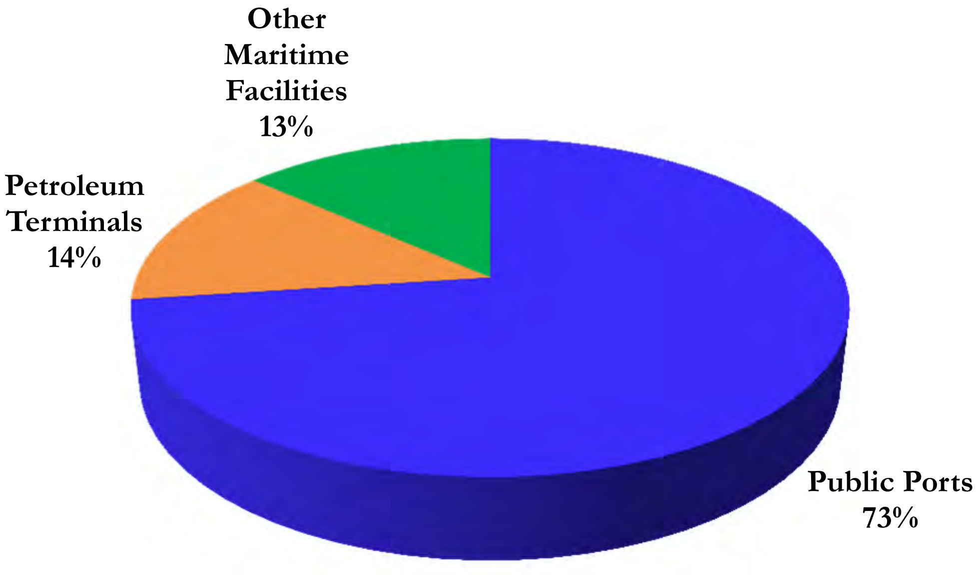
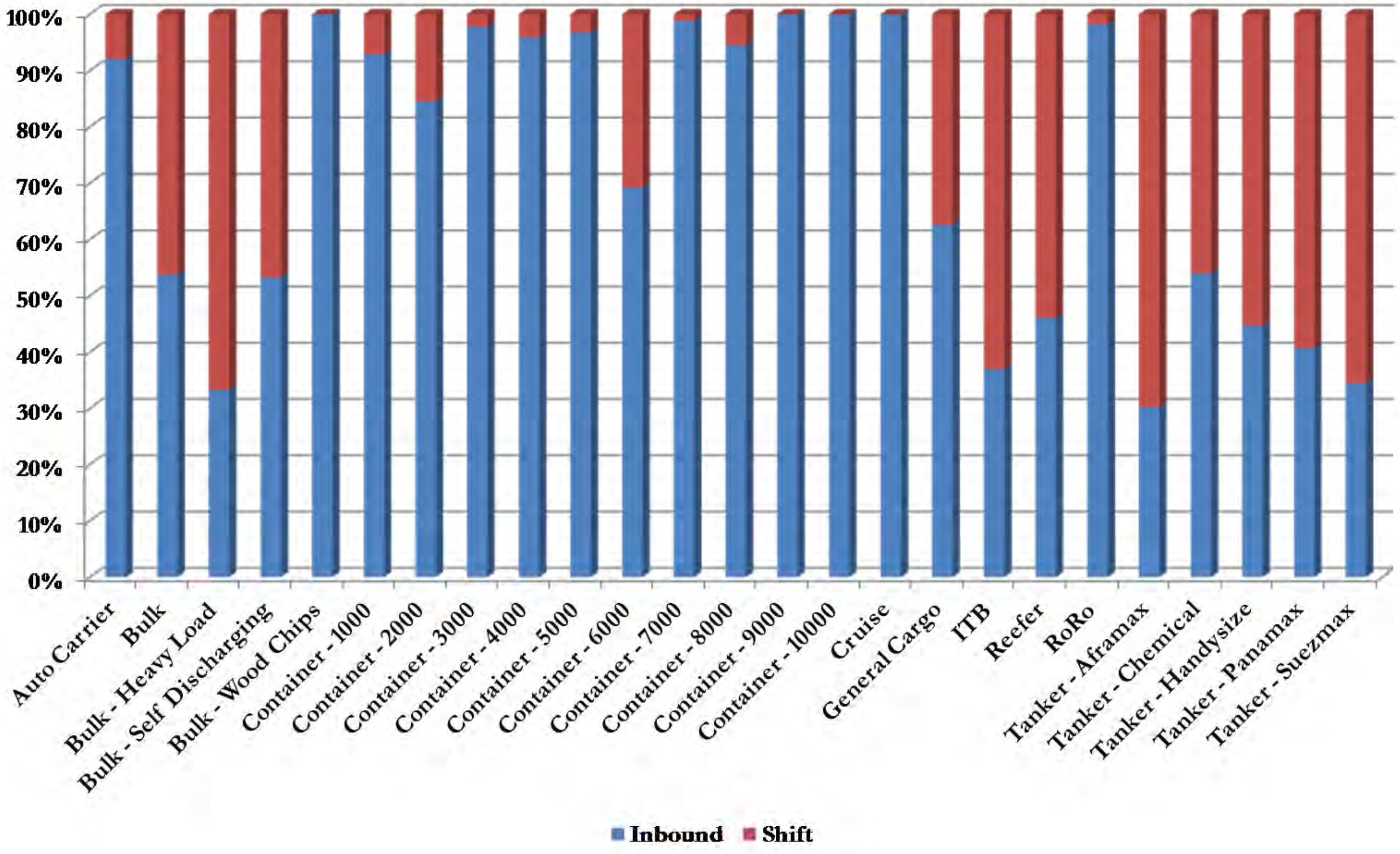


Figure 3.20 presents the distribution of shift vs inbound calls by vessel type. Tankers, ocean tugboats, bulk vessels and miscellaneous vessels have a higher percentage of shifts than other vessel types. Tankers tend to use more anchorages and therefore shift from anchorage to oil and chemical terminals instead of coming straight from the sea to the terminal. Bulk vessels make more than one stop at terminals within a port to load and unload their cargo.

**Figure 3.20: 2011 Distribution of OGV Shifts vs Inbound Calls by Vessel Type**



### *3.4.2 Vessel Routing*

Vessel routing is the underlying geographic element on which the emissions estimates are based. Using the 2011 MarEx of Puget Sound data, distinct trip routes were derived. There were a total of 156 distinct ship routes in the MarEx data. As shown in Table 3.2, 148 distinct ship routes were within the study area and scope.

The term "port" in the following tables refers to any stop made by a vessel and does not necessarily refer to a public port. In Table 3.2, routes that have the same "from port" and "to port" (i.e., Everett to Everett) are included for shifts within the port. Vessels may make a movement or shift within the port from one terminal to another or from an anchorage to a terminal.

Due to the routing complexity of the region and the multiple movements, including arrivals, departures and shifts, some routes may have reciprocal routes included in Table 3.2 (i.e., Tacoma to Seattle and Seattle to Tacoma), while others may not. For example, Anacortes to Seattle is listed, but there is no reciprocal Seattle to Anacortes route listed. This indicates that in 2011, vessels may have traveled from Anacortes to Seattle, but there were no movements from Seattle to Anacortes. The distinct routes are from the 2011 MarEx data and depict the movements made that year.

# Table 3.2: OGV Vessel Routes Used in Puget Sound Maritime Air Emissions Inventory

| From Port | To Port |
|---|---|
| ANACORTES | CHERRY POINT |
| ANACORTES | FERNDALE |
| ANACORTES | MARCH POINT |
| ANACORTES | OUT SEA |
| ANACORTES | PORT ANGELE |
| ANACORTES | SEATTLE |
| ANACORTES | VENDOVI ISLA |
| BELLINGHAM | BELLINGHAM |
| BELLINGHAM | CHERRY POINT |
| BELLINGHAM | MARCH POINT |
| BELLINGHAM | OUT SEA |
| BELLINGHAM | PORT ANGELE |
| BELLINGHAM | SEATTLE |
| BREMERTON | TACOMA |
| CHERRY POINT | BELLINGHAM |
| CHERRY POINT | FERNDALE |
| CHERRY POINT | MANCHESTER |
| CHERRY POINT | MARCH POINT |
| CHERRY POINT | OUT SEA |
| CHERRY POINT | PORT ANGELE |
| CHERRY POINT | SEATTLE |
| CHERRY POINT | TACOMA |
| CHERRY POINT | VANCOUVER B |
| CHERRY POINT | VENDOVI ISLA |
| EVERETT | EVERETT |
| EVERETT | OUT SEA |
| EVERETT | PORT ANGELE |
| EVERETT | SEATTLE |
| EVERETT | VANCOUVER B |
| FERNDALE | CHERRY POINT |
| FERNDALE | MARCH POINT |
| FERNDALE | OUT SEA |
| FERNDALE | PORT ANGELE |
| FERNDALE | SANDY POINT |
| FERNDALE | TACOMA |
| FERNDALE | VANCOUVER B |
| FERNDALE | VENDOVI ISLA |
| INDIAN ISLAND | MANCHESTER |
| INDIAN ISLAND | OUT SEA |
| MANCHESTER | CHERRY POINT |
| MANCHESTER | MARCH POINT |
| MANCHESTER | OUT SEA |
| MANCHESTER | PORT ANGELE |
| MANCHESTER | SEATTLE |
| MARCH POINT | ANACORTES |
| MARCH POINT | CHERRY POINT |
| MARCH POINT | FERNDALE |
| MARCH POINT | MARCH POINT |
| MARCH POINT | OUT SEA |
| MARCH POINT | POINT WELLS |
| MARCH POINT | PORT ANGELE |
| MARCH POINT | QUARTERMAST |
| MARCH POINT | SEATTLE |
| MARCH POINT | TACOMA |
| MARCH POINT | VANCOUVER B |
| MARCH POINT | VENDOVI ISLA |
| MARCH POINT | VICTORIA |
| OLYMPIA | OUT SEA |
| OLYMPIA | SEATTLE |
| OUT SEA | ANACORTES |
| OUT SEA | BELLINGHAM |
| OUT SEA | BREMERTON |
| OUT SEA | CHERRY POINT |
| OUT SEA | EVERETT |
| OUT SEA | FERNDALE |
| OUT SEA | INDIAN ISLAND |
| OUT SEA | MANCHESTER |
| OUT SEA | MARCH POINT |
| OUT SEA | OLYMPIA |
| OUT SEA | POINT WELLS |
| OUT SEA | PORT ANGELES |
| OUT SEA | PORT TOWNSEND |
| OUT SEA | QUARTERMASTER H |
| OUT SEA | SANDY POINT |
| OUT SEA | SEATTLE |
| OUT SEA | TACOMA |
| OUT SEA | VENDOVI ISLAND |
| OUT SEA | YUKON HARBOR |
| POINT WELLS | MARCH POINT |
| POINT WELLS | OUT SEA |
| POINT WELLS | PORT ANGELES |
| PORT ANGELES | ANACORTES |
| PORT ANGELES | BELLINGHAM |
| PORT ANGELES | CHERRY POINT |
| PORT ANGELES | EVERETT |
| PORT ANGELES | FERNDALE |
| PORT ANGELES | INDIAN ISLAND |
| PORT ANGELES | MARCH POINT |
| PORT ANGELES | OUT SEA |
| PORT ANGELES | POINT WELLS |
| PORT ANGELES | PORT ANGELES |
| PORT ANGELES | SANDY POINT |
| PORT ANGELES | SEATTLE |
| PORT ANGELES | TACOMA |
| PORT ANGELES | VANCOUVER BC |
| PORT ANGELES | VENDOVI ISLAND |
| PORT TOWNSEND | SEATTLE |
| QUARTERMASTER HB | OUT SEA |
| QUARTERMASTER HB | TACOMA |
| SANDY POINT | CHERRY POINT |
| SANDY POINT | FERNDALE |
| SEATTLE | CHERRY POINT |
| SEATTLE | EVERETT |
| SEATTLE | FERNDALE |
| SEATTLE | MANCHESTER |
| SEATTLE | MARCH POINT |
| SEATTLE | OLYMPIA |
| SEATTLE | OUT SEA |
| SEATTLE | PORT ANGELES |
| SEATTLE | SEATTLE |
| SEATTLE | TACOMA |
| SEATTLE | VANCOUVER BC |
| SEATTLE | VENDOVI ISLAND |
| SEATTLE | VICTORIA |
| TACOMA | CHERRY POINT |
| TACOMA | MARCH POINT |
| TACOMA | OLYMPIA |
| TACOMA | OUT SEA |
| TACOMA | PORT ANGELES |
| TACOMA | QUARTERMASTER HBR |
| TACOMA | SEATTLE |
| TACOMA | TACOMA |
| TACOMA | VANCOUVER BC |
| TACOMA | VENDOVI ISLAND |
| VANCOUVER BC | ANACORTES |
| VANCOUVER BC | BELLINGHAM |
| VANCOUVER BC | CHERRY POINT |
| VANCOUVER BC | EVERETT |
| VANCOUVER BC | INDIAN ISLAND |
| VANCOUVER BC | MARCH POINT |
| VANCOUVER BC | PORT ANGELES |
| VANCOUVER BC | QUARTERMASTER HBR |
| VANCOUVER BC | SANDY POINT |
| VANCOUVER BC | SEATTLE |
| VANCOUVER BC | TACOMA |
| VANCOUVER BC | VENDOVI ISLAND |
| VENDOVI ISLAND | ANACORTES |
| VENDOVI ISLAND | BELLINGHAM |
| VENDOVI ISLAND | CHERRY POINT |
| VENDOVI ISLAND | FERNDALE |
| VENDOVI ISLAND | MARCH POINT |
| VENDOVI ISLAND | OUT SEA |
| VENDOVI ISLAND | SEATTLE |
| VENDOVI ISLAND | TACOMA |
| VENDOVI ISLAND | VANCOUVER BC |
| VICTORIA | PORT ANGELES |
| VICTORIA | SEATTLE |
| YUKON HARBOR | OUT SEA |

As shown in Table 3.3 eight distinct routes were outside the scope of the inventory.

**Table 3.3: OGV Routes Not Included in Puget Sound Maritime Air Emissions Inventory**

| Port | Destination |
|---|---|
| ABERDEEN | ABERDEEN |
| ABERDEEN | OUT TO SEA |
| ABERDEEN | VANCOUVER BC |
| OUT TO SEA | ABERDEEN |
| OUT TO SEA | WESTPORT |
| VANCOUVER BC | ABERDEEN |
| VANCOUVER BC | WESTPORT |
| WESTPORT | ABERDEEN |

In 2005, the trip combinations were applied to specific routes using nautical chart software Maptech Offshore Navigator, v5.07. Each unique trip, inbound or outbound, was mapped and then divided into logical trip segments. These segments were aligned by precautionary zones, places where ships could take different routes, speed reduction zones, curves or bends in the fairway, major channel markers, and county lines. Any updates to the routing for 2011 were done using ArcGIS, v9.3.1. The route coordinates and segments from 2005 were plotted in ArcGIS and updates were made to accommodate new facilities or adjust route speeds. For an added level of assurance, the routing segments were reviewed with the Puget Sound Pilots and modified based on their input.[11] As an example of trip segmentation, the Port of Everett to out to sea route is discussed in more detail. In this effort, there was one trip route and 21 trip segments or links using the partitioning techniques described earlier. For the Port of Everett to the out to sea route:

- The shortest segment was 0.8 nautical miles (miles)
- The longest segment was 34.1 miles (the Strait of San Juan de Fuca)
- The average segment was 5.7 miles

Each port-to-port combination was modeled differently, depending also on whether it was inbound or outbound. Service speeds (knots) for each vessel were taken from Lloyd's data. Reduced speeds were assigned for each vessel type, depending on whether they were:

- Fast – containerships, auto carriers, and cruise ships
- Medium – reefers and RoRos
- Slow – tankers and all other vessel types

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[11] Meeting between Captain Frantz (Andy) Coe, Puget Sound Pilots, and Bruce Anderson and Rose Muller, Starcrest, 10April 2012. Puget Sound Pilots, *http://www.pspilots.org*.

Although there is no industry standard that assigns ranges for speed category, in general, fast vessels are considered to have a maximum speed range of 20 to 25 knots, while slow vessels have a maximum speed range of 17 knots or less, and the medium speed vessels fall between the speed ranges of 17 to 20 knots.

For the maneuvering, a list of destinations for each port area was derived from the 2011 MarEx data. Some of the destinations listed in the following tables may not be property of the ports listed. These include port-owned berths, private facilities, and anchorages that are located near that port. Tables 3.4 through 3.11 list the destinations by port area, as provided by MarEx:

**Table 3.4: 2011 OGV Anacortes Destinations**

| Port | Destination |
|---|---|
| ANACORTES | CURTIS WHARF |
| ANACORTES | PORT DOCK 1 |
| ANACORTES | PORT DOCK 2 |

**Table 3.5: 2011 OGV Everett Destinations**

| Port | Destination |
|---|---|
| EVERETT | 1-NORTH |
| EVERETT | 1-SOUTH |
| EVERETT | 3-NORTH |
| EVERETT | 3-SOUTH |
| EVERETT | ANCHOR |
| EVERETT | DOLPHIN BERTH |
| EVERETT | HEWITT |
| EVERETT | PACIFIC TERM |
| EVERETT | SOUTH TERMINAL |

**Table 3.6: 2011 OGV Olympia Destinations**

| Port | Destination |
|---|---|
| OLYMPIA | PORT DOCK 2 |
| OLYMPIA | PORT DOCK 3 |

### Table 3.7: 2011 OGV Port Angeles Destinations

| Port | Destination |
|---|---|
| PORT ANGELES | 1-NORTH |
| PORT ANGELES | ANCHOR |
| PORT ANGELES | T PIER |

### Table 3.8: 2011 OGV Tacoma Destinations

| **Port** | **Destination** | **Port** | **Destination** |
|---|---|---|---|
| TACOMA | 3 | TACOMA | PCT-A |
| TACOMA | 3-SOUTH | TACOMA | PCT-A&B |
| TACOMA | 4 | TACOMA | PCT-B |
| TACOMA | 4-A | TACOMA | TEMCO |
| TACOMA | 4-A&B | TACOMA | TOTE |
| TACOMA | 7-A | TACOMA | WA UNITED 1 |
| TACOMA | 7-B | TACOMA | WA UNITED 2 |
| TACOMA | 7-D | TACOMA | WEYCO Log 1 |
| TACOMA | ANCHOR | TACOMA | WEYCO Log 2 |
| TACOMA | BLAIR-A | TACOMA - PRIVATE | PNW TERMINAL |
| TACOMA | BLAIR-A&B | TACOMA - PRIVATE | SCHNITZER |
| TACOMA | BLAIR-B | TACOMA - PRIVATE | SOUND OIL |
| TACOMA | BLAIR-E | TACOMA - PRIVATE | SPERRY |
| TACOMA | BLAIR-EAST | TACOMA - PRIVATE | US OIL |
| TACOMA | MAERSK | TACOMA - PRIVATE | VIGOR MARINE |

For the Seattle area, there are four anchorages (EBE, EBW, SCE, and SCW) not listed in the Table 3.9, but are included in this study.

**Table 3.9: 2011 OGV Seattle Destinations**

| Port | Destination | Port | Destination |
|---|---|---|---|
| SEATTLE | 105 | SEATTLE | 86 |
| SEATTLE | 15 | SEATTLE | 90-1 |
| SEATTLE | 18-1 | SEATTLE | 90-7 |
| SEATTLE | 18-2 | SEATTLE | 90-I |
| SEATTLE | 18-3 | SEATTLE | 91-E |
| SEATTLE | 18-4 | SEATTLE | 91-I |
| SEATTLE | 20-1 | SEATTLE - PRIVATE | 17 |
| SEATTLE | 25-NORTH | SEATTLE - PRIVATE | BP |
| SEATTLE | 30-NORTH | SEATTLE - PRIVATE | CTG |
| SEATTLE | 30-SOUTH | SEATTLE - PRIVATE | GLACIER |
| SEATTLE | 46 | SEATTLE - PRIVATE | KINDER MORGAN |
| SEATTLE | 5-CENTER | SEATTLE - PRIVATE | LAFARGE |
| SEATTLE | 5-NORTH | SEATTLE - PRIVATE | SHELL |
| SEATTLE | 5-SOUTH | SEATTLE - PRIVATE | VIGOR-H |
| SEATTLE | 66-2 | | |

Table 3.10 lists "other ports" destinations. The term "other ports" refers to any stop made by a vessel not included in the main port areas and does not necessarily refer to a public port. Some of these "ports" may not be typical vessel stops, (e.g., Blake Island) but were listed in the MarEx and therefore included in the routing for completeness.

**Table 3.10: 2011 OGV Other Ports Destinations**

| Port | Destination |
|---|---|
| BELLINGHAM | ANCHOR |
| BELLINGHAM | COLD STORAGE |
| BELLINGHAM | PORT DOCK 1 |
| BELLINGHAM | PORT DOCK 2 |
| BREMERTON | PSNS |
| CHERRY POINT | BP |
| CHERRY POINT | PORT DOCK 2 |
| FERNDALE | INTALCO |
| FERNDALE | PHILLIPS |
| FERNDALE | SHELL |
| INDIAN ISLAND | AMMO |
| MANCHESTER | FUEL |
| MARCH POINT | ANCHOR |
| MARCH POINT | SHELL |
| MARCH POINT | TESORO |
| POINT WELLS | ANCHOR |
| POINT WELLS | PARAMOUNT |
| PORT TOWNSEND | ANCHOR |
| QUARTERMASTER HBR | ANCHOR |
| SANDY POINT | ANCHOR |
| SEA | NA |
| VENDOVI ISLAND | ANCHOR |
| VENDOVI ISLAND | PORT DOCK 2 |
| VENDOVI ISLAND | WEST HYLEBOS 2 |
| YUKON HARBOR | ANCHOR |

The Foss Shipyard, Lake Union, Salmon Bay and Northlake piers listed in Table 3.11 are located in Lake Washington which is outside the scope of this study and were not included in the inventory. There were only a few trips made to these piers.

**Table 3.11: 2011 Excluded Piers in Lake Washington**

| Port | Pier |
|---|---|
| LWSC | FOSS SHIPYAR |
| LWSC | LAKE UNION |
| LWSC | NORTHLAKE |
| LWSC | SALMON BAY |

## 3.5 Emission Reduction Technologies Identified

In 2011, slide fuel valves were used by 330 known vessels that called in the Puget Sound. Slide fuel valves lead to better combustion, less smoke, and lower fuel consumption, resulting in reduced overall $NO_x$ and PM emissions. Propulsion engines manufactured by MAN B&W that have a build year of 2004 or greater are considered to have slide valves. Since the use of slide valves is not called out specifically in the information available for each vessel, the inventory may not have captured all the vessels with slide valves that called at Puget Sound maritime facilities in 2011. The emission reduction estimates for the slide valves have been reported by MAN B&W as based on their diesel engine[12] emission measurements. The reductions are:

- 30% reduction for $NO_x$
- 25% reduction for PM

At the Port of Seattle, Holland America Line, Carnival and Princess Line cruise vessels used shore power during the 2011 cruise season at Terminal 91. At the Port of Tacoma, all vessels operated by Totem Ocean Trailer Express which called at TOTE terminal also used shore power in 2011. These vessels had zero emissions while using shore power at berth. For all vessels that used shore power, a minimum of 1.5 hours was used for hotelling time to allow time for vessels to plug in.

Holland America Line and Westwood Shipping vessels have maintained their 'Clean Class' or 'Environmental Notation' designations from 2005, allowing for lower $NO_x$ emission factors to be applied on specific vessels (See Section 3.6.4 and Table 3.14).

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[12] Port of Los Angeles, *http://www.portoflosangeles.org/pdf/2010_Air_Emissions_Inventory.pdf.*

The Port of Seattle and the Port of Tacoma both had vessel calls which utilized lower sulfur marine gas oil/marine diesel oil while at berth. Many shipping and cruise lines visiting the Port of Seattle participated in the At-Berth Clean (ABC) Fuels program. In 2011, there were 375 vessel calls that used low-sulfur fuel while at berth under the ABC Fuels program. See section 3.6.10 for a full listing of participating lines. At the Port of Tacoma, any vessels operated by Evergreen, as well as all K-line container vessels, switched to low-sulfur fuel while at berth. The use of low-sulfur fuel allows for $SO_2$ and PM emissions reductions.

## 3.6 Emissions Estimating Methodology

In developing an activity-based emissions inventory for marine vessels, emissions are estimated as a function of vessel power demand (expressed in kW-hrs) multiplied by an emission factor, where the emission factor is expressed in terms of grams per kilowatt-hour (g/kW-hr). Emission factors and emission factor adjustments for low propulsion engine load were then applied to the various activity data.

Equation 3.1

$$\boldsymbol{E = Energy \times EF \times FCF}$$

Where:

E = emissions from the engine(s) that are included in the "Energy" term discussed below, usually calculated as grams of emissions per unit of time (e.g., per year), but converted to tons of emissions by dividing by 453.6 grams per pound and 2,000 pounds per ton.

Energy = energy demand, in kW-hrs, calculated using Equation 3.2 below as the energy output of the engine (or engines) over the period of time covered by the estimate.

EF = emission factor, usually expressed in terms of g/kW-hr, discussed in more detail in Section 3.6.4.

FCF = fuel correction factor (unitless), used to account for other fuels used and fuel switching, discussed in Section 3.6.10.

The 'Energy' term of the equation is where most of the location-specific information is used. Energy is calculated using Equation 3.2:

Equation 3.2

$$\boldsymbol{Energy = MCR \times LF \times A}$$

Where:

MCR = maximum continuous rated engine power, kW
LF = load factor (unitless)
A = activity, hours

The emissions estimation section discusses the methodology used for propulsion engines (Sections 3.6.1 to 3.6.6), auxiliary engines (Sections 3.6.7 and 3.6.8) and auxiliary boilers (Section 3.6.9). Propulsion engines are also referred to as main engines.

Incinerators are not included in the emissions estimates because incinerators are not used within the study area. Interviews with the vessel operators and marine industry, in general, report that vessels do not use their incinerators while at berth or near coastal waters. The PSCAA requires a permit to operate an incinerator on an ocean-going vessel within their jurisdiction and no permits have been issued to date.

### *3.6.1 Propulsion Engine Maximum Continuous Rated Power*

MCR power is defined as the manufacturer's tested engine power; for this study, it is assumed that the Lloyd's 'Power' value is the MCR power. The international specification is to report MCR in kilowatts, and it is related to the highest power available from a ship engine during average cargo and sea conditions. However, operating a vessel at 100% of its MCR power is very costly from a fuel consumption and engine maintenance perspective, so most operators limit their maximum power to about 80% of MCR.

### *3.6.2 Propulsion Engine Load Factor*

Load factor is expressed as the ratio of a vessel's power output at a given speed to the vessel's MCR power. At maximum power (100% MCR) and maximum speed, the load is 100%. Service speed is 94% of the maximum speed.[13] As suggested above, at normal service speed, a ship probably has a load factor of close to 80%. Every vessel has a different maximum, service, and intermediate speeds (the range is 2% to 83% load on the engine). For the purpose of computation, actual speeds from Lloyd's data are used. For intermediate speeds (2% - 83% load), the Propeller Law[14] is used to estimate ship propulsion engine loads, based on the theory that propulsion power varies by the cube of speed.

Equation 3.3

$$\boldsymbol{LF = (Speed_{Actual} / Speed_{Maximum})^3}$$

Where:

LF = load factor, percent
$Speed_{Actual}$ = actual speed, knots
$Speed_{Maximum}$ = maximum speed, knots

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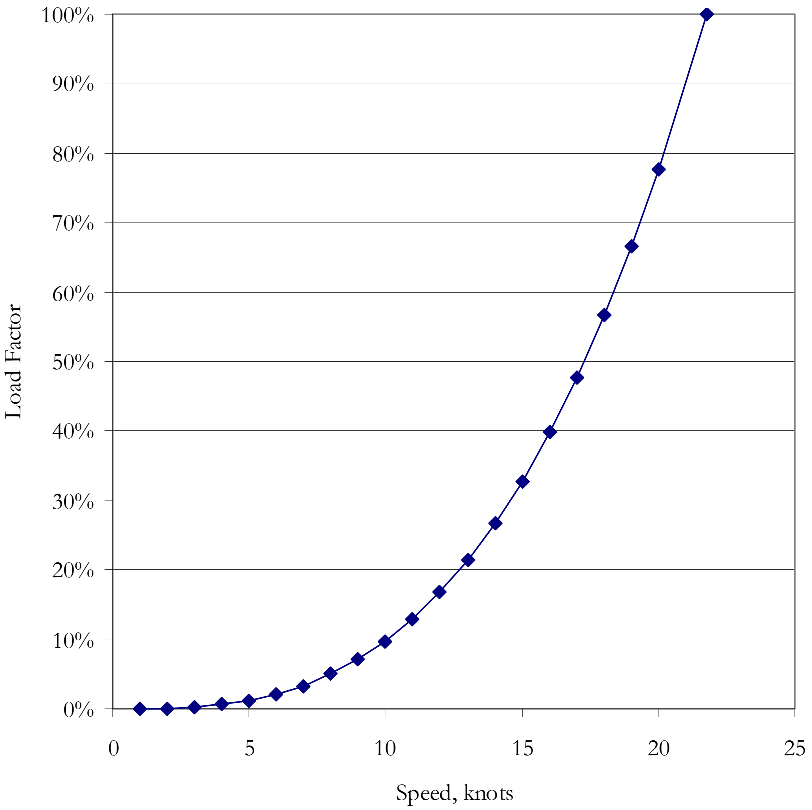
[13] Starcrest, 2005.
[14] Man B & W, *Basic Principles of Ship Propulsion.*

The output from Equation 3.3 is illustrated in Figure 3.21, showing the load factor curve of a hypothetical ship with 20,000 kW main engine power and a top speed of 22 knots at that power output. The shape of the curve illustrates why vessels typically operate at less than their MCR power – at the top of the curve, the increase in power is much greater than the increase in speed, meaning that the vessel uses comparatively more power (and fuel) to obtain a small increase in speed.

As an example, at a speed of 20 knots, the hypothetical vessel's engine would be operating with a load factor of 75% [$(20/22)^3$ = 0.75, or 75%]. At 21 knots the load factor would be 87% [$(21/22)^3$ = 0.87, or 87%]. That's an increase of 12% of the vessel's power output for a 1-knot increase in speed. At the lower end of the speed range, at a speed of 10 knots, the hypothetical vessel's engine would be operating with a load factor of 9% [$(10/22)^3$ = 0.09, or 9%]. At 9 knots the load factor would be 7% [$(9/22)^3$ = 0.07, or 7%]; this would give a 1-knot speed increase at an increase of only 2% of the vessel's power output. At 6 knots the load factor would be 2% [$(6/22)^3$ = 0.02, or 2%].

**Figure 3.21: Propeller Law Curve of Power Demand**



### *3.6.3 Propulsion Engine Time in Mode*

Time in mode or activity is measured in hours of operation. The transit times were estimated by dividing the distance traveled by ship speed. The distance and ship speed are from the routing data discussed in Section 3.4.

Equation 3.4

$$\boldsymbol{Activity = D/Speed_{Actual}}$$

Where:
Activity = activity, hours
D = distance, nautical miles
$\text{Speed}_{\text{Actual}}$ = actual ship speed, knots

In addition to transit time, there are also maneuvering and hotelling times that are used. For maneuvering time, the same Equation 3.4 is used to calculate time during maneuvering. For hotelling time, departure time was subtracted from the arrival time to estimate hours of hotelling for both at berth and anchorage.

### *3.6.4 Propulsion Engine Emission Factors*

The main engine emission factors used in this study were reported in a 2002 Entec study[15], except for the PM emission factor. The source and value of each emission factor for the main engines is discussed in this section.

Vessels are assumed to operate their main engines on residual oil (RO) which is intermediate fuel oil (IFO) or one with similar specifications with an average sulfur constant of 2.7%. Exceptions are made for those vessels that are known to use a different fuel other than residual fuel, such as those vessels participating in fuel switch incentive programs. For vessels using a different fuel, a fuel correction factor is applied in the equation and this is discussed in a separate subsection.

Three vessel technologies are reported:

- Slow speed diesel engines, having maximum engine speeds less than 130 revolutions per minute (rpm) based on the EPA definition for ship engines as described in a 1999 Regulatory Impact Analysis (RIA).[16]
- Medium speed diesel engines, having maximum engine speeds over 130 rpm (and typically greater than 400 rpm).
- Gas and steam boiler turbines.

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[15] Entec, *Quantification of Emissions from Ships Associated with Ship Movements between Ports in the European Community, Final Report*, July 2002.

[16] EPA, *Control of Emissions from Marine Diesel Engines, Regulatory Impact Analysis*, November 1999.

The emission factors for main engines using residual fuel are listed in Table 3.12. The emission factors are listed by model year for slow and medium speed engines to list the Tier 1 (2000-2010) and Tier 2 (2011-2015) $NO_x$ emission factor. The Tier 2 engines were determined by using the keel laid dates from Lloyd's data.

**Table 3.12: Emission Factors for OGV Main Engines Using RO, g/kW-hr**

| Engine | Model Year | $NO_x$ | HC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM |
|---|---|---|---|---|---|---|---|---|
| Slow speed diesel | $\leq$ 1999 | 18.1 | 0.6 | 1.4 | 10.5 | 1.5 | 1.2 | 1.5 |
| Medium speed diesel | $\leq$ 1999 | 14.0 | 0.5 | 1.1 | 11.5 | 1.5 | 1.2 | 1.5 |
| Slow speed diesel | 2000 - 2010 | 17.0 | 0.6 | 1.4 | 10.5 | 1.5 | 1.2 | 1.5 |
| Medium speed diesel | 2000 - 2010 | 13.0 | 0.5 | 1.1 | 11.5 | 1.5 | 1.2 | 1.5 |
| Slow speed diesel | 2011 - 2015 | 14.4 | 0.6 | 1.4 | 10.5 | 1.5 | 1.2 | 1.5 |
| Medium speed diesel | 2011 - 2015 | 10.5 | 0.5 | 1.1 | 11.5 | 1.5 | 1.2 | 1.5 |
| Gas turbine | All | 6.1 | 0.1 | 0.2 | 16.5 | 0.05 | 0.04 | 0.0 |
| Steamship | All | 2.1 | 0.1 | 0.2 | 16.5 | 0.8 | 0.6 | 0.0 |

The emission factors for greenhouse gases are listed in Table 3.13. The sources for the $CO_2$, $N_2O$ and methane ($CH_4$) emissions factors is the IVL 2004 report.

**Table 3.13: GHG Emission Factors for OGV Main Engines Using RO, g/kW-hr**

| Engine | Model Year | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|
| Slow speed diesel | all | 620 | 0.031 | 0.012 |
| Medium speed diesel | all | 683 | 0.031 | 0.010 |
| Gas turbine | all | 970 | 0.08 | 0.002 |
| Steamship | all | 970 | 0.08 | 0.002 |

*$NO_x$ Emission Factor*

The IMO established ocean-going vessel propulsion engine standards in Annex VI and engine manufacturers have been in compliance with the $NO_x$ Technical Code since 2000. The engine standards are baseline standards to prevent back sliding on emission levels from 2000 and newer engine models. In this study, the 17.0 g/kW-hr $NO_x$ emission factor (Tier 1) is used for slow speed vessels built in year 2000 to 2010; while 14.4 g/kW-hr $NO_x$ emission factor (Tier 2) is used for slow speed vessels with a keel laid date of 2011 and newer.

Medium speed engine standards under the IMO program are based on engine rpm. For medium speed engines built in year 2000 to 2010, the 13.0 g/kW-hr $NO_x$ emission factor is used; while those engines with keel laid date of 2011 and newer use a $NO_x$ emission factor of 10.5 g/kW-hr. Engine manufacturers design their engines to emit well below the calculated standards, but it is difficult to establish an "in-use" average without the benefit of measurements.

*Emission Factors for Clean Class or Environmental Notation*

Classification societies have introduced environmental standards for vessels and also provide independent verification of shipboard environmental performance. Vessels are assigned an environmental notation once they meet certain environmental requirements. The notation may vary by name and requirement depending on the class society providing the service. Based on interviews in previous inventory with ship owners and engine test data certified on their environmental notation, vessels from two shipping lines, Holland America Line (HAL) and Westwood Shipping, were given a lower $NO_x$ emission factor. Table 3.14 lists the $NO_x$ emission factors used for these vessels.

**Table 3.14: $NO_x$ Emission Factors for Engines on Specific Vessels, g/kW-hr**

| **Engine** | **$NO_x$** |
|---|---:|
| HAL vessels with medium speed diesel | 10 |
| Westwood vessels with slow speed diesel | 12.1 |
| Westwood vessels with medium speed diesel | 9.4 |

*CO Emission Factor*

CO emission factors were developed from information provided in the Entec 2002 appendices because they are not explicitly stated in the text. They were confirmed with IVL Swedish Environmental Research Institute Ltd.[17]

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[17] IVL Swedish Environmental Research Institute Ltd., 16 January 2004 e-mail correspondence with C.H. Wells, Starcrest Consulting Group, LLC. (IVL 2004)

*PM Emission Factor*

Recent discussions with EPA have cited PM emission factors in the range of 0.99 to 1.11 g/kW-hr for slow and medium speed engines. In order to be consistent with EPA and the concurrent BCCO inventory, an average emission factor of 1.0 g/kW-hr was used for this study. The PM emission factor is derived from the results of an equation that is based on PM and sulfate relationship[18] since the factor is not explicitly listed in the Entec study. California Air Resource Board (CARB) is using 1.5 g/kW-hr for the PM emission factor in their state emissions inventories, but this value is not being used outside of California. $PM_{10}$ is assumed to be 100% of PM and fine particulate matter, $PM_{2.5}$, was estimated to be 80% of $PM_{10}$[19]. For internal combustion diesel engines, the same $PM_{10}$ emission factor is used for DPM. For other types of engines that do not meet the definition of internal combustion, such as steam boilers and gas turbines, diesel particulate matter is zero.

*$SO_2$ Emission Factor*

The $SO_2$ emission factor is dependent on the fuel used; the baseline emission factor for Puget Sound is based on a sulfur content of 2.7%, which is an average for residual fuel. If lower sulfur fuel content is used, fuel correction factors are applied, as discussed in Section 3.6.10.

### *3.6.5 Varying Emission Factors for Low Loads for Propulsion Engines*

This section addresses emission factors for propulsion engines powered by compression ignition engines. The discussion does not include steamships or ships having gas turbines because Energy and Environmental Analysis, Inc. (EEIA), in a study conducted for EPA, observed a rise in emissions for diesel engines only.[20]

In general terms, diesel-cycle engines are not as efficient when operated at low loads or very high loads. The EEIA study established a formula for calculating emission factors for low engine load conditions, such as those encountered during harbor maneuvering and when traveling slowly at sea, such as in the reduced speed zone. While mass emissions (e.g., pounds per hour) tend to go down as vessel speeds and engine loads decrease, the emission factors (e.g., g/kW-hr) increase. This is based on observations that compression-cycle combustion engines are less efficient at low loads. Low load emission factor equations were developed from EPA emission factors for marine vessels at full load.

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[18] EPA, *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression Ignition Engines*, April 2004.

[19] Lyyranen, *Aerosol Characterization in Medium-Speed Diesel Engines Operating with Heavy Fuel Oils*, Journal of Aerosol Science*,* 1999.

[20] EEIA, *Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data,* February 2000. (EEIA 2000)

These equations work well to describe the low-load effect where emission rates can increase, based on a limited set of data from Lloyd's Maritime Program and the U.S. Coast Guard. It was first cited in a study conducted for the EPA in 2002 by ENVIRON.[21] The equation is based on the variables provided in Table 3.15.

**Table 3.15: Low-Load Emission Factor Regression Equation Variables**

| Pollutant | Exponent | Intercept (b) | Coefficient (a) |
|---|---|---|---|
| PM | 1.5 | 0.25 | 0.0059 |
| $NO_x$ | 1.5 | 10.45 | 0.1255 |
| CO | 1.0 | 0.15 | 0.8378 |
| VOC | 1.5 | 0.39 | 0.0667 |

The equations were used for the entire spectrum of load factors from 1% to 20% for each pollutant, as follows:

Equation 3.5

$$y = a(fractional\ load) - x + b$$

Where:

y = emissions in g/kW-hr
a = coefficient
b = intercept
x = exponent (negative)
fractional load = derived by the Propeller Law

The EEIA 2000 equations were used to generate emission factors at loads between one and 20% main engine power. Each of the 20 EEIA factors was divided by the emission factor at 20% EEAI load. This resulted in numbers greater than or equal to one, since emissions increased as load decreased. At 20% load, the value was exactly 1.0 since it was divided into itself. These numbers are called low-load adjustment factors (LLA). The LLA multipliers were then applied to any at sea emission factor. The database then computes the resulting emission factor for each pollutant.

Alternative methods were explored, such as using the EEAI equations to span the entire spectrum between 1% and 100% load, using revised emission factors as the intercept (the starting place at 100% load). Unfortunately, such adjustments cause the shape of the graphed curves to change, and such changes could not be validated with empirical or measurement results. Thus the low load adjustments are used in a relative sense, based on the original published data.

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[21] EPA, *Commercial Marine Inventory Development,* July 2002.

The low load adjustment multipliers are reported in Table 3.16.

**Table 3.16: Low-Load Adjustment Multipliers for Emission Factors**

| Load | $NO_x$ | CO | HC | PM |
|---|---|---|---|---|
| 2% | 4.63 | 9.68 | 21.18 | 7.29 |
| 3% | 2.92 | 6.46 | 11.68 | 4.33 |
| 4% | 2.21 | 4.86 | 7.71 | 3.09 |
| 5% | 1.83 | 3.89 | 5.61 | 2.44 |
| 6% | 1.60 | 3.25 | 4.35 | 2.04 |
| 7% | 1.45 | 2.79 | 3.52 | 1.79 |
| 8% | 1.35 | 2.45 | 2.95 | 1.61 |
| 9% | 1.27 | 2.18 | 2.52 | 1.48 |
| 10% | 1.22 | 1.96 | 2.20 | 1.38 |
| 11% | 1.17 | 1.79 | 1.96 | 1.30 |
| 12% | 1.14 | 1.64 | 1.76 | 1.24 |
| 13% | 1.11 | 1.52 | 1.60 | 1.19 |
| 14% | 1.08 | 1.41 | 1.47 | 1.15 |
| 15% | 1.06 | 1.32 | 1.36 | 1.11 |
| 16% | 1.05 | 1.24 | 1.26 | 1.08 |
| 17% | 1.03 | 1.17 | 1.60 | 1.06 |
| 18% | 1.02 | 1.11 | 1.18 | 1.04 |
| 19% | 1.01 | 1.05 | 1.11 | 1.02 |
| 20% | 1.00 | 1.00 | 1.00 | 1.00 |

### *3.6.6 Propulsion Engine Maneuvering Loads*

Maneuvering is the transition between transit and docking or vice versa. Maneuvering includes docking and a small amount of harbor transit which is transit from/to the main channel. Main engines during maneuvering tend to use a small percentage of total power, especially when coasting on the way into port. During docking, when the ship is being positioned against the wharf, the assist tugboats do most of the work. Emissions from assist tugs are included in the harbor vessel section of this report. Estimation of main engine maneuvering loads is the composite of several factors, such as:

- Variable loads for inbound and outbound segments
- Variable transit maneuvering time dependent on distance and speed
- 2% load during docking

The docking aspect is routine with the exception that some ships require extra backing and turning, either on entry or exit. Maneuvering times vary by port, terminal, and ship type.

Docking requires about 2% load on the main engines,[22] but the harbor transit load has to be calculated by the Propeller Law. The transit main engine loads are below 20% during the harbor transit mode, therefore the low load adjustments are also applied to the emission factors. Results are then weighted together by percentage of time in docking and harbor transit modes. Results are shown in Table 3.17.

**Table 3.17: Composite Maneuvering Load Factors**

| Vessel Type | Load In | Load Out |
|---|---|---|
| Auto Carrier | 0.04 | 0.06 |
| Bulk | 0.04 | 0.05 |
| Containership | 0.03 | 0.03 |
| Cruise | 0.03 | 0.04 |
| General Cargo | 0.03 | 0.04 |
| ITB | 0.04 | 0.06 |
| Reefer | 0.02 | 0.03 |
| RoRo | 0.02 | 0.02 |
| Tanker | 0.03 | 0.05 |

Load in is an arrival to the harbor and load out is a departure from a dock or pier. The load out is higher than load in because the engine power is used to leave the dock, while the vessel usually coasts in on arrival.

### *3.6.7 Auxiliary Engine Emission Factors*

The process of estimating emissions from auxiliary engines is generally the same as for main engines, with differing details. One main difference is that the load factor is not calculated but rather is estimated from reports in the technical literature (i.e., Entec 2002 and IVL 2004 studies) and from discussions with experts such as ships' engineers. Calculating auxiliary engine load factors from empirical data is theoretically possible but would require detailed fuel consumption data that is not typically available.

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[22] Starcrest 2005.

The Entec auxiliary engine emission factors used in this study are presented in Tables 3.18 and 3.19 for medium speed engines using residual fuel oil. $CO_2$, $N_2O$ and $CH_4$ emission factors are obtained from IVL 2004 report.

**Table 3.18: Auxiliary Engine Emission Factors, g/kW-hr**

| **Engine** | **Model Year** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** |
|---|---|---|---|---|---|---|---|---|
| Medium speed diesel | ≤ 1999 | 14.7 | 0.5 | 1.1 | 12.3 | 1.0 | 0.8 | 1.0 |
| Medium speed diesel | 2000 - 2010 | 13.0 | 0.5 | 1.1 | 12.3 | 1.0 | 0.8 | 1.0 |
| Medium speed diesel | 2011 - 2015 | 10.5 | 0.5 | 1.1 | 12.3 | 1.0 | 0.8 | 1.0 |

**Table 3.19: Greenhouse Gas Emission Factors for Auxiliary Engines, g/kW-hr**

| **Engine** | **$CO_2$** | **$N_2O$** | **$CH_4$** |
|---|---|---|---|
| Medium speed diesel | 683 | 0.031 | 0.008 |

It is assumed that vessels operate their auxiliary engines on residual fuel oil with an average sulfur content of 2.7%. If it is known that a vessel switches fuel while in Puget Sound to a lower sulfur fuel, a fuel correction factor is used. The fuel correction factors are discussed in Section 3.6.10.

### *3.6.8 Auxiliary Engine Defaults*

As explained earlier, auxiliary engine information is usually not provided to Lloyd's by vessel owners since it is not required by IMO or the classification societies, thus Lloyd's data contains minimal auxiliary engine information. For 2011, the 2010 published data for the Port of Los Angeles and the Port of Long Beach was averaged and used to generate profiles or defaults for the purpose of "gap filling" when there was missing data.

Vessels do not use the total auxiliary engine installed power when at sea, during hotelling and during maneuvering. For each mode and vessel type, a different number of engines may be used and at varying loads depending on several factors, such as temperature and number of reefers onboard. Hotelling load is primarily what is needed to meet the power needs of the lights, heating/ventilation/air conditioning systems, communications, computers, ship cranes, pumps, reefer load, and various other power demands while the vessel is at dock. Maneuvering generally requires the highest auxiliary load mode for OGVs in order to provide power to the bow thrusters that are used intermittently. Transit periods, or "at sea mode," generally requires the lowest auxiliary loads, as additional auxiliary power is not required for maneuvering. Many vessels also have shaft generators and exhaust turbine generators that help provide power to the ship with greater fuel efficiency than auxiliary generators.

From the inception of the Vessel Boarding Program, the average or typical number of auxiliary engines used and the corresponding load at sea, during maneuvering and at berth, have been studied to gain a better understanding of the how the auxiliary engines are used in relation to the total number and total power installed. The load default in kilowatts is based on the percent load, which takes into account the average number of actual engines used and their load. Another way to view auxiliary engine load is the kilowatts actually used as a fraction of the total power available. For example, a 1,000 TEU container vessel equipped with three auxiliary engines may use just one of them at berth at 60% load. The resulting total hotelling load is 0.33 multiplied by 0.6, which equals 0.2 or 20%. The 0.33 figure represents one of the three engines in use, while the 0.6 represents the 60% load on that engine. Table 3.20 summarizes the total power and load defaults used for this study by vessel subtype.

**Table 3.20: 2011 Auxiliary Engine Power and Load Defaults, kW**

| Vessel Type | Sea | Maneuvering | Hotelling |
|---|---:|---:|---:|
| Auto Carrier | 514 | 1,541 | 876 |
| Bulk | 266 | 705 | 157 |
| Bulk - Self Discharging | 439 | 1,163 | 258 |
| Bulk - Heavy Load | 231 | 610 | 136 |
| Bulk - Wood Chips | 266 | 705 | 157 |
| Container - 1000 | 492 | 1,556 | 536 |
| Container - 2000 | 723 | 1,916 | 945 |
| Container - 3000 | 710 | 2,382 | 965 |
| Container - 4000 | 1,162 | 2,973 | 1,196 |
| Container - 5000 | 1,185 | 4,356 | 1,202 |
| Container - 6000 | 1,554 | 4,815 | 1,461 |
| Container - 7000 | 1,446 | 4,360 | 1,325 |
| Container - 8000 | 1,576 | 4,769 | 1,449 |
| Container - 9000 | 1,498 | 4,551 | 1,383 |
| Container - 10000 | 1,767 | 2,617 | 887 |
| Cruise | na | na | na |
| General Cargo | 506 | 1,339 | 655 |
| ITB | 89 | 234 | 115 |
| Reefer | 467 | 1,402 | 900 |
| RoRo | 514 | 1,541 | 890 |
| Tanker - Aframax | 720 | 990 | 780 |
| Tanker - Chemical | 682 | 937 | 739 |
| Tanker - Handysize | 504 | 693 | 546 |
| Tanker - Panamax | 604 | 830 | 654 |
| Tanker - Suezmax | 702 | 965 | 761 |

The maneuvering load defaults for auxiliary engines are set to 100%, but can be assigned an alternate value in the vessel routing table. This is to account for the complex nature of the routing and the variability of auxiliary engine loads while maneuvering different sections of the Puget Sound.

### *3.6.9 Auxiliary Boilers*

In addition to the auxiliary engines that are used to generate electricity for on-board uses, most OGVs have one or more boilers used for fuel heating and for producing hot water. These boilers are not typically used during transit at sea because most vessels are equipped with exhaust heat recovery systems ("economizers") that use heat from the main engine's exhaust for their hot water needs. The auxiliary boilers are used when the main engine exhaust flow and/or temperature fall below what is needed for the economizer to provide adequate heat, such as during maneuvering and when the main engines are shut down at berth or when main engine loads drop below 20%. Defaults, based on 2010 published auxiliary boiler energy, for each vessel type are presented in Table 3.21. The cruise ships and tankers (except for diesel electric tankers) have much higher auxiliary boiler usage rates than the other vessel types. Cruise ships have higher boiler usage due to the number of passengers and the need for hot water. Tankers' boilers provide steam for steam-powered liquid pumps, inert gas for storage tanks, and heat to keep fuel warm for pumping.

**Table 3.21: 2011 Auxiliary Boiler Energy Defaults, kW**

| Vessel Type | Sea | Maneuvering | Hotelling |
|---|---|---|---|
| Auto Carrier | 0 | 250 | 250 |
| Bulk | 0 | 134 | 134 |
| Bulk - Self Discharging | 0 | 130 | 130 |
| Bulk - Heavy Load | 0 | 137 | 137 |
| Bulk - Wood Chips | 0 | 134 | 134 |
| Container - 1000 | 0 | 263 | 263 |
| Container - 2000 | 0 | 300 | 300 |
| Container - 3000 | 0 | 517 | 517 |
| Container - 4000 | 0 | 554 | 554 |
| Container - 5000 | 0 | 675 | 675 |
| Container - 6000 | 0 | 623 | 623 |
| Container - 7000 | 0 | 479 | 479 |
| Container - 8000 | 0 | 572 | 572 |
| Container - 9000 | 0 | 572 | 572 |
| Container - 10000 | 0 | 572 | 572 |
| Cruise | 0 | 1,549 | 1,549 |
| General Cargo | 0 | 134 | 134 |
| ITB | 0 | 0 | 0 |
| Reefer | 0 | 338 | 338 |
| RoRo | 0 | 275 | 275 |
| Tanker - Aframax | 0 | 371 | 2,750 |
| Tanker - Chemical | 0 | 371 | 2,750 |
| Tanker - Handysize | 0 | 371 | 2,750 |
| Tanker - Panamax | 0 | 371 | 2,750 |
| Tanker - Suezmax | 0 | 371 | 3,000 |

### *3.6.10 Fuel Correction Factors*

Fuel correction factors are used to account for variations in fuel parameters between different types of fuel, so these variations can be accounted for in the emission estimates. As discussed earlier, emission factors were given for engines using residual fuel with an average 2.7% sulfur content. Table 3.22 lists the fuel correction factors used for most vessels in this study, which are based on fuel correction factors used in the San Pedro Bay Clean Air Action Plan.[23]

**Table 3.22: Fuel Correction Factors**

| **Fuel Used** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** | **$CO_2$** | **$N_2O$** | **$CH_4$** |
|---|---|---|---|---|---|---|---|---|---|---|
| HFO (2.7% S) | 1.00 | 1.00 | 1.00 | 1.000 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| HFO (1.5% S) | 1.00 | 1.00 | 1.00 | 0.555 | 0.82 | 0.82 | 0.82 | 1.00 | 1.00 | 1.00 |
| MGO (0.5% S) | 0.94 | 1.00 | 1.00 | 0.185 | 0.25 | 0.25 | 0.25 | 1.00 | 0.94 | 1.00 |
| MDO (1.5% S) | 0.94 | 1.00 | 1.00 | 0.555 | 0.47 | 0.47 | 0.47 | 1.00 | 0.94 | 1.00 |
| MGO (0.1% S) | 0.94 | 1.00 | 1.00 | 0.037 | 0.17 | 0.17 | 0.17 | 1.00 | 0.94 | 1.00 |
| MGO (0.3% S) | 0.94 | 1.00 | 1.00 | 0.111 | 0.21 | 0.21 | 0.21 | 1.00 | 0.94 | 1.00 |
| MGO (0.4% S) | 0.94 | 1.00 | 1.00 | 0.148 | 0.23 | 0.23 | 0.23 | 1.00 | 0.94 | 1.00 |

In 2011, there were 375 vessel calls at the Port of Seattle that participated in the At-Berth Clean (ABC) Fuels program. Participating vessels committed to using marine gas oil/marine diesel oil with less than 0.5% S while at berth. There were also several vessels that were not part of the ABC Fuel program but switched fuel at the Port Angeles pilot station and used low-sulfur fuel all the way into Port. Participating shipping and cruise lines include:

- Hapag Lloyd
- American Presidents Line
- China Ocean Shipping Company
- Hamburg Sud
- Maersk Line
- Matson Navigation
- Orient Overseas Container Line
- Royal Caribbean
- Celebrity Cruises
- Norwegian Cruise Line

Due to the variability of fuel sulfur content listed in actual fuel switch data obtained from the ABC Fuels program, vessel activity specific fuel correction factors were calculated and used in the emission calculations for these vessels.

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[23] Port of Los Angeles and Port of Long Beach, *San Pedro Bay Clean Air Action Plan*, 2006.

Evergreen Line vessels, and some K-line vessels, which also called at the Port of Tacoma, used low-sulfur fuel with less than 0.5% S while at berth. Cruise ship lines that did not participate in the ABC Fuels program used residual fuel with an average of 1.5% S.

### *3.6.11 Other Correction Factors*

Slide valve correction factors (see Section 3.5) are 0.70 for $NO_x$ and 0.75 for PM[24].

## 3.7 Data Facts and Findings

Information gathered during the data collection process is summarized in this subsection. Table 3.23 lists the 910 discrete vessels that visited the Puget Sound study area in 2011 by vessel type.

**Table 3.23: 2011 OGVs by Vessel Type**

| Vessel Type | Discrete Vessel Count |
|---|---|
| Auto Carrier | 138 |
| Bulk | 294 |
| Bulk - Heavy Load | 2 |
| Bulk - Self Discharging | 4 |
| Bulk - Wood Chips | 1 |
| Container - 1000 | 23 |
| Container - 2000 | 24 |
| Container - 3000 | 8 |
| Container - 4000 | 45 |
| Container - 5000 | 58 |
| Container - 6000 | 29 |
| Container - 7000 | 18 |
| Container - 8000 | 39 |
| Container - 9000 | 2 |
| Container - 10000 | 1 |
| Cruise | 16 |
| General Cargo | 42 |
| ITB | 9 |
| Reefer | 6 |
| RoRo | 7 |
| Tanker - Aframax | 28 |
| Tanker - Chemical | 55 |
| Tanker - Handysize | 14 |
| Tanker - Panamax | 18 |
| Tanker - Suezmax | 29 |
| **Total** | **910** |

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[24] Port of Los Angeles, *Inventory of Air Emissions*, 2010.

Although the study is for all maritime facilities, the following data findings are for the main ports. The average vessel characteristics listed in the tables were not used for estimating emissions since actual values were used on a per engine and vessel basis. The purpose of the average vessel characteristic tables included in this subsection is to summarize the data for the readers.

### *3.7.1 Port of Anacortes Data Findings*

Table 3.24 summarizes the vessel movements for Port of Anacortes in 2011.

**Table 3.24: Port of Anacortes 2011 OGV Movements**

| Vessel Type | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Bulk | 5 | 4 | 2 | 11 |
| General Cargo | 2 | 3 | 1 | 6 |
| ITB | 17 | 1 | 11 | 29 |
| **Total** | **24** | **8** | **14** | **46** |

Table 3.25 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Anacortes in 2011.

**Table 3.25: Port of Anacortes 2011 OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Bulk | 2002 | 36,492 | 6,847 | 1,742 | 128.1 |
| General Cargo | 2000 | 20,005 | 8,121 | 1,333 | 111.6 |
| ITB | 2002 | 364 | 6,851 | na | 49.9 |

Table 3.26 presents the vessel movements for Port of Port Angeles in 2011. It should be noted that Port of Port Angeles did not participate in the 2011 PSEI, but the vessel data was available and thus included in this section.

The number of inbound and outbound trips does not match due to vessel shifts from another dock or terminal within the port instead of arriving from the sea or another port or maritime facility.

**Table 3.26: Port of Port Angeles 2011 OGV Movements**

| **Vessel Type** | **Inbound** | **Outbound** | **Shift** | **Total Movements** |
|---|---|---|---|---|
| Auto Carrier | 0 | 0 | 1 | 1 |
| Bulk | 32 | 8 | 8 | 48 |
| Bulk - Self Discharging | 1 | 1 | 4 | 6 |
| Container - 2000 | 0 | 1 | 1 | 2 |
| Container - 5000 | 0 | 1 | 1 | 2 |
| General Cargo | 5 | 0 | 1 | 6 |
| ITB | 1 | 0 | 2 | 3 |
| Reefer | 0 | 0 | 2 | 2 |
| RoRo | 0 | 1 | 1 | 2 |
| Tanker - Aframax | 0 | 1 | 1 | 2 |
| Tanker - Chemical | 4 | 1 | 4 | 9 |
| Tanker - Handysize | 0 | 1 | 0 | 1 |
| Tanker - Panamax | 1 | 0 | 0 | 1 |
| Tanker - Suezmax | 4 | 15 | 14 | 33 |
| **Total** | **48** | **30** | **40** | **118** |

Table 3.27 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Port Angeles in 2011.

**Table 3.27: Port of Port Angeles 2011 OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Auto Carrier | 2000 | 20,144 | 14,123 | na | na |
| Bulk | 2004 | 44,318 | 7,654 | 2,000 | 104.1 |
| Bulk - Self Discharging | 1975 | 33,797 | 8,517 | 2,380 | na |
| Container - 2000 | 1999 | 30,135 | 12,240 | na | na |
| Container - 5000 | 2002 | 67,009 | 57,199 | na | na |
| General Cargo | 2000 | 22,507 | 7,607 | na | 130.5 |
| ITB | 2002 | 630 | 6,767 | na | 21.4 |
| Reefer | 1993 | 11,181 | 11,950 | na | na |
| RoRo | 2003 | 22,437 | 52,198 | na | na |
| Tanker - Aframax | 2005 | 115,525 | 14,313 | na | 164.6 |
| Tanker - Chemical | 2007 | 40,274 | 8,685 | 2,790 | 146.8 |
| Tanker - Handysize | 2000 | 47,037 | 8,683 | 1,519 | na |
| Tanker - Panamax | 2007 | 74,875 | 13,548 | 2,400 | na |
| Tanker - Suezmax | 1997 | 151,325 | 22,947 | na | 97.7 |

### *3.7.2 Port of Everett Data Findings*

Table 3.28 presents the vessel movements for Port of Everett in 2011. The number of inbound and outbound trips does not match due to vessel shifts from another dock or terminal within the port instead of arriving from the sea or another port or maritime facility.

**Table 3.28: Port of Everett 2011 OGVMovements**

| Vessel Type | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Bulk | 1 | 3 | 2 | 6 |
| Container - 1000 | 9 | 0 | 0 | 9 |
| Container - 2000 | 16 | 0 | 1 | 17 |
| General Cargo | 52 | 30 | 12 | 94 |
| ITB | 0 | 0 | 1 | 1 |
| RoRo | 9 | 9 | 0 | 18 |
| **Total** | **87** | **42** | **16** | **145** |

Table 3.29 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Everett in 2011.

**Table 3.29: Port of Everett 2011 OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Bulk | 2005 | 45,179 | 7,182 | 1,640 | 85.2 |
| Container - 1000 | 2008 | 27,418 | 18,634 | na | 14.9 |
| Container - 2000 | 1998 | 30,197 | 12,512 | na | 13.4 |
| General Cargo | 2000 | 28,619 | 10,435 | 854 | 45.3 |
| ITB | 2002 | na | 6,767 | na | na |
| RoRo | 1997 | 12,262 | 5,051 | na | 49.0 |

### *3.7.3 Port of Olympia Data Findings*

Table 3.30 presents the vessel movements for Port of Olympia in 2011. The number of inbound and outbound trips does not match due to vessel shifts from another dock or terminal within the port instead of arriving from the sea or another port or maritime facility.

**Table 3.30: Port of Olympia 2011 OGV Movements**

| Vessel Type | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Bulk | 22 | 23 | 4 | 49 |
| **Total** | **22** | **23** | **4** | **49** |

Table 3.31 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Olympia in 2011.

**Table 3.31: Port of Olympia 2011 Average OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Bulk | 2006 | 32,945 | 6,750 | 1,640 | 111.2 |

### *3.7.4 Port of Seattle Data Findings*

Table 3.32 presents the vessel movements for Port of Seattle in 2011. The number of inbound and outbound trips does not match due to vessel shifts from another dock or terminal within the port instead of arriving from the sea or another port or maritime facility.

**Table 3.32: Port of Seattle 2011 OGV Movements**

| Vessel Type | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Bulk | 0 | 74 | 99 | 173 |
| Bulk - Heavy Load | 2 | 2 | 6 | 10 |
| Container - 1000 | 108 | 116 | 15 | 239 |
| Container - 2000 | 73 | 89 | 24 | 186 |
| Container - 3000 | 29 | 30 | 1 | 60 |
| Container - 4000 | 111 | 115 | 6 | 232 |
| Container - 5000 | 124 | 126 | 5 | 255 |
| Container - 6000 | 17 | 68 | 51 | 136 |
| Container - 7000 | 83 | 81 | 1 | 165 |
| Container - 8000 | 130 | 135 | 8 | 273 |
| Container - 9000 | 2 | 2 | 0 | 4 |
| Container - 10000 | 1 | 1 | 0 | 2 |
| Cruise | 196 | 196 | 0 | 392 |
| General Cargo | 14 | 39 | 26 | 79 |
| ITB | 0 | 1 | 4 | 5 |
| Tanker - Chemical | 0 | 5 | 0 | 5 |
| **Total** | **890** | **1,080** | **246** | **2,216** |

Table 3.33 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Seattle in 2011.

**Table 3.33: Port of Seattle 2011 OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Bulk | 2003 | 69,669 | 9,609 | 1,784 | 88.0 |
| Bulk - Heavy Load | 1999 | 14,302 | 6,614 | na | 133.6 |
| Container - 1000 | 1999 | 25,048 | 18,665 | 4,857 | 24.2 |
| Container - 2000 | 2002 | 33,232 | 18,874 | 6,695 | 30.3 |
| Container - 3000 | 1986 | 33,860 | 30,474 | na | 31.8 |
| Container - 4000 | 1999 | 63,363 | 40,446 | 6,889 | 31.6 |
| Container - 5000 | 2001 | 67,695 | 52,012 | 12,017 | 30.0 |
| Container - 6000 | 2005 | 78,785 | 62,920 | 13,004 | 28.7 |
| Container - 7000 | 2004 | 95,841 | 68,913 | na | 27.8 |
| Container - 8000 | 2008 | 104,941 | 68,368 | 12,014 | 38.3 |
| Container - 9000 | 2003 | 107,550 | 61,739 | 11,520 | 33.3 |
| Container - 10000 | 2009 | 116,440 | 68,639 | 13,188 | 32.1 |
| Cruise | 2002 | 9,767 | 64,211 | 1,755 | 10.1 |
| General Cargo | 2003 | 43,871 | 13,170 | na | 30.1 |
| ITB | 2005 | 214 | 4,876 | na | 110.2 |
| Tanker - Chemical | 1999 | 28,212 | 6,904 | 1,650 | na |

Figures 3.22, 3.23, and 3.24 presents the 2011 Port of Seattle average ocean-going vessel model year, DWT, and engine power (main and auxiliary), respectively

**Figure 3.22: Port of Seattle 2011 OGV Model Year, by Vessel Type**

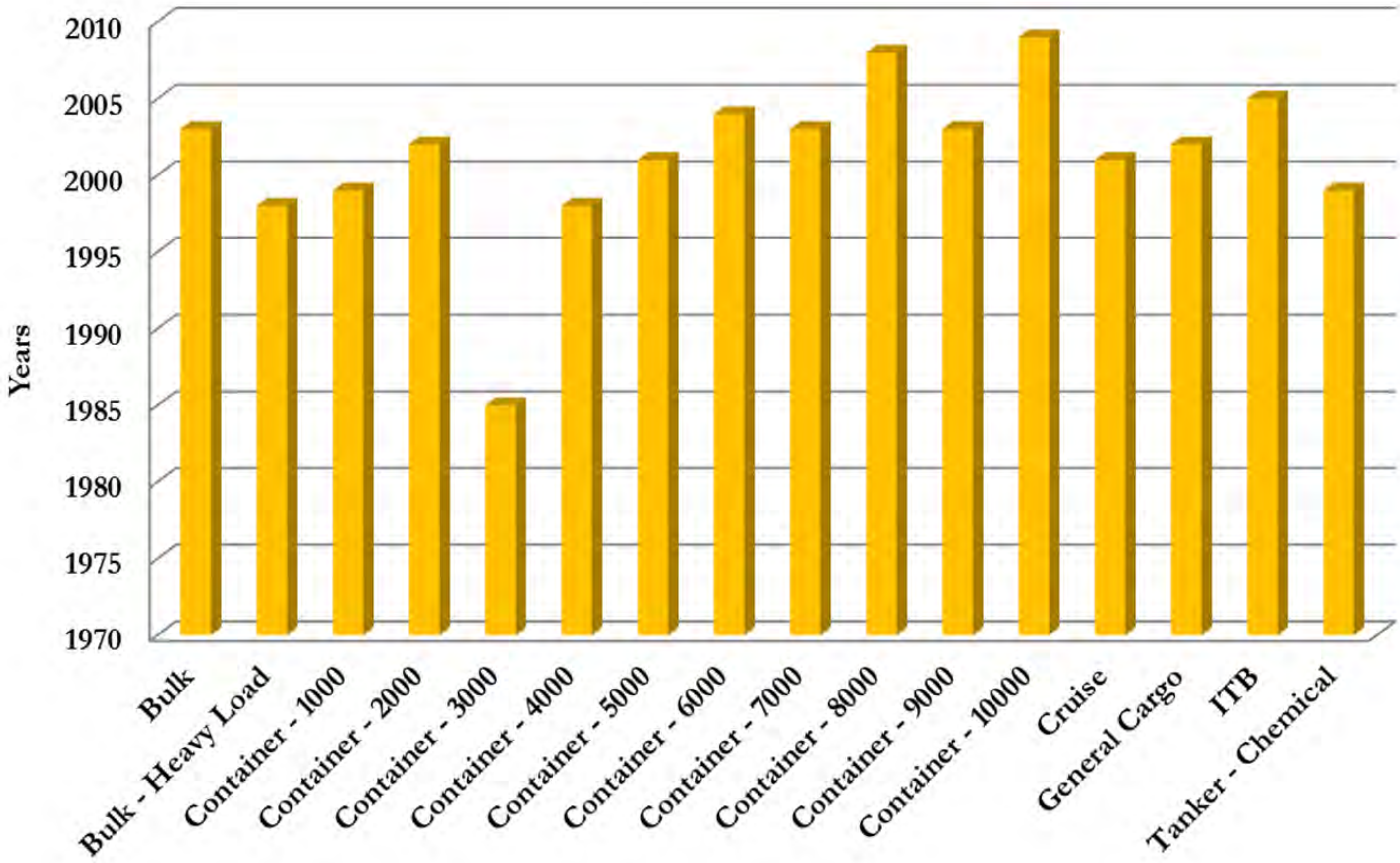


**Figure 3.23: Port of Seattle 2011 OGV DWT by Vessel Type**

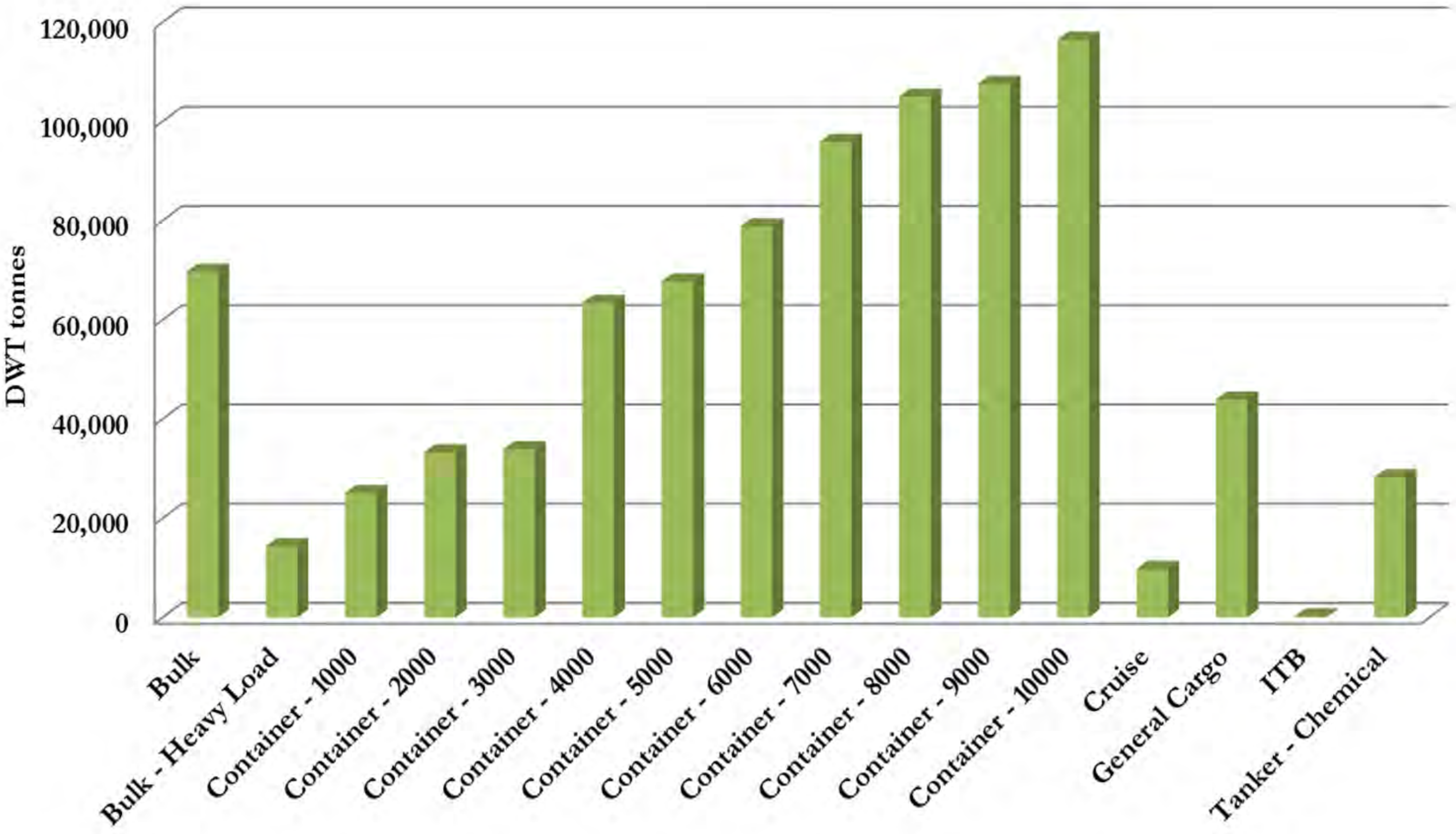
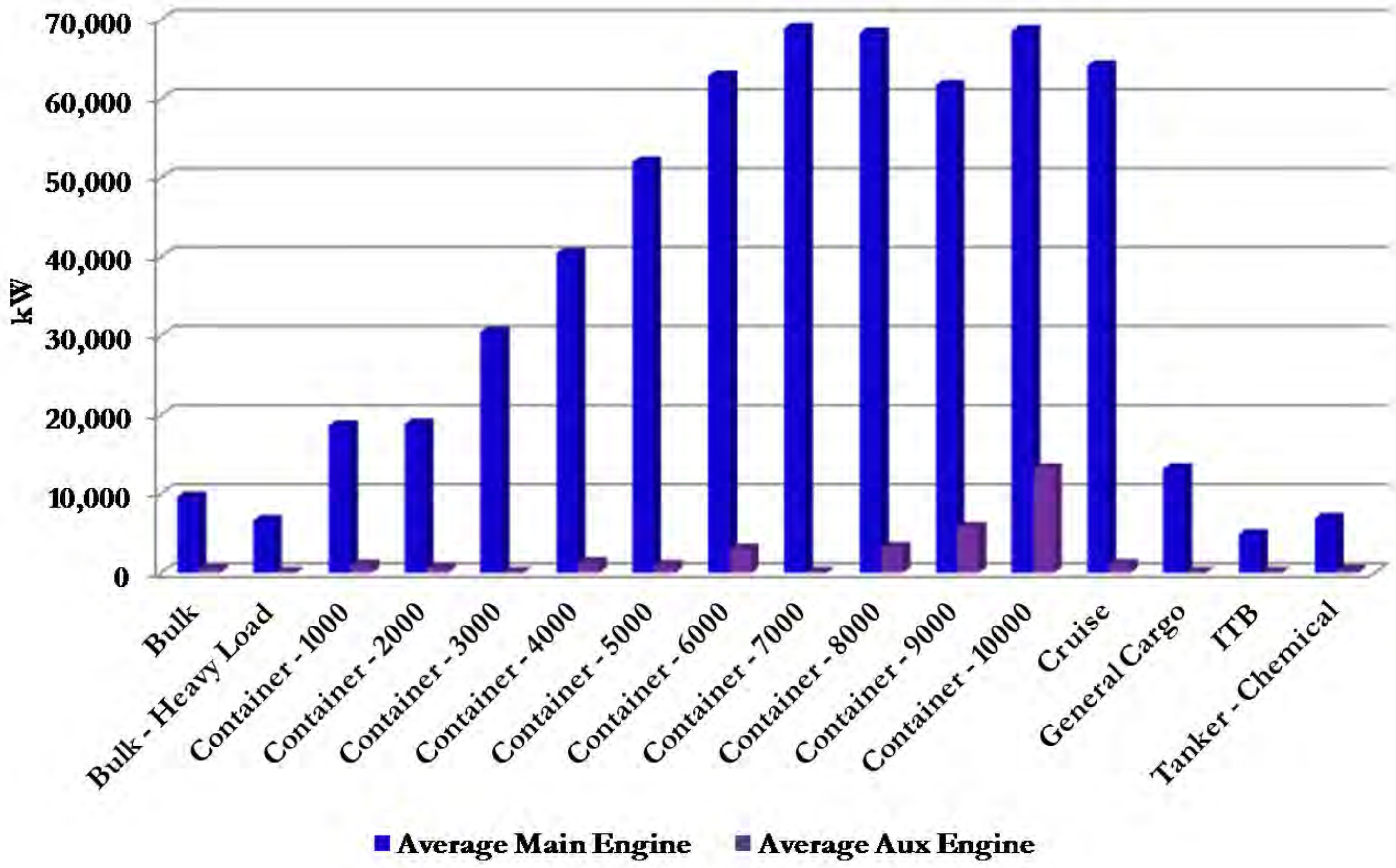


**Figure 3.24: Port of Seattle 2011 OGV Main and Auxiliary Engine Power by Vessel Type, kW**



### *3.7.5 Port of Tacoma Data Findings*

Table 3.34 presents the vessel movements for Port of Tacoma in 2011. The number of inbound and outbound trips does not match due to vessel shifts from another dock or terminal within the port instead of arriving from the sea or another port or maritime facility.

**Table 3.34: Port of Tacoma 2011 OGV Movements**

| Vessel Type | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Auto Carrier | 196 | 211 | 16 | 423 |
| Bulk | 18 | 105 | 103 | 226 |
| Bulk - Self Discharging | 6 | 6 | 1 | 13 |
| Container - 1000 | 105 | 104 | 0 | 209 |
| Container - 2000 | 50 | 50 | 0 | 100 |
| Container - 3000 | 15 | 15 | 0 | 30 |
| Container - 4000 | 26 | 25 | 0 | 51 |
| Container - 5000 | 114 | 115 | 3 | 232 |
| Container - 6000 | 97 | 46 | 0 | 143 |
| Container - 7000 | 4 | 4 | 0 | 8 |
| General Cargo | 4 | 5 | 1 | 10 |
| ITB | 0 | 0 | 1 | 1 |
| RoRo | 101 | 100 | 1 | 202 |
| Tanker - Chemical | 9 | 13 | 3 | 25 |
| Tanker - Suezmax | 0 | 0 | 1 | 1 |
| **Total** | **745** | **799** | **130** | **1,674** |

Table 3.35 presents the average vessel and engine characteristics by vessel type for those vessels that called at the Port of Tacoma in 2011.

**Table 3.35: Port of Tacoma Average 2011 OGV Type Characteristics**

| Vessel Type | Year Built | DWT (tonnes) | Main Engine Power (kW) | Aux Engine Power (kW) | At-Berth Time (hours) |
|---|---|---|---|---|---|
| Auto Carrier | 1998 | 19,459 | 13,582 | 4,047 | 16.6 |
| Bulk | 2003 | 63,407 | 8,823 | 1,738 | 89.0 |
| Bulk - Self Discharging | 1977 | 44,452 | 9,322 | 2,605 | 34.2 |
| Container - 1000 | 1986 | 21,288 | 17,390 | na | 24.2 |
| Container - 2000 | 1980 | 31,322 | 20,963 | na | 10.6 |
| Container - 3000 | 1995 | 46,176 | 30,269 | na | 43.1 |
| Container - 4000 | 2003 | 55,097 | 39,957 | 5,195 | 38.6 |
| Container - 5000 | 2001 | 66,120 | 52,936 | 7,763 | 35.7 |
| Container - 6000 | 2005 | 76,033 | 58,914 | 12,842 | 35.0 |
| Container - 7000 | 2007 | 78,714 | 54,941 | 12,560 | 29.2 |
| General Cargo | 2005 | 14,691 | 6,045 | 1,257 | 51.9 |
| ITB | 2008 | 428 | 2,985 | na | 10.5 |
| RoRo | 2002 | 22,134 | 50,864 | 1,760 | 14.9 |
| Tanker - Chemical | 2007 | 20,597 | 6,385 | 1,650 | 20.9 |
| Tanker - Suezmax | 2002 | 141,740 | 22,087 | na | na |

Figures 3.25, 3.26, and 3.27 presents the 2011 Port of Tacoma average ocean-going vessel model year, DWT, and engine power (main and auxiliary), respectively

**Figure 3.25: Port of Tacoma Average 2011 OGV Model Year, by Vessel Type**

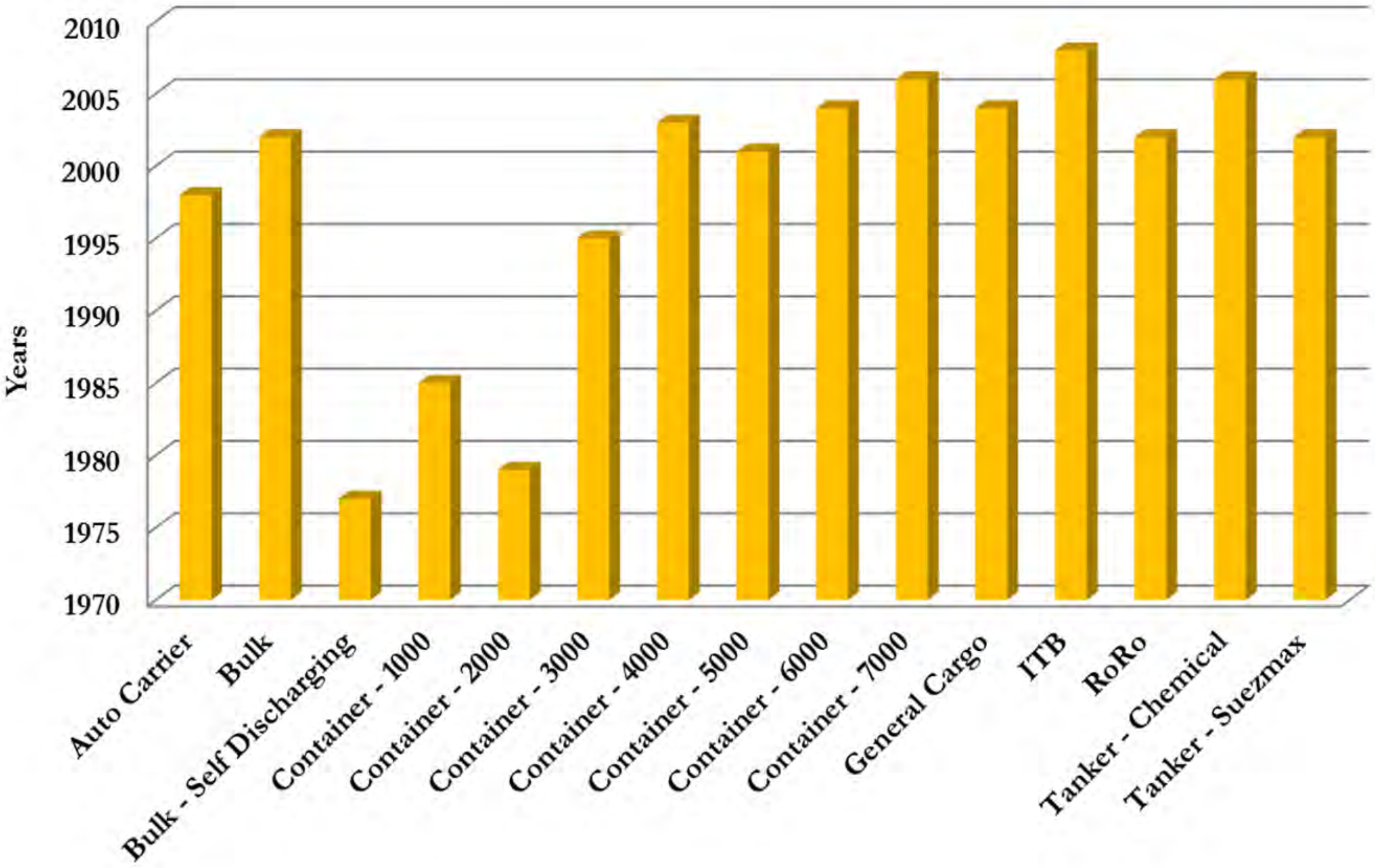


Figure 3.26: Port of Tacoma Average 2011 OGV DWT by Vessel Type

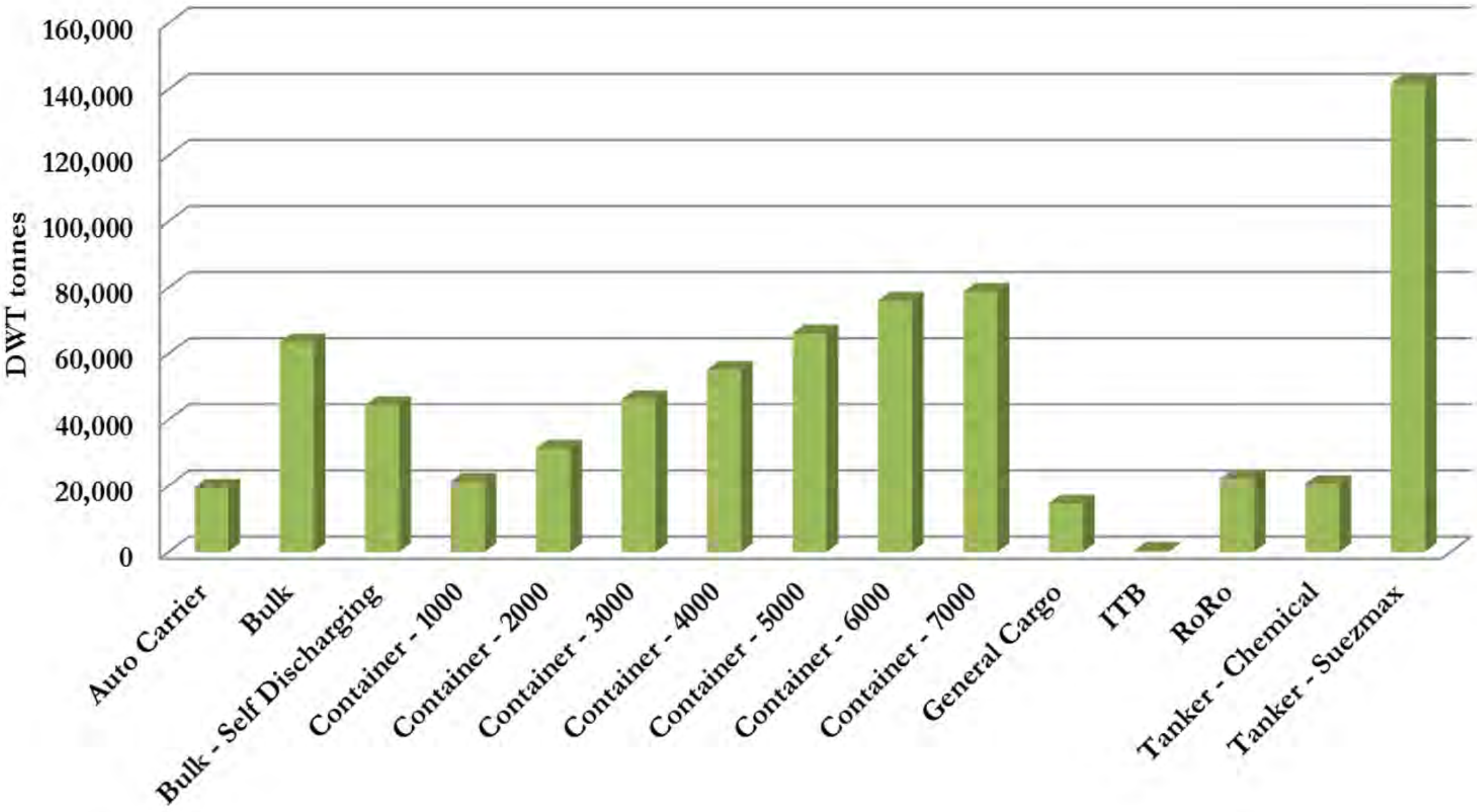
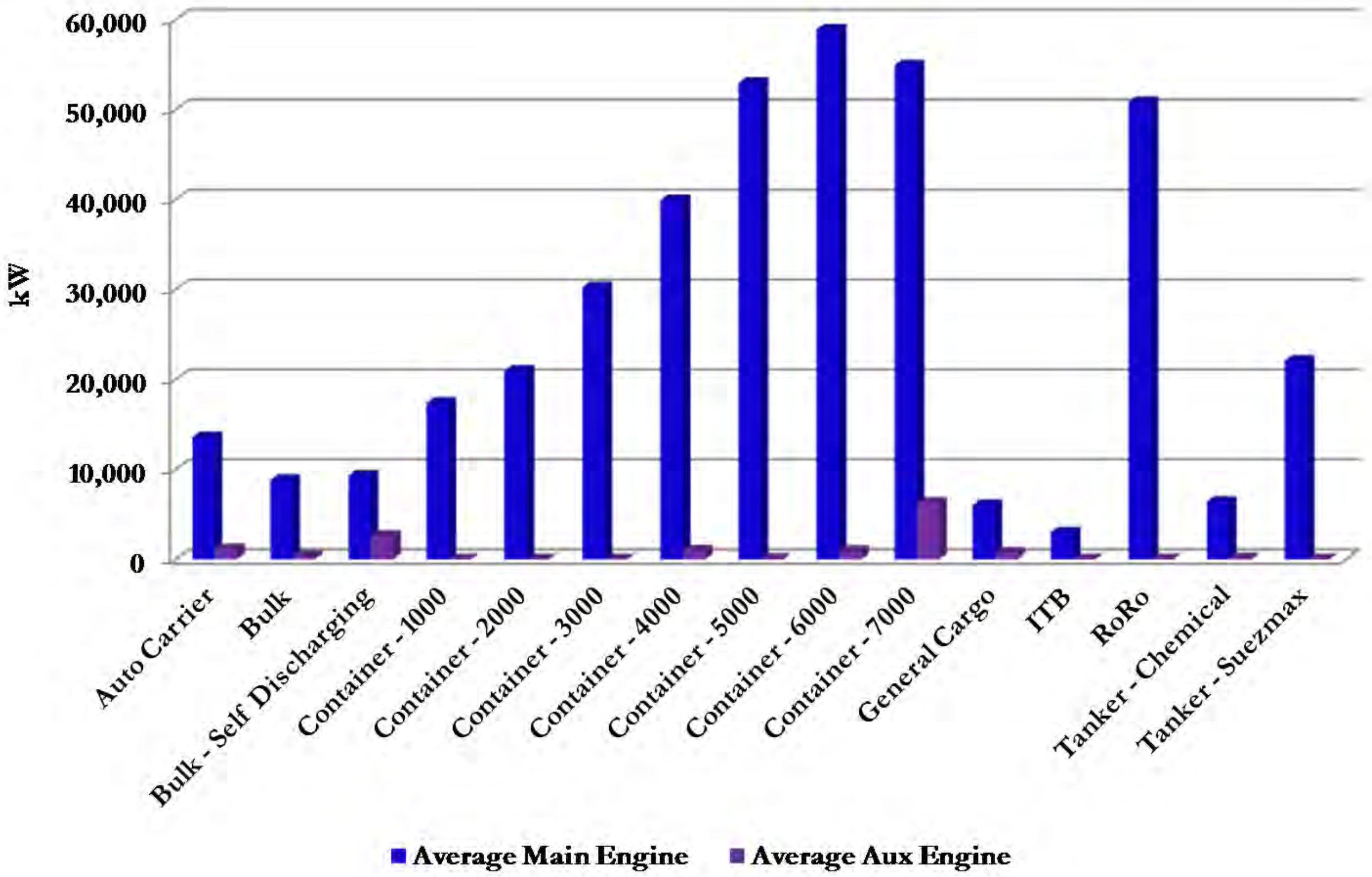


Figure 3.27: Port of Tacoma Average 2011 OGV Main and Auxiliary Engine Power by Vessel Type, kW



### *3.7.6 Tankers in Puget Sound*

Table 3.36 presents the vessel movements for tankers in Puget Sound in 2011. The number of inbound and outbound trips does not match due to shifts tankers make from one dock to another within a facility or from anchorage to a dock. Arrivals are strictly defined as a vessel arriving from the sea or another maritime facility and do not include shifts from a dock within the facility or anchorage near the facility.

**Table 3.36: 2011 Tanker Movements**

| Associated Port | Inbound | Outbound | Shift | Total Movements |
|---|---|---|---|---|
| Bellingham | 2 | 0 | 1 | 3 |
| Cherry Point | 108 | 102 | 148 | 358 |
| Ferndale | 50 | 7 | 42 | 99 |
| Indian Island | 1 | 0 | 0 | 1 |
| Manchester | 6 | 3 | 6 | 15 |
| March Point | 116 | 142 | 225 | 483 |
| Point Wells | 3 | 1 | 3 | 7 |
| Port Angeles | 118 | 155 | 141 | 414 |
| Sandy Point | 4 | 0 | 1 | 5 |
| Seattle | 12 | 10 | 14 | 36 |
| Tacoma | 14 | 33 | 43 | 90 |
| Vendovi Island | 30 | 5 | 68 | 103 |
| **Total** | **464** | **458** | **692** | **1,614** |

The MarEx of Puget Sound data was used for tankers, as for all other vessels in the area due to its detailed information on arrivals, departures and shifts.

### 3.8 Emission Estimates

The 2011 ocean-going vessel emissions for Puget Sound are summarized in this section. Tables 3.37 through 3.48 include the transit, maneuvering, and hotelling emission estimates for all vessel movements in the study area.

Table 3.37 presents the 2011 ocean-going vessel criteria pollutant emission by county and regional air agency in tons per year. The links in the routing were cut at the county lines so that all links within a county could be easily divided up by county and their respective emissions summarized.

**Table 3.37: 2011 Total OGV Airshed Emissions by County and Regional Clean Air Agency, tpy**

| County | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Island | 878.1 | 33.2 | 76.9 | 683.4 | 57.4 | 45.9 | 55.3 | 42,648 |
| San Juan | 174.1 | 7.1 | 16.4 | 141.1 | 11.6 | 9.3 | 11.5 | 8,418 |
| Skagit | 542.6 | 20.4 | 48.5 | 1,633.3 | 90.6 | 72.5 | 28.0 | 97,344 |
| Whatcom | 216.1 | 8.9 | 20.2 | 617.0 | 35.0 | 28.0 | 11.7 | 36,737 |
| **Total NWCAA** | **1,810.9** | **69.6** | **162.0** | **3,074.8** | **194.6** | **155.7** | **106.4** | **185,148** |
| Clallam | 6,295.6 | 242.1 | 560.8 | 5,487.9 | 437.7 | 350.1 | 392.1 | 336,717 |
| Jefferson | 711.5 | 27.0 | 62.7 | 550.8 | 46.1 | 36.9 | 44.4 | 34,357 |
| Mason | 0.3 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 13 |
| Thurston | 10.3 | 0.4 | 0.9 | 15.1 | 1.0 | 0.8 | 0.7 | 887 |
| **Total ORCAA** | **7,017.7** | **269.5** | **624.4** | **6,054.0** | **484.8** | **387.9** | **437.2** | **371,973** |
| King | 1,316.4 | 48.1 | 117.2 | 1,135.1 | 89.6 | 71.7 | 74.5 | 86,922 |
| Kitsap | 925.3 | 35.0 | 81.3 | 756.7 | 62.0 | 49.6 | 57.9 | 46,890 |
| Pierce | 481.6 | 16.4 | 41.5 | 578.4 | 40.2 | 32.2 | 28.0 | 40,168 |
| Snohomish | 106.3 | 3.7 | 9.2 | 110.0 | 8.3 | 6.7 | 7.1 | 6,539 |
| **Total PSCAA** | **2,829.7** | **103.1** | **249.2** | **2,580.2** | **200.2** | **160.2** | **167.5** | **180,520** |
| **Total** | **11,658.2** | **442.2** | **1,035.6** | **11,709.0** | **879.6** | **703.7** | **711.1** | **737,640** |

Table 3.38 presents the 2011 ocean-going vessel criteria pollutant emission by vessel type. The values include the transit, maneuvering, and hotelling emission estimates for all vessel movements in the study area. DPM emissions are lower than $PM_{10}$ emissions for ocean-going vessels, especially tankers, because boilers do not meet the definition of an internal combustion engine and therefore do not have DPM emissions associated with them. Tankers typically have higher boiler loads at berth while unloading, so they will have higher $PM_{10}$ emissions and the difference between $PM_{10}$ and DPM emissions will be greater.

**Table 3.38: 2011 Total OGV Airshed Emissions by Vessel Type, tpy**

| **Vessel Type** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** | **$CO_2e$** |
|---|---|---|---|---|---|---|---|---|
| Auto Carrier | 571.4 | 20.2 | 47.9 | 397.5 | 34.8 | 27.9 | 33.9 | 23,573 |
| Bulk | 863.2 | 33.3 | 78.8 | 766.4 | 59.8 | 47.9 | 53.5 | 45,455 |
| Bulk - Heavy Load | 6.2 | 0.2 | 0.5 | 5.4 | 0.4 | 0.4 | 0.4 | 323 |
| Bulk - Self Discharging | 21.1 | 0.7 | 1.6 | 15.4 | 1.3 | 1.1 | 1.2 | 911 |
| Bulk - Wood Chips | 1.0 | 0.1 | 0.1 | 0.9 | 0.1 | 0.1 | 0.1 | 54 |
| Container1000 | 661.0 | 23.5 | 55.3 | 617.9 | 46.9 | 37.6 | 36.9 | 37,556 |
| Container2000 | 262.8 | 10.0 | 23.5 | 412.6 | 26.1 | 20.9 | 14.1 | 25,353 |
| Container3000 | 239.9 | 8.0 | 18.8 | 136.0 | 13.1 | 10.5 | 12.6 | 9,665 |
| Container4000 | 775.8 | 28.2 | 66.2 | 500.3 | 44.9 | 35.9 | 43.4 | 33,651 |
| Container5000 | 1,397.3 | 50.6 | 119.0 | 891.7 | 80.8 | 64.7 | 78.6 | 61,079 |
| Container6000 | 812.4 | 32.1 | 75.7 | 613.4 | 51.2 | 41.0 | 49.0 | 38,893 |
| Container7000 | 610.2 | 24.8 | 57.8 | 426.1 | 36.5 | 29.2 | 36.0 | 27,704 |
| Container8000 | 692.1 | 29.0 | 68.1 | 552.4 | 44.4 | 35.5 | 42.4 | 35,116 |
| Container9000 | 17.2 | 0.6 | 1.4 | 11.5 | 1.0 | 0.8 | 1.0 | 687 |
| Container10000 | 4.6 | 0.2 | 0.5 | 4.4 | 0.3 | 0.3 | 0.3 | 259 |
| Cruise | 1,442.2 | 51.8 | 122.4 | 1,213.9 | 99.5 | 79.6 | 98.0 | 90,483 |
| General Cargo | 211.3 | 8.0 | 19.5 | 205.9 | 16.8 | 13.4 | 15.7 | 12,117 |
| ITB | 132.6 | 4.9 | 11.2 | 119.2 | 10.2 | 8.2 | 10.2 | 7,068 |
| Reefer | 15.4 | 0.5 | 1.2 | 14.3 | 1.1 | 0.9 | 1.0 | 835 |
| RoRo | 752.2 | 28.7 | 63.5 | 683.5 | 58.5 | 46.8 | 57.5 | 41,088 |
| Tanker - Aframax | 303.6 | 12.1 | 28.5 | 669.3 | 39.3 | 31.4 | 16.8 | 39,878 |
| Tanker - Chemical | 464.0 | 19.9 | 46.6 | 959.0 | 56.5 | 45.2 | 26.8 | 57,116 |
| Tanker - Handysize | 125.0 | 4.6 | 10.7 | 242.5 | 14.6 | 11.7 | 6.4 | 14,489 |
| Tanker - Panamax | 95.9 | 3.9 | 9.1 | 237.5 | 13.5 | 10.8 | 5.0 | 14,172 |
| Tanker - Suezmax | 1,180.0 | 46.4 | 107.4 | 2,011.8 | 127.7 | 102.2 | 70.3 | 120,116 |
| **Total** | **11,658.2** | **442.2** | **1,035.6** | **11,709.0** | **879.6** | **703.7** | **711.1** | **737,640** |

Table 3.39 presents the total 2011 OGV emissions by engine type. The engines include main (i.e., propulsion) engines, auxiliary engines and auxiliary boilers. The main engines are used during transit and maneuvering. Auxiliary engines are used during transit, maneuvering and hotelling. Hotelling can be at a berth or at an anchorage. All vessels, except the ocean tugboats, have auxiliary boilers. Auxiliary boilers are assumed to be used during maneuvering and hotelling, but not used during transit since vessels are equipped with an exhaust gas recovery system or "economizer" that uses main engine exhaust for heating purposes. DPM is zero for auxiliary boilers since boilers do not meet the definition of a compression ignition internal combustion engine.

**Table 3.39: 2011 Total OGV Airshed Emissions by Engine Type, tpy**

| Vessel Type | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Main Engine | 8,878.0 | 350.2 | 797.0 | 6,824.6 | 574.9 | 459.9 | 552.1 | 421,867 |
| Auxiliary Engine | 2,382.3 | 72.9 | 200.6 | 1,894.7 | 159.0 | 127.2 | 159.0 | 126,697 |
| Auxiliary Boiler | 397.9 | 19.0 | 38.0 | 2,989.7 | 145.7 | 116.6 | 0.0 | 189,076 |
| **Total** | **11,658.2** | **442.2** | **1,035.6** | **11,709.0** | **879.6** | **703.7** | **711.1** | **737,640** |

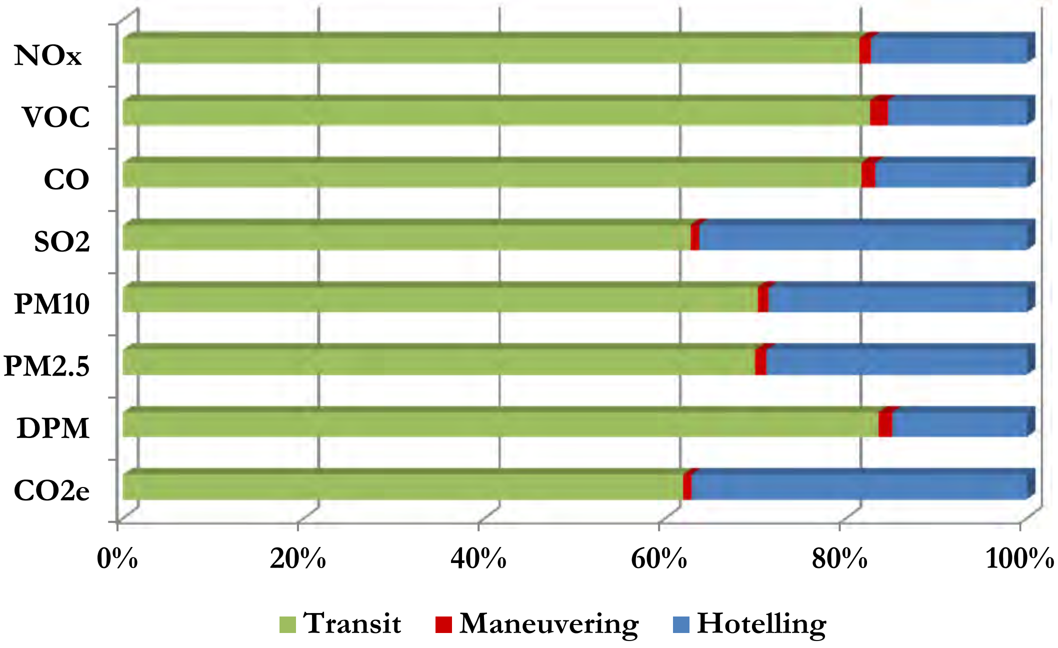
Table 3.40 presents the total 2011 OGV emissions by mode in Puget Sound in tons per year. The transit includes all transits within the study area. Hotelling and maneuvering is for all movements within the study area, including public and private facilities and anchorages.

**Table 3.40: 2011 Total OGV Airshed Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Transit | 9,423.9 | 362.8 | 839.6 | 7,333.2 | 615.8 | 492.6 | 593.0 | 452,613 |
| Maneuvering | 146.8 | 8.8 | 16.1 | 109.2 | 11.2 | 9.0 | 11.2 | 6,436 |
| Hotelling | 2,087.5 | 70.6 | 180.0 | 4,266.5 | 252.6 | 202.1 | 106.9 | 278,591 |
| **Total** | **11,658.2** | **442.2** | **1,035.6** | **11,709.0** | **879.6** | **703.7** | **711.1** | **737,640** |

Figure 3.28 presents the 2011 distribution of ocean-going vessels emissions for criteria pollutants by transit, maneuvering and hotelling mode. The figure presents that 65% to 80% of the emissions occur during transit; less than 5% occur during maneuvering, and 12% to 35% occur while the vessel is at berth.

**Figure 3.28: 2011 Distribution of Total OGV Airshed Emissions by Transit, Maneuvering, and Hotelling Mode**



*3.8.1 Main Port Emission Estimates*

This subsection presents the emissions associated with the main ports in Puget Sound for maneuvering and hotelling. The emissions by port do not include the transit emissions within Puget Sound. The maneuvering emissions include a short transit time in the harbor area near the port and the docking into the berth for arrivals. The maneuvering emissions include the maneuvering for all movements (i.e., arrivals, departures and shifts). The hotelling emissions include emissions while the vessel is at berth.

The port emissions do not include any anchorages or private facilities near the Port area, only the port-controlled terminals. Emissions at the anchorages near the ports were not attributed to the ports because the vessels that stopped at anchorage may not have called at the public port. For example, vessels may stop to refuel at anchorages near Port Angeles before continuing on their transit, but do not call at the Port of Port Angeles terminals.

Table 3.41 presents the port maneuvering and hotelling emission estimates associated with the Port of Anacortes.

**Table 3.41: Port of Anacortes 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 9.5 | 0.3 | 0.8 | 11.4 | 0.8 | 0.7 | 0.7 | 653 |
| Maneuvering | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 4 |
| **Total** | **9.6** | **0.3** | **0.8** | **11.4** | **0.8** | **0.7** | **0.7** | **657** |

Table 3.42 lists the port maneuvering and hotelling emission estimates associated with the Port of Port Angeles.

**Table 3.42: Port of Port Angeles 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 61.0 | 2.2 | 5.3 | 195.0 | 10.7 | 8.6 | 3.1 | 11,609 |
| Maneuvering | 0.9 | 0.0 | 0.1 | 0.8 | 0.1 | 0.1 | 0.1 | 47 |
| **Total** | **61.9** | **2.2** | **5.4** | **195.9** | **10.8** | **8.6** | **3.2** | **11,656** |

Table 3.43 lists the port maneuvering and hotelling emission estimates associated with the Port of Everett.

**Table 3.43: Port of Everett 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 46.4 | 1.4 | 3.8 | 52.6 | 3.9 | 3.1 | 3.3 | 3,019 |
| Maneuvering | 0.8 | 0.0 | 0.1 | 0.7 | 0.1 | 0.0 | 0.1 | 41 |
| **Total** | **47.2** | **1.4** | **3.8** | **53.3** | **3.9** | **3.2** | **3.4** | **3,059** |

Table 3.44 lists the port maneuvering and hotelling emission estimates associated with the Port of Everett.

**Table 3.44: Port of Olympia 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 7.4 | 0.2 | 0.6 | 13.2 | 0.8 | 0.7 | 0.5 | 771 |
| Maneuvering | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 8 |
| **Total** | **7.5** | **0.2** | **0.6** | **13.3** | **0.9** | **0.7** | **0.5** | **779** |

Table 3.45 lists the port maneuvering and hotelling emission estimates associated with the Port of Seattle.

**Table 3.45: Port of Seattle 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 679.0 | 21.8 | 58.7 | 551.5 | 42.4 | 33.9 | 33.3 | 51,492 |
| Maneuvering | 69.2 | 4.4 | 7.5 | 49.0 | 5.3 | 4.3 | 5.3 | 2,986 |
| **Total** | **748.3** | **26.2** | **66.2** | **600.5** | **47.7** | **38.2** | **38.6** | **54,479** |

Table 3.46 lists the port maneuvering and hotelling emission estimates associated with the Port of Tacoma.

**Table 3.46: Port of Tacoma 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 339.4 | 10.6 | 28.3 | 380.5 | 26.4 | 21.1 | 18.5 | 28,582 |
| Maneuvering | 35.8 | 1.5 | 3.4 | 29.7 | 2.6 | 2.1 | 2.6 | 1,690 |
| **Total** | **375.2** | **12.1** | **31.7** | **410.2** | **29.0** | **23.2** | **21.1** | **30,273** |

### *3.8.2 Petroleum Facilities Emission Estimates*

Emissions associated with the petroleum facilities in Puget Sound include only those for maneuvering and hotelling. The maneuvering emissions include the maneuvering for all movements (i.e., arrivals, departures and shifts). The hotelling emissions include emissions while the vessel is at berth. The terminals and anchorages associated with the petroleum facilities in the study area are located at:

- Cherry Point
- Ferndale
- March Point
- Anchorages near Point Wells, Sandy Point, Vendovi Island

Table 3.47 presents the port maneuvering and hotelling emission estimates associated with the petroleum facilities.

**Table 3.47: Petroleum Facilities 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 668.2 | 24.7 | 59.0 | 2,359.6 | 127.3 | 101.8 | 31.9 | 140,710 |
| Maneuvering | 29.2 | 2.1 | 3.7 | 21.0 | 2.3 | 1.8 | 2.3 | 1,213 |
| **Total** | **697.4** | **26.8** | **62.7** | **2,380.7** | **129.6** | **103.7** | **34.2** | **141,923** |

### *3.8.3 Other Maritime Facilities Emission Estimates*

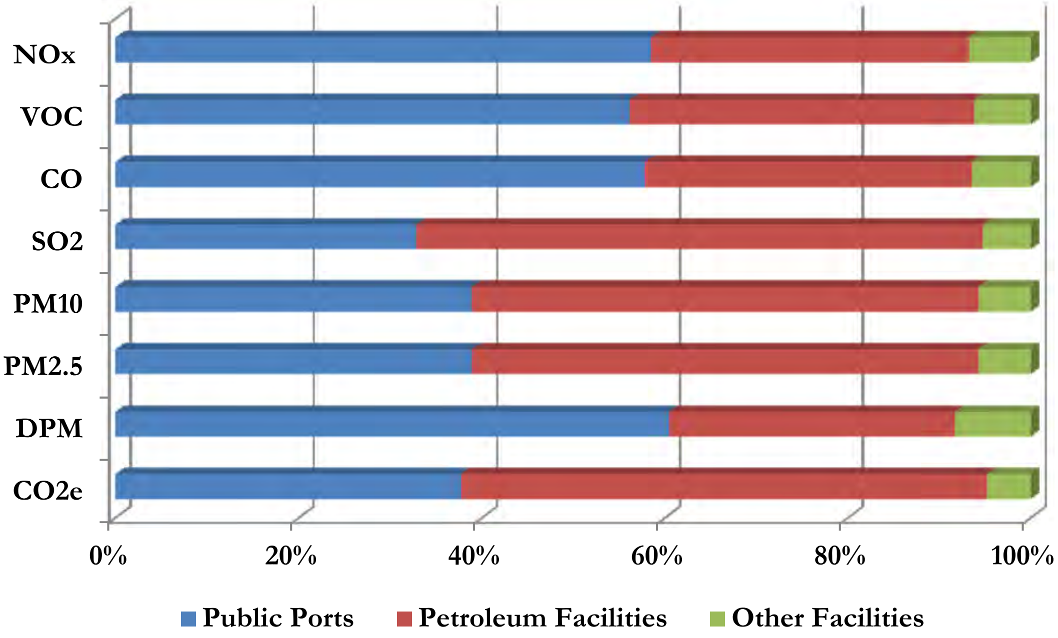
Table 3.48 presents the port maneuvering and hotelling emission estimates associated with the other maritime facilities. The maneuvering emissions include the maneuvering for all movements (i.e., arrivals, departures and shifts). The hotelling emissions include emissions while the vessel is at berth.

**Table 3.48: Other Maritime Facilities 2011 OGV Port Emissions by Mode, tpy**

| Mode | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Hotelling | 131.8 | 4.1 | 10.8 | 196.7 | 13.0 | 10.4 | 8.7 | 11,586 |
| Maneuvering | 5.2 | 0.3 | 0.6 | 3.8 | 0.4 | 0.3 | 0.4 | 221 |
| **Total** | **137.0** | **4.4** | **11.3** | **200.5** | **13.4** | **10.8** | **9.1** | **11,807** |

Figure 3.29 presents the 2011 distribution of maneuvering and hotelling emissions for the main public ports, petroleum facilities, and other maritime facilities. Approximately 55% of the $NO_x$, VOC, CO and DPM maneuvering and hotelling emissions are associated with public ports, about 35% of emissions are associated with petroleum facilities, and about 10% are associated with the other maritime facilities. For the $PM_{10}$, $PM_{2.5}$ and $SO_2$ emissions, approximately 35% of the emissions are associated with public ports, 55% of the emissions are associated with petroleum facilities, and 10% are associated with other maritime facilities. Petroleum facilities may have a higher percentage of $PM_{10}$, $PM_{2.5}$ and $SO_2$ emissions than the other pollutants due to the higher boiler loads needed during unloading.

**Figure 3.29: 2011 Distribution of Other Maritime Facilities Port Emissions**



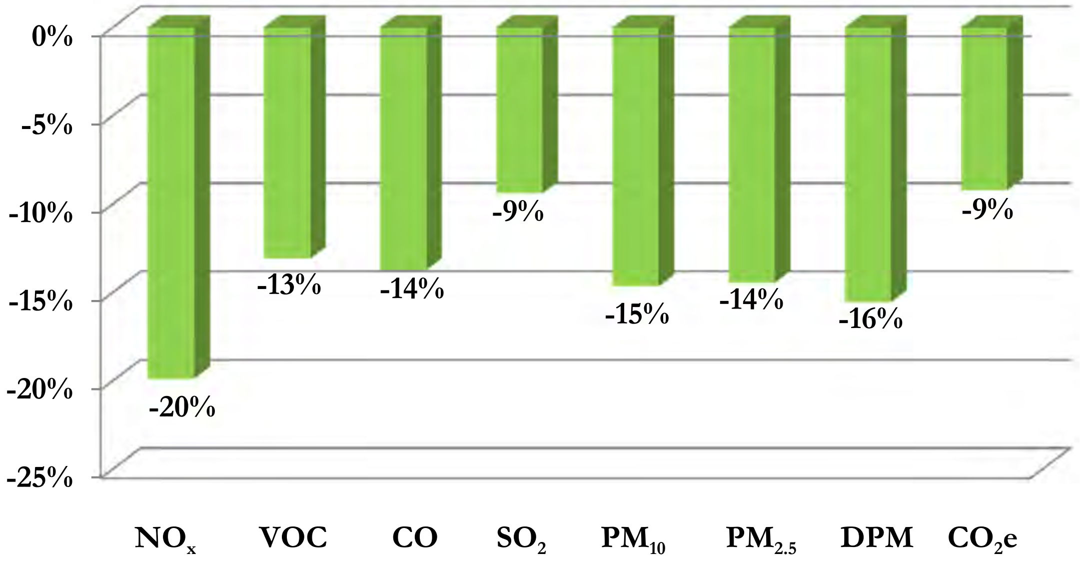
## 3.9 Emission Comparison, 2011 vs 2005

The OGV emission calculation methodology used in the 2011 inventory is similar to the methodology used in 2005. There were changes in how emissions were allocated based on the three additional zones added for 2011. Table 3.49 compares the total OGV emissions, which show a 9% to 20% reduction for 2011 emissions as compared to 2005. The emission reductions are greater than the 8% decrease in inbound vessel movement seen in 2011 from 2005 due to the emission reduction policies at Port of Tacoma and Port of Seattle for shore power and fuel switching at berth by participating shipping lines. Figure 3.30 presents the changes in 2011 from that in 2005. Table 3.50 presents the changes in OGV inbound movements in 2011 vs 2005.

### Table 3.49: 2011 vs 2005 Total OGV Airshed Emissions Comparison, tpy

| Emissions | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 11,658.2 | 442.2 | 1,035.6 | 11,709.0 | 879.6 | 703.7 | 711.1 | 737,640 |
| 2005 | 14,551.4 | 508.8 | 1,200.4 | 12,923.7 | 1,030.7 | 822.5 | 842.0 | 812,391 |
| **Change, tpy** | **-2,893.1** | **-66.6** | **-164.8** | **-1,214.7** | **-151.0** | **-118.8** | **-130.9** | **-74,751** |
| **Change, %** | **-20%** | **-13%** | **-14%** | **-9%** | **-15%** | **-14%** | **-16%** | **-9%** |

### Figure 3.30: 2011 vs 2005 Total OGV Airshed Emissions Change



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

### Table 3.50: 2011 vs 2005 Total OGV Inbound Movements Comparison

| Year | Inbound Movements |
|---|---|
| 2011 | 4,128 |
| 2005 | 4,281 |
| **Change, %** | **-4%** |

# SECTION 4 HARBOR VESSELS

Section 4 provides an overview of the harbor vessels operating in Puget Sound, describes the methodology used to estimate emissions, and summarizes the emission estimates for this source category.

## 4.1 Source Description

The harbor vessels designation is used to identify vessels that are not in the ocean-going vessel category. These vessels typically spend the majority of the time in the Puget Sound and/or coastal region and do not routinely make trans-Pacific crossings. Harbor vessels are divided into three groups: commercial harbor vessels, government (non-military) vessels, and recreational vessels.

Commercial harbor and government vessels included in this inventory are divided into the following vessel types:

- Assist and escort tugboats
- Harbor and ocean tugboats
- Government (non-military) vessels
- Work boats
- Commercial fishing vessels
- Ferry vessels
- Excursion vessels
- Tank barges

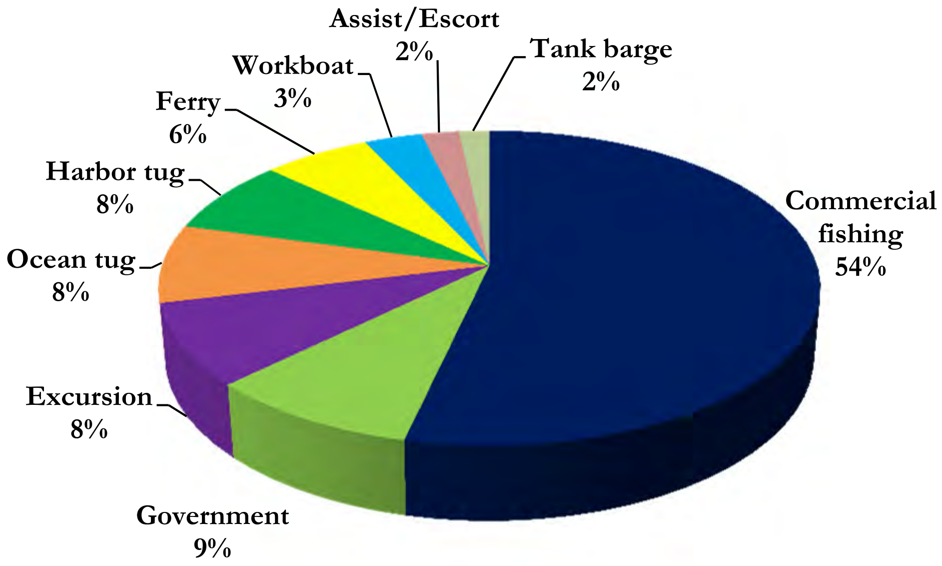
A description of each vessel type and operational profiles are further described for each vessel type in Section 4.4. Recreational vessels are presented in this section, but separately from the commercial harbor and government vessels (see Section 4.8). Table 4.1 presents the number of commercial harbor and government vessels inventoried for the Puget Sound in 2011 for each vessel type (this number does not include recreational vessels, see Section 4.8).

**Table 4.1: 2011 Commercial Harbor and Government Vessel Counts by Vessel Type**

| Type | Vessel Count |
|---|---|
| Assist/Escort | 15 |
| Commercial fishing | 380 |
| Excursion | 60 |
| Ferry | 43 |
| Government | 65 |
| Harbor tug | 54 |
| Ocean tug | 57 |
| Tank barge | 12 |
| Workboat | 23 |
| **Total** | **709** |

Figure 4.1 presents the distribution of commercial harbor and government vessels inventoried for Puget Sound in 2011. Emission contribution by vessel type is presented in Figure 4.2 in section 4.7.

**Figure 4.1: 2011 Commercial Harbor and Government Vessels Count by Vessel Type**



Data for all engines for all vessels was not available for the 2011 inventory and it was decided to keep the 2005 data when the 2011 data was not available. Data was collected for about 264 vessels in 2011 out of the 709 vessels included in the inventory. For the remaining vessels, if 2011 data was not collected, it was assumed that the vessel information stayed the same as what was collected and used in 2005. With the data collected for 2011 and 2005 for vessels that remained in the 2011 inventory, about 1% of the engines were missing activity hours, horsepower or model year which is required for emission estimate calculations. Where data was available for engine model year, horsepower, and activity hours, the actual values were used as inputs to the emission model. For those vessels for which data was unavailable, the average engine model year, horsepower, and activity hours for vessels of that type were used as inputs to the emission model, consistent with the 2005 approach.

Recreational vessels are privately owned watercraft used for pleasure boating and are not associated with commercial or cargo related activities. Recreational vessels are included in the inventory as many of the ports have marinas that are used by recreational vessels (see Section 4.8).

## 4.2 Geographical Delineation

The geographical area in which the harbor vessels operate is similar to that of the area for ocean-going vessels. This area includes the U.S. portions of the Georgia Basin/Puget Sound International Airshed, as shown in Figure 1.1, and the twelve counties and six ports described in Section 1.2.4. Emissions from harbor vessels that routinely cross the international border are estimated for the U.S. portions of their operations. Emissions from U.S. based harbor vessels that traverse the Strait of Juan de Fuca are estimated regardless of whether the vessels travel on the U.S. side or the Canadian side of the international border, the same approach as for ocean-going vessels.

## 4.3 Data and Information Acquisition

To collect data for the commercial harbor and government vessels inventory, vessel owners and operators were identified and contacted on key operating parameters. The operating parameters of interest included the following:

- Vessel type
- Number, type and horsepower (or kilowatts) of main engine(s)
- Number, type and horsepower (or kilowatts) of auxiliary engines
- Hours of operation in Puget Sound for 2011
- Information on percentage of time operating within Puget Sound regions
- Annual fuel consumption
- Engine model year, and if engines on vessel had been replaced
- Emission reduction strategies including but not limited to: alternative fuels, retrofits with after-treatment, and shore power

Individual vessel data was not collected for recreational vessels. The number of slips, moorage balls, and transient dock space relating to the various private and public marinas was collected.

## 4.4 Operational Profiles

Commercial harbor vessel companies and government harbor vessel entities were identified and contacted to obtain the operating parameters of their vessels. Tables 4.2 and 4.3 summarize the main and auxiliary engine data respectively for the vessel. A main engine may also be referred to as a propulsion engine since it is normally used for propulsion. Auxiliary engines may also be referred to as diesel generators. While in transit, most harbor vessels only use one auxiliary engine along with the main engine(s). The activity hours for all engines are reflected in this inventory.

Data for all engines for all vessels was not available for the 2011 inventory and it was decided to keep the 2005 data when the 2011 data was not available. Using the 2005 data made the comparison be more apples to apples and it also minimized the data gap for estimating 2011 emissions. About 1% of the engines were missing activity hours, horsepower or model year which is required for emission estimate calculations. Where data was available for engine model year, horsepower, and activity hours, the actual values were used as inputs to the emission model. For those vessels for which data was unavailable, the average engine model year, horsepower, and activity hours for all vessels of that type were used as inputs to the emission model.

Tank barges are not self-propelled, thus they do not have propulsion engines, but do have auxiliary engines. The 12 tank barges included in the inventory have a total of 39 auxiliary engines combined.

In 2011, the entire diesel powered harbor vessel fleet used ULSD.

**Table 4.2: 2011 Commercial Harbor and Government Vessel Propulsion Engines Inventory**

| Harbor Vessel Type | Vessel Count | Engine Count | Model year Min | Model year Max | Model year Avg | Horsepower Min | Horsepower Max | Horsepower Avg | Annual Hours Min | Annual Hours Max | Annual Hours Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Assist/Escort | 15 | 32 | 1975 | 2010 | 1994 | 1,500 | 4,100 | 2,616 | 2,480 | 6,948 | 3,135 |
| Commercial fishing | 380 | 733 | 1913 | 2002 | 1976 | 110 | 6,200 | 718 | 48 | 144 | 49 |
| Excursion | 60 | 96 | 1970 | 2009 | 1992 | 85 | 2,990 | 433 | 10 | 3,000 | 879 |
| Ferry | 43 | 98 | 1959 | 2011 | 1996 | 250 | 4,400 | 1,973 | 0 | 6,836 | 4,420 |
| Government | 63 | 99 | 1940 | 2009 | 1991 | 10 | 3,500 | 1,002 | 40 | 2,700 | 838 |
| Harbor tug | 54 | 94 | 1944 | 2004 | 1979 | 135 | 3,600 | 856 | 0 | 5,000 | 1,540 |
| Ocean tug | 57 | 113 | 1966 | 2004 | 1981 | 365 | 5,100 | 2,156 | 0 | 5,000 | 498 |
| Pilot boat | 2 | 4 | 1999 | 2001 | 2000 | 1,100 | 1,100 | 1,100 | 763 | 834 | 799 |
| Tank barge | 12 | 0 | na | na | na | na | na | na | na | na | na |
| Workboat | 23 | 38 | 1955 | 2011 | 1984 | 45 | 1,910 | 453 | 0 | 7,360 | 840 |
| **Total** | **709** | **1,307** | | | | | | | | | |

**Table 4.3: 2011 Commercial Harbor and Government Vessel Auxiliary Engines Inventory**

| Harbor Vessel Type | Vessel Count | Engine Count | Model year Min | Model year Max | Model year Avg | Horsepower Min | Horsepower Max | Horsepower Avg | Annual Hours Min | Annual Hours Max | Annual Hours Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Assist/Escort | 15 | 34 | 1982 | 2010 | 1999 | 74 | 550 | 203 | 83 | 5,870 | 3,122 |
| Commercial fishing | 380 | 370 | 1913 | 2002 | 1976 | 100 | 900 | 298 | 48 | 144 | 49 |
| Excursion | 60 | 29 | 1974 | 2011 | 1992 | 13 | 150 | 43 | 60 | 2,000 | 697 |
| Ferry | 43 | 82 | 1959 | 2011 | 1997 | 13 | 1,210 | 378 | 0 | 7,015 | 2,110 |
| Ferry boilers | na | 35 | 1959 | 2004 | 1998 | 60 | 60 | 60 | 0 | 3,000 | 1,238 |
| Government | 63 | 28 | 1940 | 2007 | 1966 | 19 | 1,555 | 237 | 7 | 2,700 | 535 |
| Harbor tug | 54 | 74 | 1945 | 2006 | 1982 | 10 | 230 | 102 | 0 | 7,685 | 1,647 |
| Ocean tug | 57 | 126 | 1966 | 2011 | 1984 | 70 | 240 | 147 | 0 | 7,132 | 457 |
| Pilot boat | 2 | 4 | 1999 | 2001 | 2000 | 43 | 50 | 47 | 327 | 357 | 342 |
| Tank barge | 12 | 39 | 1980 | 2001 | 1990 | 80 | 240 | 185 | 18 | 3,586 | 1,087 |
| Workboat | 23 | 13 | 1967 | 2005 | 1982 | 130 | 318 | 197 | 0 | 1,403 | 321 |
| **Total** | **709** | **834** | | | | | | | | | |

The following subsections provide a brief description, counts, and operating highlights for each type of commercial harbor and government vessels included in the inventory.

### *4.4.1 Assist and Escort Tugboats*

The main function of assist and escort tugboats is to assist ocean-going vessels in making turns, reducing speed, providing propulsion, and docking. The tugboats assist the OGVs to maneuver during arrival, departure and shifts from berth.

There are approximately 15 tugboats from two companies that primarily provide assist and escort services in Puget Sound. These tugboats may be assigned to a certain port or geographical area to lessen the transit time between jobs. The largest tugs are used for Puget Sound tanker escort service in Anacortes region where the oil terminals are mainly located.

Most of the tugboats have twin-screw propulsion engines. The horsepower per engine ranged from 1,500 hp to 4,100 hp with an average of 2,616 hp. The annual operating hours for main engines ranged from 2,480 hours to 6,948 hours, with an average of 3,135 hours. The main engine model years ranged from 1975 to 2010, with an average model year of 1994.

Most of the assist tugboats have two auxiliary engines to supply on-board power, but only one auxiliary engine is used at a time. The activity hours in this inventory reflect the interchangeable use of auxiliary engines. The horsepower for each auxiliary engine ranged from 74 hp to 550 hp, with an average of 203 hp. The annual operating hours ranged from 83 hours to 5,870 hours, with an average of 3,122 hours. The auxiliary engine model years ranged from 1982 to 2010, with an average of 1999.

### *4.4.2 Harbor and Ocean Tugboats*

In Puget Sound, tugboats, towboats and push-boats are mainly referred to as harbor tugs or ocean tugs, depending where they do the work. Harbor tugs mainly stay within Puget Sound and ocean tugs mainly work outside the Puget Sound boundary and may transit in and out of their home facility a few times per year. Only the hours spent in Puget Sound were included in the inventory. The inventory includes 54 harbor tugs and 57 ocean tugs.

Most of the harbor tugboats have twin-screw propulsion engines, although some are single-screw. The horsepower of each engine ranged from 135 hp to 3,600 hp, with an average of 856 hp. The annual operating hours for main engines ranged from zero to 5,000 hours, with an average of 1,540 hours. The main engine model years ranged from 1944 to 2004, with an average model year of 1979.

The harbor tugboats have one or two auxiliary engines. The horsepower for each auxiliary engine ranged from 10 hp to 230 hp, with an average of 102 hp. The annual operating hours ranged from zero hours to 7,685 hours, with an average of 1,647 hours. The auxiliary engine model years ranged from 1945 to 2006, with an average model year of 1982.

The ocean tugboats have twin-screw propulsion engines. The horsepower of each engine ranged from 365 hp to 5,100 hp with an average of 2,156 hp. The annual operating hours for main engines ranged from zero to 5,000 hours, with an average of 498 hours. The main engine model years ranged from 1966 to 2004, with an average model year of 1981.

The harbor tugboats have one or two auxiliary engines. The horsepower for each auxiliary engine ranged from 70 hp to 240 hp, with an average of 147 hp. The annual operating hours ranged from zero hours to 7,132 hours, with an average of 457 hours. The auxiliary engine model years ranged from 1966 to 2011, with an average model year of 1984.

### *4.4.3 Commercial Fishing Vessels*

Commercial fishing vessels are vessels dedicated to procuring fish and other seafood such as crab for the purpose of sale. In many cases operations are seasonal. There are numerous vessels classified as fishing vessels in Puget Sound. They range from the smaller fishing charter vessels to the larger commercial fishing vessels that go to Alaska. Seiners, crabbers, trollers, trawlers, longliners and gillnetters are included in this category along with their associated processing ships where the fish can be processed while at sea. The larger fishing vessels generally make one or two trips out to Alaska or the Bering Sea and into Puget Sound per year. While at dock, these vessels use shore power. Charter vessels, which are largely used for recreational fishing excursions, are not included in the commercial fishing vessel category but instead are included as excursion vessels.

The Puget Sound Vessel Traffic Services (VTS) data for commercial fishing vessels was used to update the commercial fishing vessels that transited Puget Sound in 2011. The VTS data included the vessel name and vessel identification number only and did not include specific engine data such as horsepower, model year or activity hours. The VTS file was similar to one received in 2005 that was used for the 2005 commercial fishing vessel category, so the data collection methodology was consistent with 2005. For the 2011 inventory, the 2011 VTS file was compared to the 2005 data for vessel name and vessel count. The vessel names/IDs listed in both 2011 and 2005 commercial fishing vessel inventory, were kept as well as the same assumptions made in 2005 for the horsepower, model year and activity hours. New vessel names in 2011 were added to the commercial fishing vessel inventory while those vessels in 2005 that were not listed in the 2011 VTS file were dropped from the 2011 commercial fishing inventory. As in 2005, the model year of the vessel was researched for the new 2011 vessels through the United States Coast Guard (USCG) Maritime information exchange[25]. For the new 2011 vessels added, similar assumptions as in 2005 were made for horsepower, model year and activity hours.

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[25] See *www.sgmix.uscg.mil/psix/psixsearch.aspx*

In summary, the average commercial fishing vessels included in the 2011 Puget Sound inventory typically have two main engines and one auxiliary engine. Main engine power ranged from 110 hp to 6,200 hp with an average of 718 hp. The annual operating hours for main engines ranged from 48 hours to 144 hours, with an average of 49 hours. The low hours are due to the fact that these vessels do not fish in Puget Sound and only transit time was included. While in port, the main engines are turned off. In comparison to the other vessel types, the population for commercial fishing vessels is larger but the actual hours used are lower than the other vessel types. The main engines had a model year range from 1913 to 2002, with an average model year of 1976. The 1913 year found in the USCG database is more likely the vessel year instead of the engine model year. This could not be verified with the vessel owner*; therefore the year is listed but not included in the average for commercial fishing average model year*.

### *4.4.4 Ferry Vessels*

Ferry vessels are self-propelled vessels that carry more than six passengers. Ferry vessels include the large ferries operated by Washington State Ferries (WSF) along with a few local ferries in the Puget Sound area. The WSF vessels have medium speed propulsion engines; several auxiliary engines used mainly for house load; one emergency generator not normally used but tested once a month; and one or two small auxiliary boilers used during the colder months of the year. In this respect, their engines are similar to the ocean-going vessels; however, they are considered harbor vessels since they only operate within Puget Sound. The ferries in the inventory each have at least two main engines. The engine power ranged from 250 to 4,400 hp, averaging 1,973 hp. The annual operating hours ranged from zero hours to 6,836 hours, with an average of 4,420 hours. The engine model years ranged from 1959 to 2011, with an average model year of 1996.

The horsepower for each auxiliary engine ranged from 13 hp to 1,210 hp, with an average of 378 hp. The annual operating hours ranged from zero hours to 7,015 hours, with an average of 2,110 hours. The auxiliary engines model years ranged from 1959 to 2011, with an average model year of 1997.

### *4.4.5 Excursion Vessels*

Excursion vessels are smaller than ferry vessels and are used for harbor cruises, dining cruises, whale watching and other specialty cruises. Included with the excursion vessels are charter vessels that may be used for half day, whole day or multiple day fishing trips. In the Puget Sound area, there are numerous excursion vessel companies that own one or two vessels.

Excursion vessels have one to two main engines. Main engine power ranged from 85 hp to 2,990 hp, with an average of 433 hp. The annual operating hours for main engines ranged from 10 hours to 3,000 hours, with an average of 879 hours. The main engines had a model year range from 1970 to 2009, with an average model year of 1992.

Excursion vessels have either one or no auxiliary engines. The power for each auxiliary engine ranged from 13 hp to 150 hp, with an average of 43 hp. The annual operating hours ranged from 60 hours to 2,000 hours, with an average of 697 hours. The auxiliary engine model years ranged from 1974 to 2011, with an average model year of 1992.

### *4.4.6 Government Vessels*

Pilot boats, Coast Guard vessels, National Oceanic and Atmospheric Administration research vessels, police patrol boats and fireboats, are included in this vessel type. A total of 63 government vessels are included in the inventory, in addition to two pilot boats. Although the pilot boats are not considered government vessels, they share the same load factors for emissions estimation purposes.

Government vessels have one or two main engines. Engine power ranged from 10 hp to 3,500 hp with an average of 1,002 hp. The annual operating hours from main engines ranged from 40 hours to 2,700 hours, with an average of 838 hours. The main engines had model years ranging from 1940 to 2009, with an average of model year of 1991.

The engine power for each auxiliary engine ranged from 19 hp to 1,555 hp, with an average of 237 hp. The annual operating hours ranged from seven hours to 2,700 hours, with an average of 535 hours. The auxiliary engines had a model year range from 1940 to 2007, with an average model year of 1966.

The two pilot boats have two main engines and two auxiliary engines with relatively new fuel-efficient engines. The horsepower of the main engines is 1,100 hp each. The main engine activity hours averaged 799. The auxiliary engines have an average of 47 hp and were used an average of 342 hours.

### *4.4.7 Work Boats*

Work boats perform numerous duties within the harbor, such as utility inspection, surveying, spill/response, training and construction. There are a total of 23 workboats.

The workboats in the inventory for the most part have one main engine with a horsepower range of 45 hp to 1,910 hp, and an average of 453 hp. The annual operating hours for main engines ranged from zero hours to 7,360 hours, with an average of 840 hours. The main engines had a model year range from 1955 to 2011, with an average model year of 1984.

Workboats have either one or no auxiliary engines. The horsepower for each auxiliary engine ranged from 130 hp to 318 hp, with an average of 197 hp. The annual operating hours ranged from zero hours to 1,403 hours, with an average of 321 hours. The auxiliary engines had model years ranging from 1967 to 2005, with an average model year of 1982.

## 4.5 Emission Reduction Initiatives Identified

In 2011, all of the diesel-powered commercial harbor craft used ULSD. The suppliers in the Puget Sound region started supplying exclusively ULSD one year ahead of schedule of the phased-in EPA Nonroad Diesel Rule for locomotive and marine diesel fuel due to early ULSD production by U.S. Oil. This reduction has been included in the 2011 inventory.

A small percentage of companies repowered some of their vessels at their own expense or with assistance from federal grants. The reductions due to these repowers are included in the 2011 inventory.

In 2008, the federal Inland Marine and Locomotive Rule came into effect. It requires that when commercial harbor craft marine engines meeting certain criteria are overhauled, an EPA certified kit that reduces PM emissions by at least 25% must be installed. In the absence of a program to track the installation of these kits, these emission reductions are not included in the 2011 inventory.

## 4.6 Emissions Estimating Methodology

### *4.6.1 Emission Equations*

The basic equation used to estimate harbor vessels emissions is:

Equation 4.1

$$E = kW \times Act \times LF \times EF \times FCF$$

Where:

E = emission, g/year
kW = kilowatts
Act = activity, hours/year
LF = load factor
EF = emission factor, g/kW-hr
FCF = fuel correction factor

The EPA emission factors are in g/kW-hr, therefore engine horsepower was converted to kilowatts by dividing the horsepower by 1.341 (one horsepower is equal to 0.746 kilowatts). The activity hours represent estimated annual hours of use in 2011 within the Puget Sound. The total annual hours were used to calculate harbor vessels emissions. The calculated emissions were converted to tons per year by dividing the emissions by 907,200 (which is 2,000 lb/ton x 453.6 g/lb).

### *4.6.2 Emission Factors for Diesel Engines*

The emission factors for harbor vessels are based on marine engine standards (i.e., Tier 0 to Tier 3) and their respective EPA engine categories. In addition, EPA identified three categories for commercial marine vessel main propulsion engines and auxiliary engines:

- Category 1: 1-5 liters per cylinder displacement
- Category 2: 5-30 liters per cylinder displacement
- Category 3: over 30 liters per cylinder displacement

Most commercial harbor vessels have Category 1 engines, except for some of the larger tugboats and larger commercial fishing vessels, which have Category 2 engines. In Puget Sound, approximately 90% of the harbor vessels inventoried had EPA Category 1 engines. The other 10% had EPA Category 2 engines.

The majority, 87%, of the diesel marine engines in this inventory have Tier 0 unregulated engines; the rest of the engines meet Tier 1, Tier 2 or Tier 3 engine standards. The various marine engine standards are listed below.

- Tier 0 marine engines are unregulated, older engines (1999 and prior)
- Tier 1 marine engine standards are voluntary under MARPOL Annex VI $NO_x$ limits (model year 2000+)
- Tier 2 marine engine standards have been promulgated (mainly 2004+ model year engines and 2007+ for larger engines)
- Tier 3 marine engine standards (2009+ for 37 kW and smaller engines)

In summary, the use of a specific emission factor is dependent on engine power, engine model year, and engine cylinder displacement. The source of emission factors is listed in Table 4.4.

**Table 4.4: Source of Emission Factors**

| Engine Standard | EPA Eng Category | Source of Emission Factor |
|---|---|---|
| Tier 0 | Cat 1 | 1999 EPA RIA |
| Tier 0 | Cat 2 | 2002 Entec |
| Tier 1 | Cat 1 | 1999 EPA RIA, IMO $NO_X$ |
| Tier 1 | Cat 2 | 2002 Entec, IMO $NO_X$ |
| Tier 2 | Cat 1 | 1999 EPA RIA |
| Tier 2 | Cat 2 | 2002 Entec, 1999 EPA RIA |
| Tier 3 | Cat 1 | 40 CFR[26] Part 94, Table 1 of 1042.101 |

The emission factors used for this study are listed in Table 4.5 for diesel-fueled main propulsion and auxiliary engines. The emission factors units are in grams per kilowatt-hour.

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[26] CFR - Code of Federal Regulations

### Table 4.5: Harbor Vessel Emission Factors for Diesel Engines, g/kW-hr

| kW Range | Year Range | $NO_x$ | VOC | CO | $SO_2$ | PM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|
| **Tier 0 Engines** | | | | | | | | | |
| 0 to 8 | <2000 | 11.0 | 0.27 | 2.0 | 1.3 | 0.90 | 690 | 0.02 | 0.09 |
| 8 to 19 | <2000 | 11.0 | 0.27 | 2.0 | 1.3 | 0.90 | 690 | 0.02 | 0.09 |
| 19 to 37 | <1999 | 11.0 | 0.27 | 2.0 | 1.3 | 0.90 | 690 | 0.02 | 0.09 |
| 37 to 76 | <2000 | 10.0 | 0.27 | 1.7 | 1.3 | 0.40 | 690 | 0.02 | 0.09 |
| 76 to 131 | <2000 | 10.0 | 0.27 | 1.5 | 1.3 | 0.40 | 690 | 0.02 | 0.09 |
| 131 to 226 | <2000 | 10.0 | 0.27 | 1.5 | 1.3 | 0.30 | 690 | 0.02 | 0.09 |
| 226 to 451 | <2000 | 10.0 | 0.27 | 1.5 | 1.3 | 0.30 | 690 | 0.02 | 0.09 |
| 451 to 561 | <2000 | 10.0 | 0.27 | 1.5 | 1.3 | 0.30 | 690 | 0.02 | 0.09 |
| 561 to 1,001 | <2000 | 10.0 | 0.27 | 1.5 | 1.3 | 0.30 | 690 | 0.02 | 0.09 |
| 1,000+ | <2000 | 13.0 | 0.27 | 2.5 | 1.3 | 0.30 | 690 | 0.02 | 0.09 |
| Cat 2 Engines | <2000 | 13.2 | 0.50 | 1.1 | 1.3 | 0.72 | 690 | 0.02 | 0.09 |
| **Tier 1 Engines** | | | | | | | | | |
| 0 to 8 | 2000-2005 | 10.23 | 0.27 | 2.0 | 1.3 | 0.9 | 690 | 0.02 | 0.09 |
| 8 to 19 | 2000-2005 | 9.23 | 0.27 | 2.0 | 1.3 | 0.8 | 690 | 0.02 | 0.09 |
| 19 to 37 | 2000-2004 | 9.23 | 0.27 | 2.0 | 1.3 | 0.8 | 690 | 0.02 | 0.09 |
| 37 to 76 | 2000-2004 | 9.80 | 0.27 | 1.7 | 1.3 | 0.4 | 690 | 0.02 | 0.09 |
| 76 to 131 | 2000-2004 | 9.80 | 0.27 | 1.5 | 1.3 | 0.4 | 690 | 0.02 | 0.09 |
| 131 to 226 | 2000-2004 | 9.80 | 0.27 | 1.5 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 226 to 451 | 2000-2004 | 9.80 | 0.27 | 1.5 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 451 to 561 | 2000-2004 | 9.80 | 0.27 | 1.5 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 561 to 1,001 | 2000-2004 | 10.0 | 0.27 | 1.5 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 1,000+ | 2000-2007 | 9.80 | 0.27 | 2.5 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| Cat 2 Engines | 2000-2007 | 9.80 | 0.50 | 1.1 | 1.3 | 0.72 | 690 | 0.02 | 0.09 |
| **Tier 2 Engines** | | | | | | | | | |
| 0 to 8 | 2005-2009 | 7.23 | 0.27 | 5.0 | 1.3 | 0.8 | 690 | 0.02 | 0.09 |
| 8 to 19 | 2005-2009 | 7.23 | 0.27 | 5.0 | 1.3 | 0.8 | 690 | 0.02 | 0.09 |
| 19 to 37 | 2004-2009 | 7.23 | 0.27 | 5.0 | 1.3 | 0.6 | 690 | 0.02 | 0.09 |
| 37 to 76 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 76 to 131 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 131 to 226 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 226 to 451 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 451 to 561 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 561 to 1,001 | 2004-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| 1,000+ | 2007-2013 | 6.80 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |
| Cat 2 Engines | 2007-2013 | 9.80 | 0.50 | 5.0 | 1.3 | 0.5 | 690 | 0.02 | 0.09 |
| **Tier 3 Engines** | | | | | | | | | |
| 0 to 8 | 2009+ | 7.23 | 0.27 | 5.0 | 1.3 | 0.4 | 690 | 0.02 | 0.09 |
| 8 to 19 | 2009+ | 7.23 | 0.27 | 5.0 | 1.3 | 0.4 | 690 | 0.02 | 0.09 |
| 19 to 37 | 2009+ | 7.23 | 0.27 | 5.0 | 1.3 | 0.3 | 690 | 0.02 | 0.09 |

### *4.6.3 Fuel Correction Factors for Diesel Alternatives*

Fuel correction factors, shown in Table 4.6, were applied to the vessels using ULSD, which are consistent with the factors used in 2005. The emission factors used for this study and listed in Table 4.5, are based on use of EPA non-road diesel fuel and thus need to be adjusted to account for alternative fuels.

**Table 4.6: Fuel Correction Factors**

| Fuel | $NO_x$ | VOC | CO | $SO_2$ | PM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|
| ULSD | 1.00 | 1.00 | 1.00 | 0.005 | 0.86 | 1.00 | 1.00 | 1.00 |

### *4.6.4 Emission Factors for Gasoline Engines*

Two percent of the commercial harbor vessels are powered with gasoline engines. These are mainly government vessels, such as patrol boats with 2-stroke and 4-stroke gasoline engines. The emission factors for gasoline engines are different than those described previously for diesel engines. The emission factor units, taken from EPA's guidance for recreational marine exhaust emission factors,[27] were converted from g/bhp-hr to g/kW-hr. Evaporative emissions from gasoline engines are not included since they are insignificant for the small number of gasoline-powered commercial harbor vessels in this inventory. The emission factor for particulate matter is listed in Table 4.7. $PM_{10}$ is 100% of PM, $PM_{2.5}$ is 92%[28] of PM, and DPM is zero for gasoline.

**Table 4.7: Harbor Vessel Emission Factors for Gasoline Engines, g/kW-hr**

| Power (kW) | Stroke | $NO_x$ | VOC | CO | $SO_2$ | PM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|
| 7 to 12 | 2 | 2.6 | 229.0 | 314.7 | 3.1 | 3.9 | 2376 | 0.06 | 0.13 |
| 12 to 19 | 2 | 2.6 | 189.0 | 273.8 | 3.2 | 3.1 | 2298 | 0.06 | 0.13 |
| 19 to 30 | 2 | 2.6 | 149.1 | 273.8 | 2.9 | 3 | 1980 | 0.05 | 0.11 |
| 30 to 37 | 2 | 2.6 | 143.8 | 273.8 | 2.8 | 2.8 | 1902 | 0.05 | 0.11 |
| 37 to 75 | 2 | 2.6 | 137.5 | 273.8 | 2.3 | 2.5 | 1632 | 0.04 | 0.09 |
| 75 to 130 | 2 | 2.6 | 124 | 273.8 | 2.3 | 2.5 | 1584 | 0.04 | 0.09 |
| 75 to 130 | 4 | 7.3 | 7.8 | 182.9 | 2.5 | 0.1 | 1321 | 0.03 | 0.07 |
| 131 to 745 | 4 | 7.3 | 7.8 | 188.7 | 2.4 | 0.1 | 1251 | 0.03 | 0.07 |

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[27] EPA, *Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition,* December 2005.

[28] EPA, *NONROAD.*

### *4.6.5 Fuel Correction Factors for Gasoline Engines*

The $SO_2$ emission factor is based on S content of 330 ppm. In 2011, the average S content of the gasoline fuel was 30 ppm. Therefore a fuel correction of .091 was applied to estimate $SO_2$ emissions.

### *4.6.6 Engine Load Factors*

Engine load factors represent the load applied to an engine or the percentage of rated engine power that is applied during the engine's operation. Depending on the duration of the period being estimated, the load factor can represent an hourly average, daily average, or annual average load applied to an engine while it is in operation. Table 4.8 summarizes the annual average engine load factors that were used in this inventory for the harbor craft vessel types for their propulsion and auxiliary engines.

**Table 4.8: Load Factors**

| **Harbor Vessel Type** | **Propulsion Engine** | **Source** | **Auxiliary Engine** | **Source** |
|---|---|---|---|---|
| Assist and Escort | 0.31 | 2001 POLA EI | 0.43 | EPA NONROAD |
| Harbor Tug | 0.31 | 2001 POLA EI | 0.43 | EPA NONROAD |
| Ocean Tug | 0.68 | EPA NONROAD | 0.43 | EPA NONROAD |
| Commercial Fishing | 0.30 | EPA NONROAD | 0.30 | EPA NONROAD |
| Ferry | 0.34 | WSF 2011 data | 0.43 | EPA NONROAD |
| Excursion | 0.42 | EPA NONROAD | 0.43 | EPA NONROAD |
| Government | 0.51 | EPA NONROAD | 0.43 | EPA NONROAD |
| Pilot Boat | 0.51 | EPA NONROAD | 0.43 | EPA NONROAD |
| Tank Barge | na | na | 0.43 | EPA NONROAD |
| Workboat | 0.38 | CARB | 0.32 | CARB |

The 31% engine load factor for assist/escort and harbor tugboats is based on actual vessel engine load readings published in the 2001 *Port of Los Angeles Baseline Air Emissions Inventory*. The 43% engine load factor used for the auxiliary engines is obtained from the EPA NONROAD model guidance[29] which used some direct measurements and has been used in previous studies.[30] The ferry's 34% engine load factor is based on data provided by Washington State Ferries engineers. The workboat propulsion and auxiliary engine load factors are from California Air Resources' *Emissions Estimation Methodology for Commercial Harbor Craft Operating in California, Appendix B*. All other load factors are from EPA NONROAD.

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[29] EPA, *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling*, December 2002.

[30] Starcrest, *Update to the Commercial Marine Inventory for Texas to Review Emission Factors, Consider a Ton-mile EI Method, and Revise Emissions for the Beaumont-Port Arthur Nonattainment Area*, January 2004.

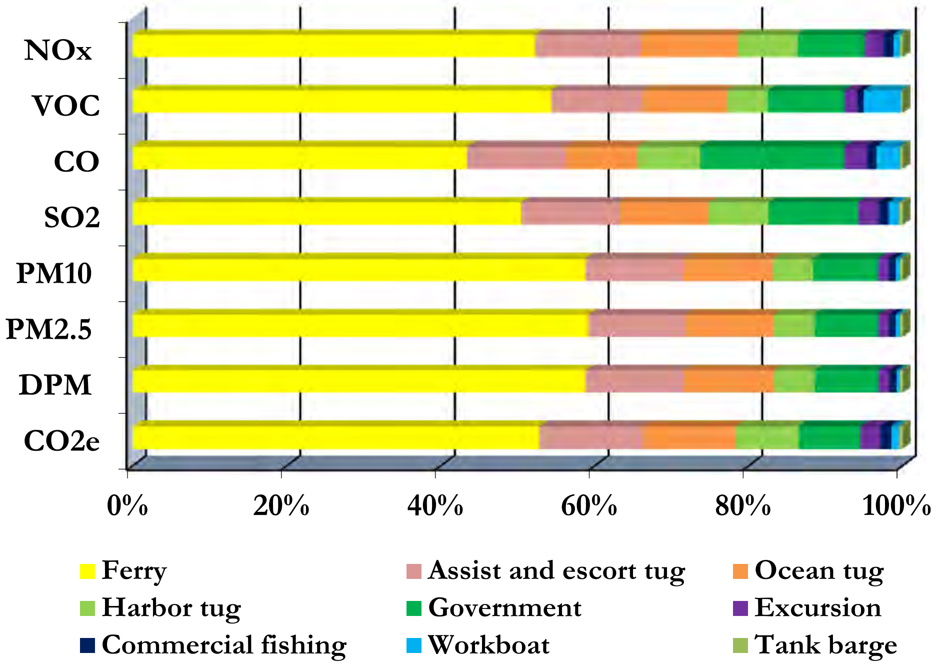
## 4.7 Commercial Harbor and Government (non military) Vessel Emissions Estimates

The 2011harbor vessel emissions for Puget Sound are summarized in this section. Table 4.9 presents the 2011 harbor vessel emissions by vessel type for Puget Sound in tons per year (tpy). Figure 4.2 presents that almost half of the commercial harbor and government vessel emissions are attributable to ferries, followed by assist tugs, ocean tugs and government vessels.

**Table 4.9: 2011 Commercial Harbor and Government Vessel Emissions by Vessel Type, tpy**

| Type | NO$_x$ | VOC | CO | SO$_2$ | PM$_{10}$ | PM$_{2.5}$ | DPM | CO$_2$e |
|---|---|---|---|---|---|---|---|---|
| Assist/Escort | 855.1 | 29.6 | 130.9 | 0.5 | 34.9 | 32.1 | 34.9 | 51,236 |
| Commercial fishing | 84.2 | 2.2 | 13.1 | 0.1 | 2.3 | 2.2 | 2.3 | 5,448 |
| Excursion | 151.4 | 3.9 | 29.0 | 0.1 | 3.9 | 3.7 | 3.9 | 9,900 |
| Ferry | 3,266.0 | 134.0 | 443.1 | 1.9 | 159.8 | 150.0 | 159.8 | 201,112 |
| Government | 543.3 | 24.8 | 192.0 | 0.4 | 22.8 | 20.9 | 22.7 | 30,543 |
| Harbor tug | 483.0 | 13.1 | 83.6 | 0.3 | 14.4 | 13.4 | 14.4 | 31,370 |
| Ocean tug | 791.4 | 26.9 | 94.7 | 0.4 | 31.7 | 29.2 | 31.7 | 45,973 |
| Tank barge | 27.7 | 0.7 | 4.2 | 0.0 | 1.0 | 0.9 | 1.0 | 1,936 |
| Workboat | 50.9 | 11.9 | 31.3 | 0.1 | 1.6 | 1.5 | 1.4 | 3,758 |
| **Total** | **6,253.0** | **247.2** | **1,021.9** | **3.7** | **272.3** | **253.7** | **272.1** | **381,275** |

**Figure 4.2: 2011 Commercial Harbor and Government Vessel Emissions by Vessel Type**



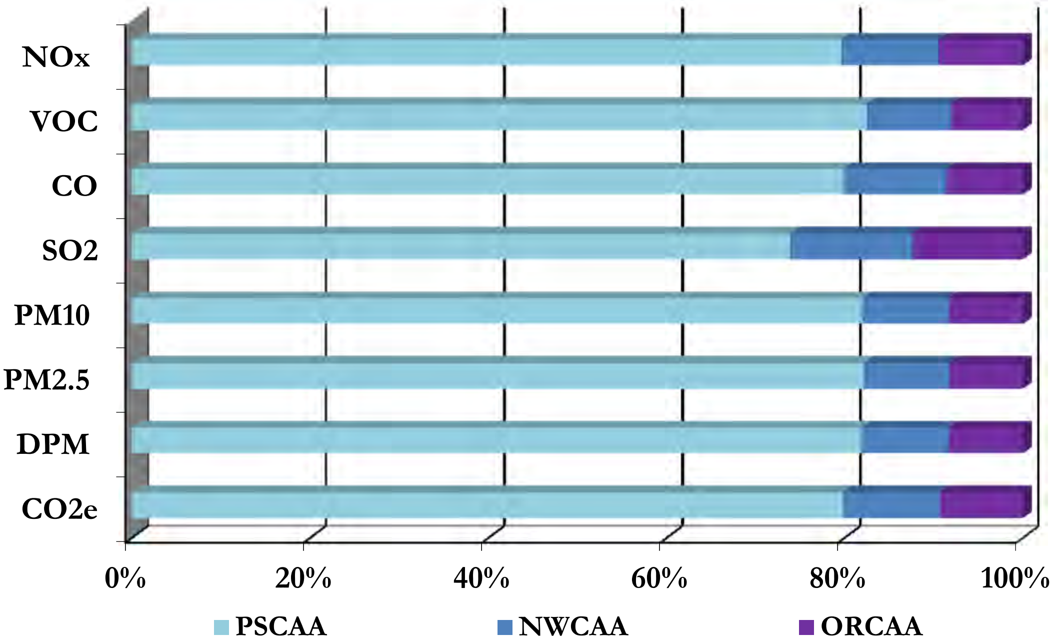
First, the emissions were estimated by regional clean air agency jurisdictions, as described in Section 2.1.2, based on discussions with vessel owners. They were then subdivided by county based on knowledge of where the various vessels types transit.

The emission results for each of the three regional clean air agency regions covered by this inventory are summarized in Table 4.10. Figure 4.3 illustrates that approximately 80% of the commercial harbor and government vessel emissions are in PSCAA region.

**Table 4.10: 2011 Commercial Harbor and Government Vessel Emissions by Regional Clean Air Agency, tpy**

| Clean Air Agency | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| NWCAA | 680.2 | 23.4 | 117.5 | 0.6 | 26.6 | 24.5 | 26.6 | 41,543 |
| ORCAA | 603.3 | 20.1 | 88.1 | 0.5 | 22.7 | 20.9 | 22.7 | 35,615 |
| PSCAA | 4,969.5 | 203.7 | 816.2 | 3.0 | 223.0 | 208.3 | 222.8 | 304,117 |
| **Total** | **6,253.0** | **247.2** | **1,021.9** | **4.0** | **272.3** | **253.7** | **272.1** | **381,275** |

**Figure 4.3: 2011 Commercial Harbor and Government Vessel Emissions by Regional Clean Air Agency**



The emission results for each of the 12 counties covered by this inventory are summarized in Table 4.11 by county. The same methodology used in the 2005 PSEI report for allocating the emissions by county was used. Percentages were used for five zones (ORCAA, PSCAA1, PSCAA2, PSCAA3, and NWCAA) based on the general amount of time spent in each zone. Island, San Juan, Skagit, and Whatcom Counties are included in the NWCAA zone and the emissions are divided equally among these four counties. Clallam, Jefferson, Mason, and Thurston Counties are included in the ORCAA zone with the following emissions distribution: 80% for Clallam, 0% for Jefferson, 10% for Mason, and 10% for Thurston. PSCAA1 zone is Pierce County. PSCAA2 zone emission distribution is 75% King County and 25% Kitsap County. PSCAA3 zone is Snohomish County.

**Table 4.11: 2011 Commercial Harbor and Government Vessel Emissions by County, tpy**

| County | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Clallam | 482.7 | 16.1 | 70.5 | 0.4 | 18.2 | 16.7 | 18.2 | 28,492 |
| Island | 170.1 | 5.8 | 29.4 | 0.1 | 6.7 | 6.1 | 6.7 | 10,386 |
| Jefferson | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| King | 1,958.5 | 85.3 | 318.6 | 1.2 | 89.4 | 83.6 | 89.2 | 119,139 |
| Kitsap | 652.8 | 28.4 | 106.2 | 0.4 | 29.8 | 27.9 | 29.7 | 39,713 |
| Mason | 60.3 | 2.0 | 8.8 | 0.0 | 2.3 | 2.1 | 2.3 | 3,561 |
| Pierce | 802.2 | 27.9 | 153.4 | 0.5 | 30.9 | 28.5 | 30.9 | 48,802.6 |
| San Juan | 170.1 | 5.8 | 29.4 | 0.1 | 6.7 | 6.1 | 6.7 | 10,386 |
| Skagit | 170.1 | 5.8 | 29.4 | 0.1 | 6.7 | 6.1 | 6.7 | 10,386 |
| Snohomish | 1,555.9 | 62.2 | 238.0 | 0.9 | 72.9 | 68.3 | 72.9 | 96,462.2 |
| Thurston | 60.3 | 2.0 | 8.8 | 0.0 | 2.3 | 2.1 | 2.3 | 3,561 |
| Whatcom | 170.1 | 5.8 | 29.4 | 0.1 | 6.7 | 6.1 | 6.7 | 10,386 |
| **Total** | **6,253.0** | **247.2** | **1,021.9** | **4.0** | **272.3** | **253.7** | **272.1** | **381,275** |

## 4.8 Recreational Vessels

Recreational vessels were included into the original 2005 inventory for the sake of completeness and because several of the participating ports owned public marinas. The number of recreational vessels was determined based on the methodology used in 2005 which assumed that the number of vessels at public and private marinas equaled the number of slips plus extra dock space that some marinas have available (conservatively high assumption). Vessel numbers were then allocated between sailing and motorized recreational vessels and emissions estimated. The same approach was taken in 2011, based on the 2005 methods.

Due to limited funds only a small number public and private marinas were contacted in 2011 for slip count numbers to determine if the number of slips changed significantly since 2005. For 2011, there were 23,771 slips identified compared to 24,387 slips in 2005. For the few marinas that provided occupancy rates for 2011, which included some public and private marinas in the Everett, Seattle and Tacoma areas, the occupancy rate was used and averaged about 84% for private marinas and 87% for public marinas in 2011. For those public and private marinas not contacted in 2011, which were the majority of the marinas, the 2005 vessel counts were used with assumption that there were no changes in the number of slips or occupancy since 2005. The most typical uses for recreational vessels are fishing, cruising, swimming, sightseeing, entertaining, water skiing, etc.

Table 4.12 lists of the public marinas associated with public port authorities included in this study. For purposes of estimating vessel numbers and calculating emissions, slip count was considered to be the same as vessel count, although in actuality a slip may moor more than one vessel, also slips are sometimes unoccupied.

**Table 4.12: 2011 Public Marina Vessel Counts by Associated Port and County**

| Marina | County | Associated Port | Total Vessel Count |
|---|---|---|---|
| John Wayne Marina | Clallam | Port Angeles | 280 |
| Port Angeles Boat Haven | Clallam | Port Angeles | 520 |
| Port of Everett Marina | Snohomish | Port of Everett | 2,050 |
| 12th Street Yacht Basin | Snohomish | Port of Everett | 225 |
| Cap Sante Boat Haven | Skagit | Port of Anacortes | 1,000 |
| Blaine Harbor | Whatcom | Port of Bellingham | 629 |
| Squalicum | Whatcom | Port of Bellingham | 1,415 |
| Bremerton | Kitsap | Port of Bremerton | 45 |
| Port Orchard | Kitsap | Port of Bremerton | 375 |
| Port of Brownsville | Kitsap | Port of Brownsville | 335 |
| Coupeville Wharf | Island | Port of Coupeville | 340 |
| Edmonds Marina | Snohomish | Port of Edmonds | 292 |
| Friday Harbor | San Juan | Port of Friday Harbor | 500 |
| Keyport Marina | Kitsap | Port of Keyport | 28 |
| Cove Marina | Kitsap | Port of Kingston | 300 |
| Swantown | Thurston | Port of Olympia | 700 |
| Point Hudson | Jefferson | Port of Port Townsend | 45 |
| Boat Haven | Jefferson | Port of Port Townsend | 475 |
| Herb Beck Marina | Jefferson | Port of Port Townsend | 50 |
| Poulsbo Marina | Kitsap | Port of Poulsbo | 400 |
| Fishermen's Terminal | King | Port of Seattle | 165 |
| Harbor Island | King | Port of Seattle | 65 |
| Shilshole Bay Marina | King | Port of Seattle | 1,411 |
| Bell Harbor Marina | King | Port of Seattle | 45 |
| Shelton Marina | Mason | Port of Shelton | 50 |
| La Conner Marina | Skagit | Port of Skagit | 460 |
| Ole & Charlie's | Pierce | Port of Tacoma | 70 |
| | | | **12,270** |

Table 4.13 lists the marinas owned by private and other non-port, public entities included in this study. The slip count included permanent slips, transient slips, moorage balls, and transient dock space. The dock space was converted from linear feet to number of vessels by dividing by 15 feet, an assumed average length for recreational vessels in the area.

**Table 4.13: 2011 Private Marinas and Other Non-Port Public Entities Vessel Counts by County**

| **Marina** | **Location** | **County** | **Total Vessel Count** |
|---|---|---|---:|
| La Push Marina | La Push | Clallam | 92 |
| Port of Neah Bay | Neah Bay | Clallam | 303 |
| City of Langley Boat Harbor | Langley | Island | 67 |
| Deception Pass Marina | Oak Harbor | Island | 70 |
| Oak Harbor Marina | Oak Harbor | Island | 404 |
| Pleasant Harbor Marina | Brinnon | Jefferson | 312 |
| Port Hadlock Marina | Port Hadlock | Jefferson | 164 |
| City of des Moines Marina | Des Moines | King | 915 |
| Eagle Harbor Marina | Bainbridge Is. | King | 107 |
| Elliott Bay Marina | Seattle | King | 1,200 |
| Fairview Marina | Seattle | King | 157 |
| Harbour Village Marina | Kenmore | King | 137 |
| Hood Canal Marina (Alderbrook) | Union | King | 100 |
| Port Washington Marina | Bremerton | King | 81 |
| Sagstad  Marina | Seattle | King | 40 |
| Salmon Bay Marina | Seattle | King | 168 |
| Bainbridge Island Marina | Bainbridge Is. | Kitsap | 173 |
| Harbour Marina | Bainbridge Is. | Kitsap | 50 |
| Liberty Bay Marina | Poulsbo | Kitsap | 177 |
| Point Hudson Marina | Port Townsend | Kitsap | 150 |
| Port Ludlow Marina | Port Ludlow | Kitsap | 353 |
| Port Orchard Yacht Club | Port Orchard | Kitsap | 78 |
| Seabeck Marina | Seabeck | Kitsap | 125 |
| Winslow Wharf Marina | Bainbridge Is. | Kitsap | 239 |
| Jarrell's Cove Marina | Shelton | Mason | 20 |

**Table 4.13: 2011 Private Marinas and Other Non-Port Public Entities Vessel Counts by County (cont'd)**

| Marina | Location | County | Total Vessel Count |
|---|---|---|---|
| Arabella's Landing | Gig Harbor | Pierce | 103 |
| Breakwater Marina | Tacoma | Pierce | 123 |
| Chinook Landing Marina | Tacoma | Pierce | 210 |
| Crow's Nest Marina | Tacoma | Pierce | 109 |
| Dock Street Marina | Tacoma | Pierce | 0 |
| Fair Harbor Marina | Grapeview | Pierce | 78 |
| Foss Harbor Marina | Tacoma | Pierce | 344 |
| Foss Waterway Marina | Tacoma | Pierce | 50 |
| Longbranch Marina | Longbranch | Pierce | 86 |
| Murphy's Landing | Gig Harbor | Pierce | 85 |
| Narrows Marina | Tacoma | Pierce | 26 |
| Peninsula Yacht Basin | Gig Harbor | Pierce | 100 |
| Point Defiance Boathouse Marina | Tacoma | Pierce | 0 |
| Port of Allyn | Allyn | Pierce | 10 |
| Blakely Island Marina | Blakely Island | San Juan | 45 |
| Cayou Quay Marina | Deer Harbor | San Juan | 118 |
| Deer Harbor Marina | Deer Harbor | San Juan | 125 |
| Islands Marina Center | Lopez Island | San Juan | 100 |
| Lopez Islander Resort & Marina | Lopez Island | San Juan | 110 |
| Quartermaster Yacht Club | Burton | San Juan | 65 |
| Roche Harbor Resort & Marina | Roche Harbor | San Juan | 377 |
| Rosario Resort Marina | Eastbound | San Juan | 35 |
| Skyline Marina | Anacortes | San Juan | 600 |
| Snug Harbor Marina Resort | Friday Harbor | San Juan | 72 |
| Stuart Island |  | San Juan | 83 |
| Sucia Island |  | San Juan | 95 |
| West Beach Resort & Marina | Eastbound | San Juan | 55 |
| West Sound Marina | Orcas Island | San Juan | 157 |
| Anchor Cove Marina | Anacortes | Skagit | 166 |
| LaConner City Floats | LaConner | Skagit | 7 |
| Lovric's Landing | Anacortes | Skagit | 87 |
| Shelter Bay Marina | LaConner | Skagit | 330 |
| 12th St Yacht Basin | Everett | Snohomish | 155 |
| Boston Harbor Marina | Olympia | Thurston | 110 |
| Zittles Marina | Olympia | Thurston | 200 |
| Fisherman's Cove Marina | Bellingham | Whatcom | 58 |
| Point Roberts Marina | Point Roberts | Whatcom | 1,048 |
| Semiahmoo Marina | Blaine | Whatcom | 296 |
|  |  |  | **11,501** |

EPA's NONROAD model was used to estimate recreational vessel emissions for outboard gasoline engines, inboard gasoline engines and inboard diesel engines. The same 2005 average horsepower, listed in Table 4.14, was used for each engine type for recreational vessels in 2011. Since there is no actual data on the engine power, the same assumptions were used from the baseline inventory. Evaporative emissions from the gasoline engines are included in the emissions estimates. The only data used from 2011 was the updated vessel count.

**Table 4.14: 2011 Recreational Vessel Fuel and Average Horsepower by Vessel Type**

| Vessel Type | Fuel | Power (hp) |
|---|---|---|
| Vessel outboard engines , runabouts | Gasoline | 40 |
| Vessel inboard engines , cabin boats | Gasoline | 150 |
| Vessels inboard engines | Gasoline | 70 |
| Vessel inboard Engines | Diesel | 400 |
| Sailboat auxiliary outboard engines | Gasoline | 6 |
| Sailboat auxiliary inboard engines | Diesel | 34 |

Table 4.15 presents the 2011 total recreational vessel airshed emissions by county in tons per year. These emissions include vessels utilizing port-owned marinas, private marinas, and marinas of other non-port, public entities.

**Table 4.15: 2011 Recreational Vessel Airshed Emissions by County, tpy**

| County | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Clallam | 39.8 | 43.9 | 432.5 | 0.1 | 1.0 | 0.9 | 0.3 | 4,992 |
| Island | 31.9 | 35.1 | 346.0 | 0.1 | 0.8 | 0.7 | 0.2 | 3,994 |
| Jefferson | 31.9 | 35.1 | 346.0 | 0.1 | 0.8 | 0.7 | 0.2 | 3,994 |
| King | 151.4 | 166.6 | 1,643.6 | 0.3 | 3.6 | 3.4 | 1.1 | 18,971 |
| Kitsap | 95.6 | 105.2 | 1,038.1 | 0.2 | 2.3 | 2.2 | 0.7 | 11,982 |
| Mason | 2.4 | 2.6 | 26.0 | 0.0 | 0.1 | 0.1 | 0.0 | 300 |
| Pierce | 47.8 | 52.6 | 519.0 | 0.1 | 1.2 | 1.1 | 0.3 | 5,991 |
| San Juan | 87.6 | 96.5 | 951.6 | 0.2 | 2.1 | 2.0 | 0.6 | 10,983 |
| Skagit | 71.7 | 78.9 | 778.5 | 0.1 | 1.7 | 1.6 | 0.5 | 8,986 |
| Snohomish | 87.6 | 96.5 | 951.6 | 0.2 | 2.1 | 2.0 | 0.6 | 10,983 |
| Thurston | 33.5 | 36.8 | 363.3 | 0.1 | 0.8 | 0.8 | 0.2 | 4,194 |
| Whatcom | 115.5 | 127.2 | 1,254.3 | 0.2 | 2.8 | 2.6 | 0.8 | 14,478 |
| **Total** | **796.6** | **877.0** | **8,650.5** | **1.6** | **19.2** | **17.9** | **5.6** | **99,848** |

Table 4.16 presents the total 2011 recreational vessel airshed emissions for only port-owned marinas in tons per year. These values are included in the total recreational vessel emissions reported in the prior table, but are listed separately here for the benefit of port authorities who are interested in emissions for a marina associated with their respective port.

**Table 4.16: 2011 Recreational Vessel Airshed Emissions by Public Marinaand Associated Port, tpy**

| Marina | Associated Port | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| John Wayne Marina | Port Angeles | 9.4 | 10.3 | 101.9 | 0.0 | 0.2 | 0.2 | 0.1 | 1,176 |
| P. A. Boat Haven | Port Angeles | 17.4 | 19.2 | 189.3 | 0.0 | 0.4 | 0.4 | 0.1 | 2,184 |
| Port of Everett Marina | Port of Everett | 68.7 | 75.6 | 746.1 | 0.1 | 1.7 | 1.5 | 0.5 | 8,612 |
| 12th Street Yacht Basin | Port of Everett | 7.5 | 8.3 | 81.9 | 0.0 | 0.2 | 0.2 | 0.1 | 945 |
| Cap Sante Boat Haven | Port of Anacortes | 33.5 | 36.9 | 363.9 | 0.1 | 0.8 | 0.8 | 0.2 | 4,201 |
| Blaine Harbor | Port of Bellingham | 21.1 | 23.2 | 228.9 | 0.0 | 0.5 | 0.5 | 0.1 | 2,642 |
| Squalicum | Port of Bellingham | 47.4 | 52.2 | 515.0 | 0.1 | 1.1 | 1.1 | 0.3 | 5,944 |
| Bremerton | Port of Bremerton | 1.5 | 1.7 | 16.4 | 0.0 | 0.0 | 0.0 | 0.0 | 189 |
| Port Orchard | Port of Bremerton | 12.6 | 13.8 | 136.5 | 0.0 | 0.3 | 0.3 | 0.1 | 1,575 |
| Port of Brownsville | Port of Brownsville | 11.2 | 12.4 | 121.9 | 0.0 | 0.3 | 0.3 | 0.1 | 1,407 |
| Coupeville Wharf | Port of Coupeville | 11.4 | 12.5 | 123.7 | 0.0 | 0.3 | 0.3 | 0.1 | 1,428 |
| Edmonds Marina | Port of Edmonds | 9.8 | 10.8 | 106.3 | 0.0 | 0.2 | 0.2 | 0.1 | 1,227 |
| Friday Harbor | Port of Friday Harbor | 16.8 | 18.4 | 182.0 | 0.0 | 0.4 | 0.4 | 0.1 | 2,100 |
| Keyport Marina | Port of Keyport | 0.9 | 1.0 | 10.2 | 0.0 | 0.0 | 0.0 | 0.0 | 118 |
| Cove Marina | Port of Kingston | 10.1 | 11.1 | 109.2 | 0.0 | 0.2 | 0.2 | 0.1 | 1,260 |
| Swantown | Port of Olympia | 23.5 | 25.8 | 254.8 | 0.0 | 0.6 | 0.5 | 0.2 | 2,941 |
| Point Hudson | Port of Port Townsend | 1.5 | 1.7 | 16.4 | 0.0 | 0.0 | 0.0 | 0.0 | 189 |
| Boat Haven | Port of Port Townsend | 15.9 | 17.5 | 172.9 | 0.0 | 0.4 | 0.4 | 0.1 | 1,995 |
| Herb Beck Marina | Port of Port Townsend | 1.7 | 1.8 | 18.2 | 0.0 | 0.0 | 0.0 | 0.0 | 210 |
| Poulsbo Marina | Port of Poulsbo | 13.4 | 14.8 | 145.6 | 0.0 | 0.3 | 0.3 | 0.1 | 1,680 |
| Fishermen's Terminal | Port of Seattle | 5.5 | 6.1 | 60.1 | 0.0 | 0.1 | 0.1 | 0.0 | 693 |
| Harbor Island | Port of Seattle | 2.2 | 2.4 | 23.7 | 0.0 | 0.1 | 0.0 | 0.0 | 273 |
| Shilshole Bay Marina | Port of Seattle | 47.3 | 52.1 | 513.5 | 0.1 | 1.1 | 1.1 | 0.3 | 5,928 |
| Bell Harbor Marina | Port of Seattle | 1.5 | 1.7 | 16.4 | 0.0 | 0.0 | 0.0 | 0.0 | 189 |
| Shelton Marina | Port of Shelton | 1.7 | 1.8 | 18.2 | 0.0 | 0.0 | 0.0 | 0.0 | 210 |
| La Conner Marina | Port of Skagit | 15.4 | 17.0 | 167.4 | 0.0 | 0.4 | 0.3 | 0.1 | 1,932 |
| Ole & Charlie's | Port of Tacoma | 2.3 | 2.6 | 25.5 | 0.0 | 0.1 | 0.1 | 0.0 | 294 |
| **Total** | | **411.2** | **452.7** | **4,465.6** | **0.8** | **9.9** | **9.3** | **2.9** | **51,545** |

## 4.9 Emission Comparison, 2011 vs 2005

The emissions calculation methodology was similar to the methodology used in 2005, with the exception of updated load factors used in 2011. Table 4.17 lists the vessel and engine types that had updated load factors in 2011 based on updated factors, better information provided by vessel operators, or other applicable studies. The other harbor vessel load factors remained the same as 2005 and the complete list of 2011 load factors are listed previously in Table 4.8.

For harbor vessel emissions comparison, the 2005 emissions were adjusted for the updated load so that the emissions would be comparable.

**Table 4.17: 2011 vs 2005 Load Factor Changes**

| Harbor Vessel Type | Engine Type | 2011 LF | 2005 LF |
|---|---|---|---|
| Harbor Tug | Propulsion | 0.31 | 0.68 |
| Ferry | Propulsion | 0.34 | 0.76 |
| Excursion | Propulsion | 0.42 | 0.76 |
| Workboat | Propulsion | 0.38 | 0.45 |
| Workboat | Auxiliary | 0.32 | 0.43 |

Table 4.18 presents an 11% increase in activity in 2011 as compared to 2005. The vessel count did not change significantly.

**Table 4.18: 2011 vs 2005 Harbor Vessel Count Comparison**

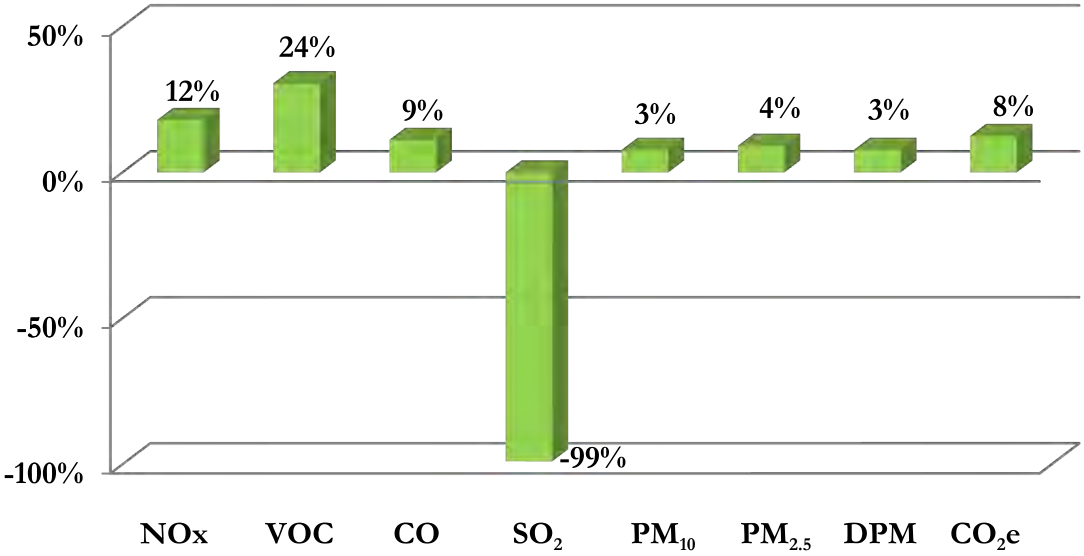
| Year | Activity (hp hr) | Count |
|---|---|---|
| 2011 | 664,138,311 | 709 |
| 2005 | 594,442,588 | 704 |
| **Change, %** | **12%** | **1%** |

Table 4.19 and Figure 4.4 present the total net change in emissions for total harbor craft, including tank barges, in 2011 as compared to 2005. With the exception of $SO_2$ emissions, the harbor craft emissions increased for all pollutants by 6% to 28% in 2011 when compared to 2005. The increase in emissions, with the exception for $SO_x$, is due to a number of reasons. The activity increased 12% (see Table 4.20) in 2011 and the fleet changed from 2005 for some of the vessel types and there was an increase in category 2 engines which have higher emission factors than category 1 engines. The $NO_x$ and VOC increase is greater than the activity increase and this reflects the fact that there was an increase in category 2 engines which have higher $NO_x$, VOC, and PM emission rates than Category 1 engines. The increase in PM and DPM is less than the activity increase and this reflects the reduction that occurred due to the use of ULSD, but there was still an increase in PM emissions due to the increased activity and rise in category 2 engine count. The $SO_2$ emissions decreased significantly in 2011 due to the availability and use of ULSD in 2011 by the vessels with diesel engines one year ahead of the EPA mandated marine and locomotive low sulfur diesel fuel requirement.

**Table 4.19: 2011 vs 2005 Commercial Harbor and Government Vessel Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 6,253.0 | 247.2 | 1,021.9 | 3.7 | 272.3 | 253.7 | 272.1 | 381,275 |
| 2005 | 5,568.7 | 199.6 | 941.5 | 358.5 | 265.4 | 244.1 | 265.1 | 353,178 |
| **Change, tpy** | **684.3** | **47.6** | **80.3** | **-354.8** | **7.0** | **9.6** | **7.0** | **28,097** |
| **Change, %** | **12%** | **24%** | **9%** | **-99%** | **3%** | **4%** | **3%** | **8%** |

**Figure 4.4: 2011 vs 2005 Commercial Harbor and Government Vessel Emissions Change**



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

Table 4.20 presents the changes in activity (hp-hr) by vessel type. The changes in activity are due to both changes in activity hours and engine horsepower. The activity is calculated by multiplying the horsepower times the activity hours times the load factor. For 2005 activity, the updated 2011 load factors were used in order to do the comparison.

**Table 4.20: 2011 vs 2005 Harbor Vesel Activity Change**

| Type | 2005 hp-hr | 2011 hp-hr | % Change |
|---|---|---|---|
| Assist/Escort | 81,212,373 | 89,289,023 | 10% |
| Commercial fishing | 10,558,042 | 9,493,618 | -10% |
| Excursion | 16,962,842 | 17,248,062 | 2% |
| Ferry | 314,514,283 | 350,485,994 | 11% |
| Government | 56,818,977 | 52,947,794 | -7% |
| Harbor tug | 45,559,880 | 54,657,979 | 20% |
| Ocean tug | 86,344,802 | 80,122,263 | -7% |
| Tank barge | 3,006,689 | 3,373,361 | 12% |
| Workboat | 4,250,700 | 6,520,218 | 53% |
| **Total** | **619,228,588** | **664,138,311** | **7%** |

The government activity doubled in 2011, as presented in Table 4.21, due to the data collected in 2011 which added vessels to the government fleet and increased the government engine count by about 28 engines from what was included in the 2005 inventory.

**Table 4.21: 2011 vs 2005 Commercial Harbor and Government Vessel Average Operational Hours Comparison**

| | Propulsion Engine | | | Auxiliary Engine | | |
|---|---|---|---|---|---|---|
| Type | 2005 (hours) | 2011 (hours) | Percent | 2005 (hours) | 2011 (hours) | Percent |
| Assist/ Escort | 2,673 | 3,135 | 17% | 3,644 | 3,122 | -14% |
| Commercial fishing | 49 | 49 | -1% | 49 | 49 | -1% |
| Excursion | 862 | 879 | 2% | 607 | 697 | 15% |
| Ferry | 3,695 | 4,420 | 20% | 1,836 | 2,110 | 15% |
| Government | 654 | 838 | 28% | 664 | 535 | -19% |
| Harbor tug | 1540 | 1,540 | 0% | 1024 | 1,647 | 61% |
| Ocean tug | 498 | 498 | 0% | 498 | 457 | -8% |
| Pilot boat | 2,675 | 799 | -70% | 1,000 | 342 | -66% |
| Tank barge | na | na | na | na | 1,087 | na |
| Workboat | 554 | 840 | 52% | 577 | 321 | -44% |

Table 4.22 compares the average engine horsepower for propulsion and auxiliary engine.

### Table 4.22: 2011 vs 2005 Commercial Harbor and Government Vessel Average Engine Horsepower by Engine and Vessel Type, hp

| | Propulsion Engine | | | Auxiliary Engine | | |
|---|---|---|---|---|---|---|
| **Type** | **2005 (hp)** | **2011 (hp)** | **Percent** | **2005 (hp)** | **2011 (hp)** | **Percent** |
| Assist/Escort | 2,123 | 2,616 | 23% | 134 | 203 | 51% |
| Commercial fishing | 750 | 718 | -4% | na | 298 | na |
| Excursion | 432 | 433 | 0% | 43 | 43 | 1% |
| Ferry | 1,845 | 1,973 | 7% | 363 | 378 | 4% |
| Government | 880 | 1,002 | 14% | 143 | 237 | 66% |
| Harbor tug | 856 | 856 | 0% | 86 | 102 | 19% |
| Ocean tug | 2,156 | 2,156 | 0% | 133 | 147 | 10% |
| Pilot boat | 1,100 | 1,100 | 0% | 47 | 47 | 0% |
| Tank barge | na | na | na | na | 185 | na |
| Workboat | 376 | 453 | 20% | 173 | 197 | 14% |

Table 4.23 presents the average engine model year and age in 2011 and 2005 for propulsion engines.

### Table 4.23: 2011 vs 2005 Commercial Harbor and Government Vessel Average Propulsion Engine Model Year by Vessel Type

| **Type** | **2005 MY (year)** | **2011 MY (year)** | **2005 Age** | **2011 Age** |
|---|---|---|---|---|
| Assist/Escort | 1986 | 1994 | 19 | 17 |
| Commercial fishing | 1973 | 1976 | 32 | 35 |
| Excursion | 1992 | 1992 | 13 | 19 |
| Ferry | 1996 | 1996 | 9 | 15 |
| Government | 1990 | 1991 | 15 | 20 |
| Harbor tug | 1979 | 1979 | 26 | 32 |
| Ocean tug | 1981 | 1981 | 24 | 30 |
| Pilot boat | 2000 | 2000 | 5 | 11 |
| Tank barge | na | na | na | na |
| Workboat | 1983 | 1984 | 22 | 27 |

Table 4.24 presents the average engine model year and age in 2011 and 2005 for auxiliary engines.

**Table 4.24: 2011 vs 2005 Commercial Harbor and Government Vessel Average Auxiliary Engine Model Year by Vessel Type**

| Type | 2005 MY (year) | 2011 MY (year) | 2005 Age | 2011 Age |
|---|---|---|---|---|
| Assist/Escort | 1985 | 1999 | 20 | 12 |
| Commercial fishing | 1973 | 1976 | 32 | 35 |
| Excursion | na | 1992 | na | 19 |
| Ferry | 1994 | 1997 | 11 | 14 |
| Government | 1945 | 1966 | 60 | 45 |
| Harbor tug | 1977 | 1982 | 28 | 29 |
| Ocean tug | 1982 | 1984 | 23 | 27 |
| Pilot boat | 2000 | 2000 | 5 | 11 |
| Tank barge | na | 1990 | na | 21 |
| Workboat | 1976 | 1982 | 29 | 29 |

For the recreational vessel emission comparison, the 2005 emission estimates were re-modeled used the NONROAD2008a model to be comparable to the 2011 emissions. The original 2005 emissions were based on the NONROAD2005c model. The differences between 2011 vs 2005 in Table 4.25 are due to the following contributing factors: 1) 3% decrease in the number of recreational vessels (see Table 4.26); 2) the use of ULSD in 2011 by diesel powered recreational vessels and the use of lower sulfur gasoline in 2011 by gasoline powered recreational vessels; 3) the improvement of gasoline and marine diesel engine standards, which came into effect in 2007 for Tier 2 gasoline engines and 2006-2009 for Tier 2 marine diesel engines; and lastly, and 4) fleet turnover assumed by the NONROAD2008a model.

The contributing factors resulted in range of 10% to 93% emission reduction for recreational vessels as presented in Table 4.25.

**Table 4.25: 2011 vs 2005 Recreational Vessels Emissions Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 797 | 877 | 8,651 | 2 | 19 | 18 | 6 | 99,848 |
| 2005 | 928 | 2,018 | 13,536 | 22 | 41 | 38 | 7 | 111,184 |
| **Change (tpy)** | **-131** | **-1,141** | **-4,885** | **-20** | **-22** | **-20** | **-1** | **-11,336** |
| **Change (%)** | **-14%** | **-57%** | **-36%** | **-93%** | **-53%** | **-53%** | **-20%** | **-10%** |

Table 4.26 presents that recreational vessel count decreased 3% in 2011 as compared to 2005.

**Table 4.26: 2011 vs 2005 Recreational Vessels Count Comparison**

| Year | Vessel Count |
|---|---|
| 2011 | 23,771 |
| 2005 | 24,390 |
| **Change (tpy)** | **-619** |
| **Change (%)** | **-3%** |

# SECTION 5 CARGO HANDLING EQUIPMENT

Section 5 provides an overview of the cargo-handling and related equipment found at Puget Sound ports. A description of the methodology used to estimate emissions is provided in this section, as well as the emission estimates for this source category.

## 5.1 Source Description

Cargo handling equipment includes equipment used to move cargo (containers, general cargo, and bulk cargo) to and from marine vessels, railcars, and on-road trucks. This includes cranes, straddle carriers, yard tractors, top and side handlers, forklifts, and other related equipment found in smaller quantities, such as various loaders, sweepers, backhoes, aerial lifts, pallet jacks, and generator sets. The equipment typically only operates at marine terminals or at rail yards and is assumed not to operate on public roadways or land. This inventory includes cargo handling equipment using diesel, gasoline, propane or electricity. Although the inventory's primary focus is diesel equipment, the total count includes zero-emitting electrical equipment.

As shown in Tables 5.1 and 5.2 and Figures 5.1 and 5.2, a total of 1,196 pieces of equipment were inventoried, including 117 electric-powered pieces. Over one-third of the equipment was yard tractors (35%), and 22% was forklifts. Each port's equipment is summarized in detail in Section 5.4.

For Table 5.1, electric equipment includes: crane, forklift, manlift, truck, pallet jacks, and compressor. The other category includes: backhoe, car loader, compressor, crane, generator, light tower, log shovel, log handler, log stacker, manlift, reach stacker, skid steer loader, truck, welder, and sweeper.

**Table 5.1: 2011 CHE Distribution by Type**

| Equipment | Count |
|---|---:|
| Yard Tractor | 418 |
| Forklift | 267 |
| Top Handler | 95 |
| Straddle Carrier | 78 |
| Loader | 42 |
| Electric Equipment | 117 |
| Other | 179 |
| **Total** | **1,196** |

**Figure 5.1: 2011 CHE Count Distribution**

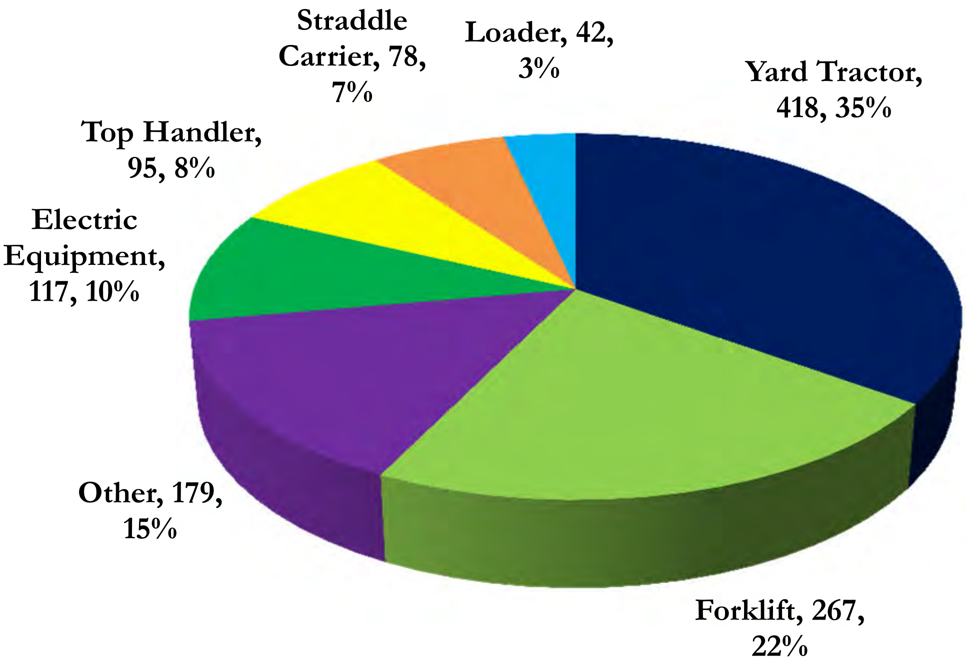
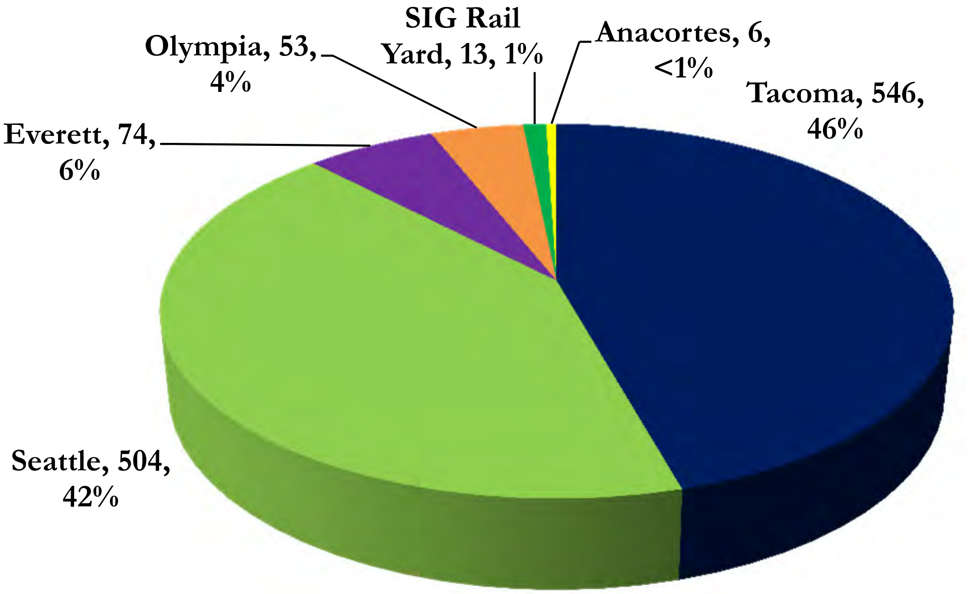


**Table 5.2: 2011 CHE Distribution by Port**

| Port | Petroleum Fueled | Electric | Total Count |
|---|---|---|---|
| Anacortes | 6 | 0 | 6 |
| Everett | 68 | 6 | 74 |
| Olympia | 53 | 0 | 53 |
| Seattle | 446 | 58 | 504 |
| Tacoma | 493 | 53 | 546 |
| BNSF SIG Rail Yard | 13 | 0 | 13 |
| **Total** | **1,079** | **117** | **1,196** |

*Note: SIG - Seattle International Gateway*

**Figure 5.2: 2011 CHE Distribution by Port**



### *5.1.1 Crane*

The crane category encompasses various types of cranes, such as overhead, gantry, stacking, and container cranes found at the ports. Crane photos are courtesy of the Port of Tacoma's Website Photo Gallery.

The container crane, shown in Figure 5.3 and otherwise known as dockside, ship to shore, or quayside crane, is electrical and is used mainly at container terminals to load/unload the vessels.

**Figure 5.3: Container Crane**

The rubber tired gantry (RTG) crane, shown in Figure 5.4is also known as a transtainer. The diesel-powered RTG crane moves containers to and from the container stacks.

**Figure 5.4: Rubber Tired Gantry Crane**

### *5.1.2 Forklift*

Forklifts or lift trucks, shown in Figure 5.5, are the second most common piece of equipment found at the ports, after the yard tractor. They vary in capacity and engine size and can have diesel, gasoline or propane engines or electric motors.

**Figure 5.5: Forklift**

### *5.1.3 Side Handler*

Side picks, side handlers, side loaders, and empty container handlers, shown in Figure 5.6, describe the cargo handling equipment that typically move and stack the empty containers at a terminal. The side handlers in this inventory are diesel-powered.

**Figure 5.6: Side Handler**

### *5.1.4 Straddle Carrier*

A straddle carrier, shown in Figure 5.7, is specialized equipment that removes the containers from delivering trucks by straddling the chassis and lifting the container using an overhead crane. The straddle carrier then drives away with the container. The straddle carriers in this inventory are diesel-powered.

**Figure 5.7: Straddle Carrier**

### *5.1.5 Top Handler*

The top loader or top handler, shown in Figure 5.8, moves, stacks and loads containers using an overhead telescopic boom. The top handler has higher horsepower and lifting capacity than the side handler. The top handlers in this inventory are diesel-powered.

**Figure 5.8: Top Handler**

### *5.1.6 Yard Tractor*

The majority of the pieces of cargo handling equipment in the inventory are yard tractors, also known as terminal tractors, yard hustlers, yard trucks, or hostlers and shown in Figure 5.9. The typical non-road yard tractor is a close relative of the on-road truck tractor chassis; however, most terminal yard tractors have a non-road engine that does not meet the EPA standards required to be registered for public roads. Some terminals may use yard tractors that are specifically purchased with on-road engines. Yard tractors are used throughout the terminal to move containers to and from the ship and to move containers within the terminal. Yard tractors are also used for intermodal rail container transfers. Equipment and emissions from intermodal rail yards are included in the rail section.

**Figure 5.9: Yard Tractor**

## 5.2 Geographical Delineation

The geographical extent for the cargo handling equipment is the marine terminals and facilities associated with the following Puget Sound ports:

- Port of Anacortes
- Port of Everett
- Port of Olympia
- Port of Seattle
- Port of Tacoma
- BNSF SIG Rail Yard
- Argo Rail Yard

## 5.3 Data and Information Acquisition

Data was collected from terminal owners, equipment operators, and others having firsthand knowledge of either equipment details or operational parameters. Additional information was requested after the initial data review. The collected information was compared with information acquired during the 2005 emissions inventory process in order to provide an order-of-magnitude "reasonableness check" on the quality of the data.

The data collection approach focused on equipment details and operational profiles (activity data). The data is summarized by port and discussed in the following subsections. Some examples of equipment details that were collected include such parameters as:

- Equipment type (e.g., yard tractor)
- Rated power (primarily horsepower)
- Equipment manufacturer and model year
- Engine make, model, model year, and technology
- Type of fuel used (e.g., ULSD, gasoline, liquefied petroleum gas or LPG)
- Emission reduction technology (e.g., DOC, DPF)

Where data was unavailable, reasonable assumptions based on similar equipment in the inventory were used. Default values by port, engine type and equipment type were assigned when the activity hour, horsepower, or model year was unavailable.

The Port of Port Angeles declined participation in the inventory update. In 2005, the Port of Port Angeles operated a small number of forklifts and log handlers (11 pieces of equipment) for less than 500 hours annually. Cargo handling equipment usage at the Port of Port Angeles is considered insignificant and excluded from the 2011 cargo-handling emission totals.

## 5.4 Operational Profiles

This section summarizes the equipment inventory at each port. It provides equipment characteristics such as the average, minimum and maximum engine power, model year and estimated annual operating hours for the port as a whole and also for each facility or entity within the port. Each facility has an assigned identification number to maintain confidentiality regarding terminal-specific information on count and types of equipment. The majority of the pieces of equipment have diesel engines, unless noted otherwise in the tables under equipment name. All of the diesel-powered equipment used ULSD in 2011. For the following characteristic tables, count column is for equipment count.

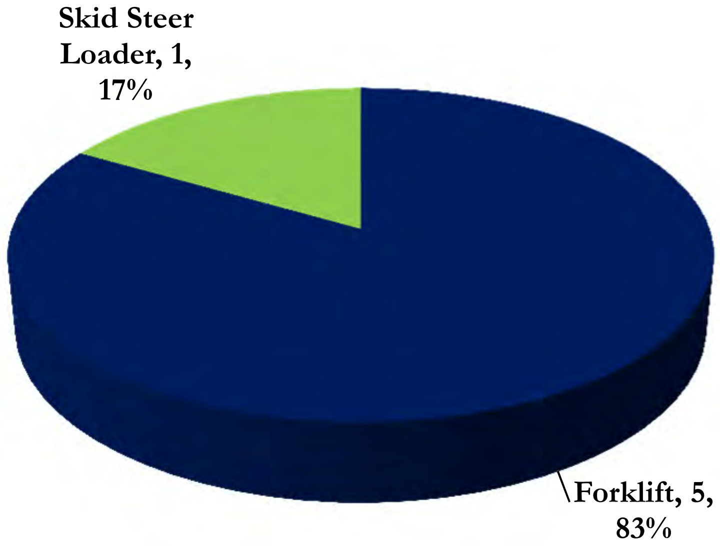
### *5.4.1 Port of Anacortes*

The Port of Anacortes is primarily an export port that handles bulk and break-bulk cargoes such as logs and petroleum coke.[31] Table 5.3 summarizes the equipment count by type, engine power, model year, and estimated annual operating hours. Figure 5.9 presents the distribution of the six pieces of equipment operated at the Port of Anacortes in 2011. There were five forklifts, accounting for 83% of the equipment inventory. The remaining equipment was a skid steer loader.

**Table 5.3: Port of Anacortes 2011 CHE Characteristics**

| Equipment | Engine Type | Count | Power (hp) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Forklift | Diesel | 1 | 200 | 200 | 200 | 1982 | 1982 | 1982 | 5 | 5 | 5 |
| Skid Steer Loader | Diesel | 1 | 150 | 150 | 150 | 1991 | 1991 | 1991 | 22 | 22 | 22 |
| Forklift | Propane | 4 | 50 | 200 | 100 | 1963 | 1995 | 1976 | 18 | 71 | 42 |
| **Total** | | 6 | | | | | | | | | |

**Figure 5.10: Port of Anacortes 2011 CHE Counts and Distribution by Type**



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[31] Port of Anacortes, *http://www.portofanacortes.com*.

### *5.4.2 Port of Everett*

The Port of Everett's primary exports are containers, heavy machinery and materials to support gold mining efforts in Russia, agricultural products and wind energy cargoes and agricultural products. Primary imports are aerospace parts, cement, wind energy components, heavy machinery, rolling cargoes and containerized cargoes. The Port uses cargo handling equipment for its eight shipping terminals, multi-purpose warehouse, and its marina operation. Port tenant operations include a shipyard, tug operations, and a bulk unloading facility for cement. There are a total of 77 pieces of equipment at the Port of Everett.

Table 5.4 summarizes the equipment count by type, engine power, model year and estimated annual operating hours for equipment inventoried at the Port of Everett. Figure 5.11 presents the distribution of the 74 pieces of equipment operated at the Port Everett in 2011.

**Table 5.4: Port of Everett 2011 CHE Characteristics**

| Equipment | Engine Type | Count | Power (hp) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Backhoe | Diesel | 1 | 63 | 63 | 63 | 1988 | 1988 | 1988 | 300 | 300 | 300 |
| Crane | Diesel | 3 | 160 | 330 | 247 | 1968 | 2000 | 1987 | 150 | 280 | 193 |
| Forklift | Diesel | 16 | 50 | 175 | 115 | 1974 | 1995 | 1983 | 32 | 300 | 185 |
| Generator | Diesel | 3 | 71 | 602 | 294 | 1992 | 2006 | 1999 | 50 | 150 | 100 |
| Light tower | Diesel | 1 | 25 | 25 | 25 | 1991 | 1991 | 1991 | 300 | 300 | 300 |
| Loader | Diesel | 11 | 101 | 400 | 260 | 1970 | 1991 | 1980 | 100 | 2,000 | 620 |
| Log shovel | Diesel | 2 | 177 | 177 | 177 | 1994 | 2001 | 1998 | 1,000 | 1,500 | 1,250 |
| Reach stacker | Diesel | 2 | 200 | 200 | 200 | 1995 | 1995 | 1995 | 400 | 400 | 400 |
| Sweeper | Diesel | 1 | 36 | 36 | 36 | 1987 | 1987 | 1987 | 300 | 300 | 300 |
| Top Handler | Diesel | 1 | 200 | 200 | 200 | 1993 | 1993 | 1993 | 25 | 25 | 25 |
| Truck | Diesel | 1 | 210 | 210 | 210 | 1992 | 1992 | 1992 | 350 | 350 | 350 |
| Yard Tractor | Diesel | 11 | 175 | 175 | 175 | 1984 | 1995 | 1988 | 200 | 350 | 239 |
| Forklift | Electric | 6 | na | na | na | 1994 | 1994 | 1994 | 0 | 0 | 0 |
| Forklift | Gasoline | 6 | 76 | 175 | 109 | 1953 | 1974 | 1963 | 200 | 250 | 217 |
| Manlift | Gasoline | 1 | 82 | 82 | 82 | 1998 | 1998 | 1998 | 300 | 300 | 300 |
| Welder | Gasoline | 1 | 76 | 76 | 76 | 1968 | 1968 | 1968 | 250 | 250 | 250 |
| Compressor | Gasoline | 1 | 50 | 50 | 50 | 1978 | 1978 | 1978 | 250 | 250 | 250 |
| Forklift | Propane | 5 | 93 | 93 | 93 | 1982 | 1982 | 1982 | 300 | 300 | 300 |
| Loader | Propane | 1 | 25 | 25 | 25 | 1968 | 1968 | 1968 | 100 | 100 | 100 |
| **Total** | | **74** | | | | | | | | | |

**Figure 5.11: Port of Everett 2011 CHE Counts and Distribution by Type**

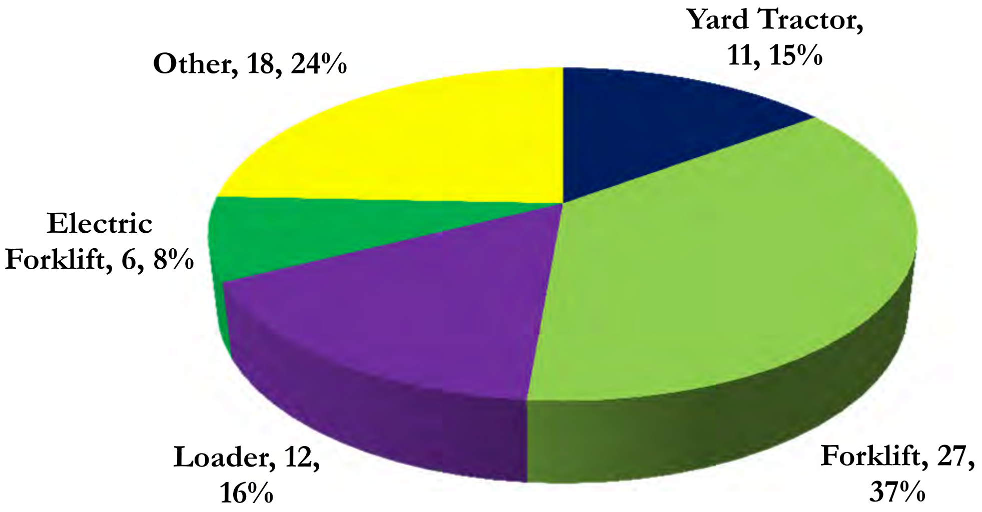


Table 5.5 summarizes by terminal, the equipment count, engine power, model year and estimated annual operating hours for equipment inventoried at the Port of Everett.

**Table 5.5: Port of Everett 2011 CHE Characteristics by Terminal**

| Equipment | Engine Type | Count | Power (hp) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| **PSE010** | | | | | | | | | | | |
| Backhoe | Diesel | 1 | 63 | 63 | 63 | 1988 | 1988 | 1988 | 300 | 300 | 300 |
| Crane | Diesel | 3 | 160 | 330 | 247 | 1968 | 2000 | 1987 | 150 | 280 | 193 |
| Forklift | Diesel | 4 | 85 | 175 | 130 | 1974 | 1976 | 1975 | 250 | 300 | 275 |
| Generator | Diesel | 3 | 71 | 602 | 294 | 1992 | 2006 | 1999 | 50 | 150 | 100 |
| Light tower | Diesel | 1 | 25 | 25 | 25 | 1991 | 1991 | 1991 | 300 | 300 | 300 |
| Loader | Diesel | 3 | 101 | 101 | 101 | 1970 | 1974 | 1972 | 200 | 200 | 200 |
| Sweeper | Diesel | 1 | 36 | 36 | 36 | 1987 | 1987 | 1987 | 300 | 300 | 300 |
| Truck | Diesel | 1 | 210 | 210 | 210 | 1992 | 1992 | 1992 | 350 | 350 | 350 |
| Forklift | Electric | 6 | na | na | na | 1994 | 1994 | 1994 | 0 | 0 | 0 |
| Forklift | Gasoline | 6 | 76 | 175 | 109 | 1953 | 1974 | 1963 | 200 | 250 | 217 |
| Manlift | Gasoline | 1 | 82 | 82 | 82 | 1998 | 1998 | 1998 | 300 | 300 | 300 |
| Welder | Gasoline | 1 | 76 | 76 | 76 | 1968 | 1968 | 1968 | 250 | 250 | 250 |
| Compressor | Gasoline | 1 | 50 | 50 | 50 | 1978 | 1978 | 1978 | 250 | 250 | 250 |
| Forklift | Propane | 5 | 93 | 93 | 93 | 1982 | 1982 | 1982 | 300 | 300 | 300 |
| Loader | Propane | 1 | 25 | 25 | 25 | 1968 | 1968 | 1968 | 100 | 100 | 100 |
| **Total** | | **38** | | | | | | | | | |
| **PSE020** | | | | | | | | | | | |
| Loader | Diesel | 8 | 177 | 400 | 300 | 1973 | 1991 | 1983 | 100 | 2,000 | 725 |
| Log shovel | Diesel | 2 | 177 | 177 | 177 | 1994 | 2001 | 1998 | 1,000 | 1,500 | 1,250 |
| **Total** | | **10** | | | | | | | | | |
| **PSE030** | | | | | | | | | | | |
| Forklift | Diesel | 6 | 75 | 150 | 100 | 1984 | 1990 | 1985 | 32 | 175 | 110 |
| Top Handler | Diesel | 1 | 200 | 200 | 200 | 1993 | 1993 | 1993 | 25 | 25 | 25 |
| Yard Tractor | Diesel | 7 | 175 | 175 | 175 | 1986 | 1993 | 1987 | 225 | 350 | 261 |
| **Total** | | **14** | | | | | | | | | |
| **PSE040** | | | | | | | | | | | |
| Forklift | Diesel | 6 | 50 | 150 | 121 | 1975 | 1995 | 1987 | 200 | 200 | 200 |
| Reach Stacker | Diesel | 2 | 200 | 200 | 200 | 1995 | 1995 | 1995 | 400 | 400 | 400 |
| Yard Tractor | Diesel | 4 | 175 | 175 | 175 | 1984 | 1995 | 1990 | 200 | 200 | 200 |
| **Total** | | **12** | | | | | | | | | |

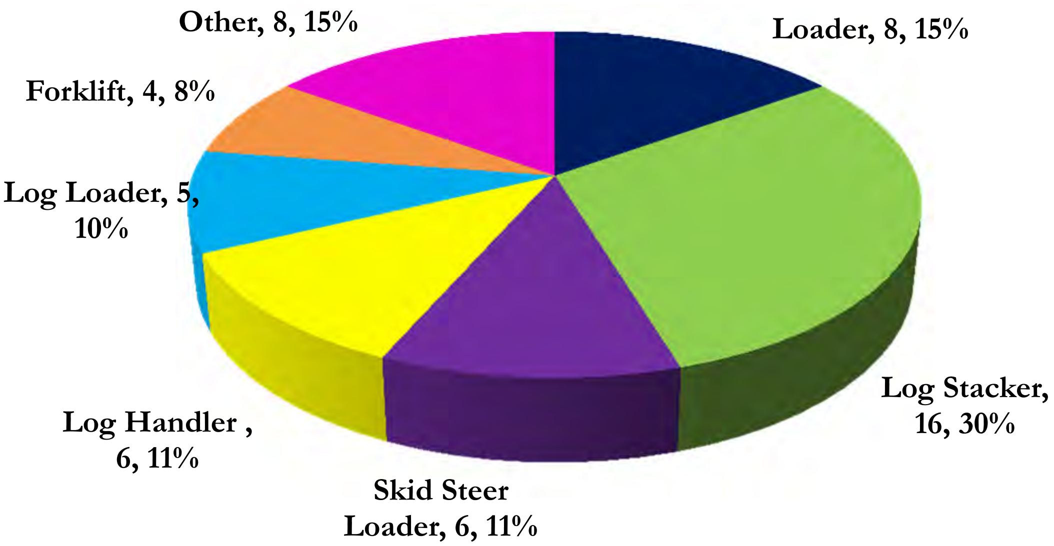
### *5.4.3 Port of Olympia*

The Port of Olympia has a 60-acre terminal with three deep-water berths that handle break-bulk, roll-on/roll-off, and forest products. Table 5.6 summarizes the equipment count by type, engine power, model year and estimated annual operating hours for the equipment inventory. Figure 5.12 presents the distribution of the 53 pieces of equipment operated at the Port of Olympia in 2011.

**Table 5.6: Port of Olympia 2011 CHE Characteristics**

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Backhoe | Diesel | 1 | 65 | 65 | 65 | 1991 | 1991 | 1991 | na | na | na |
| Crane | Diesel | 1 | 100 | 100 | 100 | na | na | na | 20 | 20 | 20 |
| Forklift | Diesel | 3 | 104 | 159 | 122 | 2001 | 2001 | 2001 | 54 | 85 | 65 |
| Loader | Diesel | 8 | 197 | 415 | 363 | 1985 | 2000 | 1993 | 0 | 738 | 248 |
| Sweeper | Diesel | 2 | 210 | 230 | 220 | 1999 | 2010 | 2005 | 8 | 531 | 270 |
| Truck | Diesel | 2 | 400 | 460 | 430 | 1991 | 1995 | 1993 | 50 | 250 | 150 |
| Log Loader | Diesel | 5 | 120 | 197 | 172 | 2000 | 2011 | 2007 | na | na | na |
| Log Stacker | Diesel | 16 | 375 | 500 | 432 | 1987 | 2011 | 2000 | 500 | 2,000 | 1,311 |
| Skid Steer Loader | Diesel | 6 | 51 | 210 | 154 | 1994 | 2007 | 1999 | 75 | 300 | 188 |
| Log Handler | Diesel | 6 | 200 | 200 | 200 | 2000 | 2001 | 2001 | 100 | 1,800 | 1,083 |
| Forklift | Propane | 1 | 120 | 120 | 120 | na | na | na | 250 | 250 | 250 |
| Manlift | Propane | 1 | 87 | 87 | 87 | 1997 | 1997 | 1997 | 71 | 71 | 71 |
| Sweeper | Propane | 1 | 130 | 130 | 130 | 2002 | 2002 | 2002 | 2 | 2 | 2 |
| **Total** | | **53** | | | | | | | | | |

**Figure 5.12: Port of Olympia 2011 CHE Counts and Distribution by Type**



### *5.4.4 Port of Seattle*

The Port of Seattle's marine cargo facilities handle worldwide trade, grain exports and the cruise industry. The majority of the Port's trade is with Asia/Pacific nations and the Alaska market. Section 1 discusses each terminal and facility at the Port of Seattle. Port-owned equipment that may be used at more than one facility is also included in the inventory.

Cargo handling equipment used at the four container facilities:

- Terminal 5
- Terminal 18
- Terminal 30
- Terminal 46

Three bulk facilities:

- Terminal 115
- Pier 86
- Terminal 91

Two cruise terminals (combined for Puget Sound Maritime Air Emissions Inventory purposes):

- Terminal 91
- Pier 66

Table 5.7 presents the equipment count by type, engine power, model year and estimated annual operating hours for equipment inventoried at the Port of Seattle. Figure 5.13 presents the distribution of the 504 pieces of equipment operated at the Port Seattle in 2011.

**Table 5.7: Port of Seattle 2011 CHE Characteristics**

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Car Loader | Diesel | 1 | 150 | 150 | 150 | 2001 | 2001 | 2001 | 365 | 365 | 365 |
| Crane | Diesel | 8 | 130 | 130 | 130 | 1992 | 1998 | 1997 | 60 | 720 | 484 |
| Forklift | Diesel | 66 | 85 | 335 | 163 | 1961 | 2008 | 1996 | 20 | 2,063 | 391 |
| Generator | Diesel | 3 | 210 | 364 | 287 | 2001 | 2003 | 2002 | 28 | 102 | 58 |
| Reach stacker | Diesel | 2 | 330 | 350 | 340 | 2002 | 2008 | 2005 | na | na | na |
| RTG | Diesel | 6 | 620 | 947 | 838 | 1995 | 2005 | 2002 | na | na | na |
| Side Handler | Diesel | 8 | 152 | 205 | 197 | 1995 | 2006 | 2002 | 350 | 1,826 | 1,196 |
| Top Handler | Diesel | 73 | 250 | 335 | 305 | 1995 | 2008 | 2002 | 371 | 4,300 | 2,385 |
| Yard Tractor | Diesel | 206 | 173 | 240 | 187 | 1974 | 2008 | 2004 | 0 | 3,998 | 1,555 |
| Crane | Electric | 27 | na | na | na | na | na | na | na | na | na |
| Forklift | Electric | 9 | na | na | na | 1975 | 1998 | 1987 | 0 | 324 | 157 |
| Pallet Jacks | Electric | 22 | na | na | na | na | na | na | 480 | 610 | 539 |
| Car Loader | Gasoline | 1 | 150 | 150 | 150 | 1989 | 1989 | 1989 | 121 | 121 | 121 |
| Forklift | Gasoline | 5 | 100 | 100 | 100 | 1988 | 1993 | 1990 | 5 | 222 | 147 |
| Generator | Gasoline | 2 | 5 | 20 | 13 | 2005 | 2005 | 2005 | 5 | 5 | 5 |
| Car Loader | Propane | 5 | 150 | 150 | 150 | 1981 | 1989 | 1984 | 14 | 30 | 23 |
| Forklift | Propane | 60 | 85 | 215 | 94 | 1966 | 2006 | 1994 | 30 | 800 | 578 |
| **Total** | | **504** | | | | | | | | | |

**Figure 5.13: Port of Seattle 2011 CHE Counts and Distribution by Type**

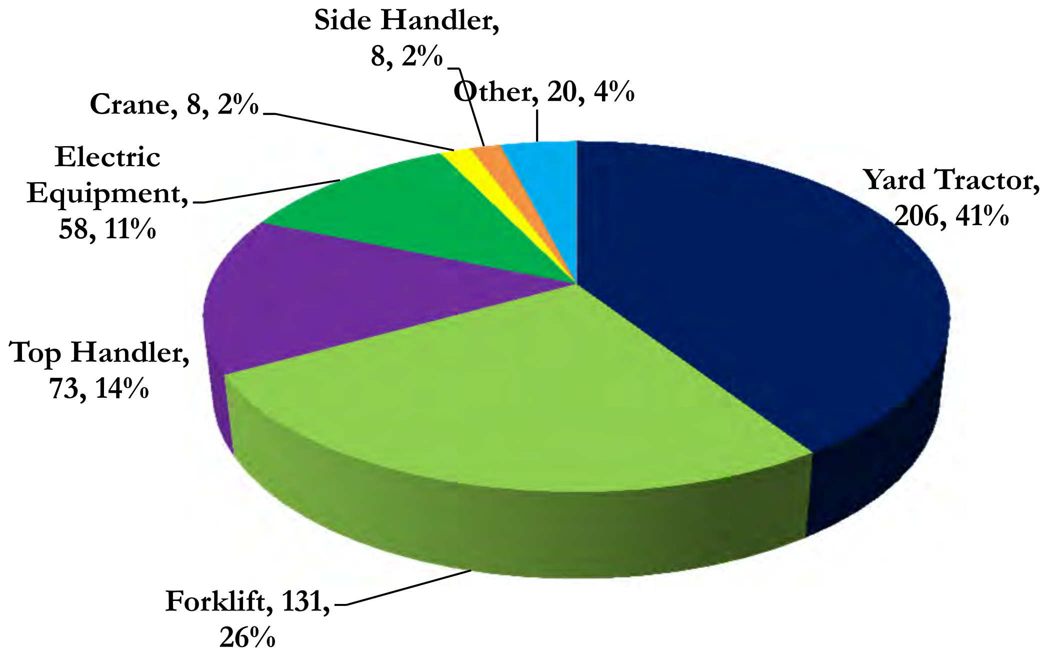


Table 5.8 summarizes by terminal, the equipment count, engine power, model year and estimated annual operating hours for equipment inventoried at the Port of Seattle

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**Table 5.8: Port of Seattle 2011 CHE Characteristics by Terminal**

| Equipment | Engine Type | Count | Power (horsepower) Min | Max | Avg | Model Year Min | Max | Avg | Annual Hours Min | Max | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PSS010** | | | | | | | | | | | |
| Car Loader | Diesel | 1 | 150 | 150 | 150 | 2001 | 2001 | 2001 | 365 | 365 | 365 |
| Forklift | Diesel | 10 | 200 | 200 | 200 | 1961 | 1992 | 1975 | 20 | 259 | 87 |
| Generator | Diesel | 3 | 210 | 364 | 287 | 2001 | 2003 | 2002 | 28 | 102 | 58 |
| Forklift | Electric | 2 | na | na | na | 1975 | 1978 | 1977 | 24 | 25 | 25 |
| Car Loader | Gasoline | 1 | 150 | 150 | 150 | 1989 | 1989 | 1989 | 121 | 121 | 121 |
| Forklift | Gasoline | 5 | 100 | 100 | 100 | 1988 | 1993 | 1990 | 5 | 222 | 147 |
| Generator | Gasoline | 2 | 5 | 20 | 13 | 2005 | 2005 | 2005 | 5 | 5 | 5 |
| Car Loader | Propane | 5 | 150 | 150 | 150 | 1981 | 1989 | 1984 | 14 | 30 | 23 |
| Forklift | Propane | 7 | 100 | 100 | 100 | 1976 | 1994 | 1988 | 35 | 340 | 108 |
| **Total** | | **36** | | | | | | | | | |
| **PSS020** | | | | | | | | | | | |
| Crane | Diesel | 8 | 130 | 130 | 130 | 1992 | 1998 | 1997 | 60 | 720 | 484 |
| Forklift | Diesel | 3 | 85 | 150 | 107 | 1991 | 1995 | 1992 | 20 | 60 | 47 |
| Forklift | Electric | 5 | na | na | na | na | na | na | 240 | 324 | 274 |
| Pallet Jacks | Electric | 22 | na | na | na | na | na | na | 480 | 610 | 539 |
| Forklift | Propane | 22 | 85 | 85 | 85 | 1987 | 2005 | 1997 | 480 | 610 | 510 |
| **Total** | | **60** | | | | | | | | | |
| **PSS030** | | | | | | | | | | | |
| Forklift | Diesel | 16 | 120 | 335 | 223 | 1993 | 2008 | 2002 | na | na | na |
| Reach Stacker | Diesel | 2 | 330 | 350 | 340 | 2002 | 2008 | 2005 | na | na | na |
| Yard Tractor | Diesel | 3 | 225 | 235 | 228 | 1974 | 1999 | 1991 | na | na | na |
| **Total** | | **21** | | | | | | | | | |
| **PSS040** | | | | | | | | | | | |
| Forklift | Diesel | 1 | 100 | 100 | 100 | 1995 | 1995 | 1995 | 1,000 | 1,000 | 1,000 |

### Table 5.8: Port of Seattle 2011 CHE Characteristics by Terminal (cont'd)

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| **PSS050** | | | | | | | | | | | |
| Forklift | Diesel | 16 | 85 | 200 | 127 | 1982 | 2006 | 2002 | na | na | na |
| RTG crane | Diesel | 6 | 620 | 947 | 838 | 1995 | 2005 | 2002 | na | na | na |
| Side Handler | Diesel | 5 | 200 | 205 | 204 | 2001 | 2006 | 2004 | 882 | 1,826 | 1,459 |
| Top Handler | Diesel | 31 | 335 | 335 | 335 | 2003 | 2007 | 2006 | 1,282 | 3,190 | 2,182 |
| Yard Tractor | Diesel | 65 | 173 | 173 | 173 | 2005 | 2008 | 2006 | 0 | 3,998 | 2,116 |
| Container Crane | Electric | 10 | na | na | na | na | na | na | na | na | na |
| **Total** | | **133** | | | | | | | | | |
| **PSS060** | | | | | | | | | | | |
| Forklift | Diesel | 3 | 85 | 190 | 120 | 2004 | 2005 | 2004 | na | na | na |
| Side Handler | Diesel | 2 | 200 | 200 | 200 | 2001 | 2001 | 2001 | 824 | 1,095 | 960 |
| Top Handler | Diesel | 11 | 250 | 335 | 278 | 1996 | 2005 | 2000 | 371 | 2,343 | 1,065 |
| Yard Tractor | Diesel | 25 | 173 | 174 | 174 | 2002 | 2005 | 2003 | 0 | 1,537 | 793 |
| Container Crane | Electric | 6 | na | na | na | na | na | na | na | na | na |
| **Total** | | **47** | | | | | | | | | |
| **PSS070** | | | | | | | | | | | |
| Forklift | Diesel | 8 | 100 | 175 | 124 | 1970 | 2005 | 1999 | 120 | 2,063 | 363 |
| Side Handler | Diesel | 1 | 152 | 152 | 152 | 1995 | 1995 | 1995 | 350 | 350 | 350 |
| Top Handler | Diesel | 18 | 250 | 250 | 250 | 1995 | 2005 | 1997 | 1,570 | 3,280 | 2,157 |
| Yard Tractor | Diesel | 30 | 174 | 240 | 188 | 2000 | 2007 | 2003 | 1,270 | 2,473 | 1,955 |
| Container Crane | Electric | 5 | na | na | na | na | na | na | na | na | na |
| Forklift | Propane | 3 | 100 | 100 | 100 | 1966 | 1994 | 1975 | 30 | 190 | 96 |
| **Total** | | **65** | | | | | | | | | |
| **PSS080** | | | | | | | | | | | |
| Forklift | Diesel | 9 | 125 | 215 | 155 | 1978 | 1997 | 1993 | 800 | 800 | 800 |
| Top Handler | Diesel | 13 | 330 | 330 | 330 | 1997 | 2008 | 2004 | 4,300 | 4,300 | 4,300 |
| Yard Tractor | Diesel | 83 | 174 | 210 | 200 | 1996 | 2008 | 2004 | 1,200 | 1,200 | 1,200 |
| Container Crane | Electric | 6 | na | na | na | na | na | na | na | na | na |
| Forklift | Electric | 2 | na | na | na | 1998 | 1998 | 1998 | na | na | na |
| Forklift | Propane | 28 | 85 | 215 | 100 | 1982 | 2006 | 1994 | 800 | 800 | 800 |
| **Total** | | **141** | | | | | | | | | |

### *5.4.5 Port of Tacoma*

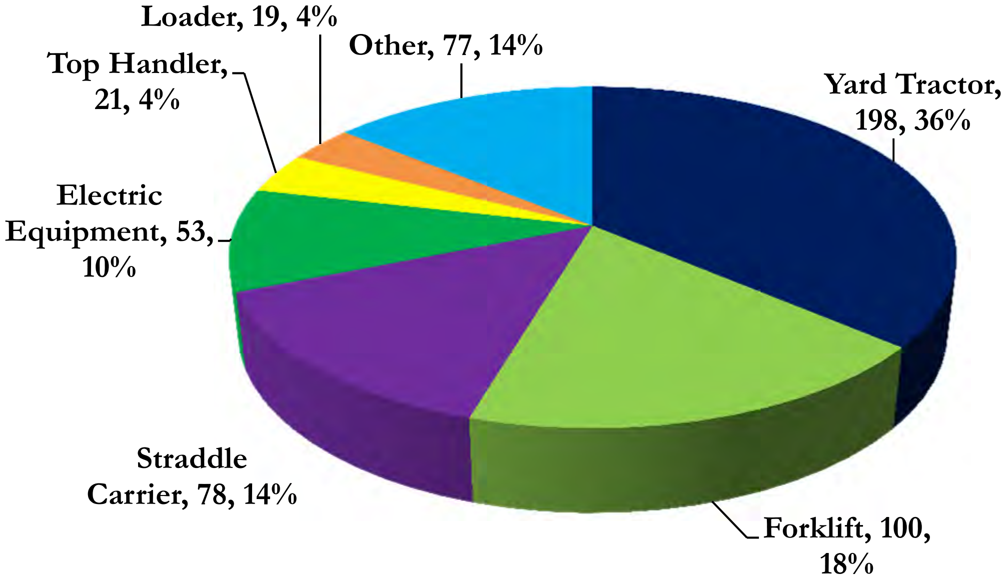
The Port of Tacoma handles Pacific Rim trade along with waterborne commerce between Alaska and the other states. The Port encompasses 2,500 acres of land and handles containerized cargo, automobiles, bulk and general cargo. The Port and tenants own and operate the equipment at the following facilities:

- APM Terminal
- Husky Terminal
- Olympic Container Terminal
- Pierce County Terminal
- Temco Grain Terminal
- Terminal 7
- TOTE Terminal
- WUT Terminal
- Formark Log Yard
- Holbrook Log Yard
- Pacific Rail Services

This section includes the cargo handling equipment used at the on-dock rail and intermodal yards at the Port of Tacoma.

Table 5.9 presents the equipment count by type, engine power, model year and estimated annual operating hours for equipment inventoried at Port of Tacoma. In 2011, there were a total of 546 pieces of equipment at the Port.

**Figure 5.14: Port of Tacoma 2011 CHE Counts and Distribution by Type**



### Table 5.9: Port of Tacoma 2011 CHE Characteristics

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| Backhoe | Diesel | 3 | 65 | 350 | 255 | 1985 | 1998 | 1991 | 65 | 271 | 168 |
| Forklift | Diesel | 57 | 50 | 375 | 156 | 1964 | 2011 | 1993 | 0 | 2,100 | 302 |
| Generator | Diesel | 3 | 50 | 50 | 50 | 1982 | 1997 | 1992 | 0 | 0 | 0 |
| Loader | Diesel | 19 | 51 | 440 | 274 | 1986 | 2011 | 1998 | na | na | na |
| Manlift | Diesel | 3 | 185 | 185 | 185 | 2005 | 2011 | 2007 | 54 | 146 | 100 |
| Reach Stacker | Diesel | 12 | 325 | 375 | 345 | 1998 | 2006 | 2001 | 9 | 2,000 | 831 |
| RTG | Diesel | 6 | 300 | 300 | 300 | 1984 | 2005 | 1993 | 0 | 78 | 35 |
| Side Handler | Diesel | 12 | 210 | 228 | 212 | 1998 | 2006 | 2003 | 171 | 1,244 | 563 |
| Sweeper | Diesel | 3 | 50 | 205 | 143 | 1994 | 2004 | 1999 | 82 | 219 | 154 |
| Top Handler | Diesel | 21 | 250 | 365 | 310 | 1993 | 2010 | 2002 | 11 | 2,243 | 1,168 |
| Truck | Diesel | 9 | 150 | 210 | 180 | 1972 | 2000 | 1991 | 4 | 203 | 57 |
| Yard Tractor | Diesel | 197 | 110 | 245 | 191 | 1987 | 2009 | 2002 | 0 | 2,550 | 817 |
| Compressor | Diesel | 6 | 10 | 10 | 10 | 1977 | 2004 | 1989 | 4 | 61 | 27 |
| Straddle Carrier | Diesel | 78 | 185 | 455 | 358 | 1991 | 2008 | 2003 | 0 | 3,666 | 1,713 |
| Crane | Electric | 45 | na | na | na | 1941 | 2005 | 1985 | 0 | 195 | 5 |
| Forklift | Electric | 3 | na | na | na | 1988 | 1988 | 1988 | 285 | 1,199 | 606 |
| Manlift | Electric | 1 | na | na | na | 2005 | 2005 | 2005 | 0 | 0 | 0 |
| Truck | Electric | 1 | na | na | na | 2001 | 2001 | 2001 | 0 | 0 | 0 |
| Compressor | Electric | 3 | na | na | na | 1974 | 2003 | 1990 | 0 | 0 | 0 |
| Generator | Gasoline | 8 | 50 | 100 | 60 | 1982 | 2011 | 2001 | 0 | 1,264 | 208 |
| Manlift | Gasoline | 4 | 30 | 60 | 50 | 1984 | 2004 | 1992 | 25 | 226 | 89 |
| Truck | Gasoline | 2 | 130 | 130 | 130 | 1999 | 2003 | 2001 | 47 | 1,665 | 856 |
| Yard Tractor | Gasoline | 1 | 110 | 110 | 110 | 2003 | 2003 | 2003 | 65 | 65 | 65 |
| Compressor | Gasoline | 4 | 10 | 10 | 10 | 1996 | 2001 | 1999 | 0 | 0 | 0 |
| Forklift | Propane | 43 | 45 | 155 | 77 | 1971 | 2009 | 1988 | 0 | 981 | 195 |
| Manlift | Propane | 1 | 60 | 60 | 60 | 2000 | 2000 | 2000 | 218 | 218 | 218 |
| Sweeper | Propane | 1 | 50 | 50 | 50 | 1989 | 1989 | 1989 | 8 | 8 | 8 |
| **Total** | | **546** | | | | | | | | | |

Table 5.10 summarizes by terminal, the equipment count, engine power, model year and estimated annual operating hours for equipment inventoried at the Port of Tacoma.

**Table 5.10: Port of Tacoma 2011 CHE Characteristics by Terminal**

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| **PST010** | | | | | | | | | | | |
| Backhoe | Diesel | 2 | 350 | 350 | 350 | 1985 | 1998 | 1992 | 65 | 271 | 168 |
| Forklift | Diesel | 27 | 174 | 375 | 202 | 1977 | 2011 | 1991 | 0 | 497 | 74 |
| Generator | Diesel | 3 | 50 | 50 | 50 | 1982 | 1997 | 1992 | 0 | 0 | 0 |
| Manlift | Diesel | 2 | na | na | na | 2006 | 2011 | 2009 | 54 | 146 | 100 |
| Truck | Diesel | 7 | na | na | na | 1984 | 2000 | 1993 | 4 | 203 | 57 |
| Yard Tractor | Diesel | 2 | 110 | 110 | 110 | 1987 | 1991 | 1989 | 16 | 43 | 30 |
| Compressor | Diesel | 6 | 10 | 10 | 10 | 1977 | 2004 | 1989 | 4 | 61 | 27 |
| Straddle Carrier | Diesel | 28 | 185 | 185 | 185 | 1991 | 2008 | 2001 | 0 | 2,330 | 1,235 |
| Sweeper | Diesel | 2 | 50 | 175 | 113 | 1994 | 2004 | 1999 | 82 | 219 | 151 |
| Crane | Electric | 38 | na | na | na | 1941 | 2001 | 1981 | 0 | 195 | 6 |
| Manlift | Electric | 1 | na | na | na | 2005 | 2005 | 2005 | 0 | 0 | 0 |
| Truck | Electric | 1 | na | na | na | 2001 | 2001 | 2001 | 0 | 0 | 0 |
| Compressor | Electric | 3 | na | na | na | 1974 | 2003 | 1990 | 0 | 0 | 0 |
| Generator | Gasoline | 8 | 50 | 100 | 60 | 1982 | 2011 | 2001 | 0 | 1,264 | 208 |
| Manlift | Gasoline | 3 | 60 | 60 | 60 | 1984 | 2004 | 1994 | 52 | 226 | 110 |
| Truck | Gasoline | 2 | 130 | 130 | 130 | 1999 | 2003 | 2001 | 47 | 1,665 | 856 |
| Yard Tractor | Gasoline | 1 | 110 | 110 | 110 | 2003 | 2003 | 2003 | 65 | 65 | 65 |
| Compressor | Gasoline | 4 | 10 | 10 | 10 | 1996 | 2001 | 1999 | 0 | 0 | 0 |
| Forklift | Propane | 23 | 60 | 80 | 65 | 1971 | 1989 | 1981 | 0 | 109 | 25 |
| Manlift | Propane | 1 | 60 | 60 | 60 | 2000 | 2000 | 2000 | 218 | 218 | 218 |
| Sweeper | Propane | 1 | 50 | 50 | 50 | 1989 | 1989 | 1989 | 8 | 8 | 8 |
| **Total** | | **165** | | | | | | | | | |
| **PST020** | | | | | | | | | | | |
| Forklift | Diesel | 2 | 180 | 180 | 180 | 2005 | 2005 | 2005 | 83 | 276 | 180 |
| Side Handler | Diesel | 8 | 210 | 210 | 210 | 2005 | 2006 | 2005 | 395 | 1,244 | 683 |
| Yard Tractor | Diesel | 4 | 180 | 180 | 180 | 2005 | 2006 | 2005 | 200 | 929 | 602 |
| Straddle Carrier | Diesel | 50 | 455 | 455 | 455 | 2004 | 2005 | 2004 | 660 | 3,666 | 1,982 |
| Crane | Electric | 7 | na | na | na | 2005 | 2005 | 2005 | 0 | 0 | 0 |
| Forklift | Propane | 6 | 155 | 155 | 155 | 2005 | 2005 | 2005 | 89 | 269 | 198 |
| **Total** | | **77** | | | | | | | | | |

## Table 5.10: Port of Tacoma 2011 CHE Characteristics by Terminal (cont'd)

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| **PST030** | | | | | | | | | | | |
| Forklift | Diesel | 5 | 57 | 57 | 57 | 1982 | 2006 | 2000 | 41 | 2,100 | 1,007 |
| RTG Crane | Diesel | 6 | 300 | 300 | 300 | 1984 | 2005 | 1993 | 0 | 78 | 35 |
| Top Handler | Diesel | 11 | 300 | 300 | 300 | 1996 | 2006 | 2003 | 105 | 2,243 | 1,504 |
| Yard Tractor | Diesel | 46 | 173 | 174 | 174 | 2004 | 2006 | 2005 | 85 | 2,017 | 938 |
| **Total** | | **68** | | | | | | | | | |
| **PST040** | | | | | | | | | | | |
| Yard Tractor | Diesel | 33 | 210 | 220 | 211 | 1994 | 2009 | 1999 | 160 | 1,032 | 454 |
| **PST050** | | | | | | | | | | | |
| Forklift | Diesel | 6 | 120 | 185 | 142 | 2003 | 2006 | 2004 | 106 | 232 | 163 |
| Manlift | Diesel | 1 | 185 | 185 | 185 | 2005 | 2005 | 2005 | 99 | 99 | 99 |
| Reach Stacker | Diesel | 4 | 330 | 335 | 334 | 1998 | 2006 | 2004 | 9 | 262 | 113 |
| Sweeper | Diesel | 1 | 205 | 205 | 205 | 2000 | 2000 | 2000 | 162 | 162 | 162 |
| Top Handler | Diesel | 1 | 330 | 330 | 330 | 2002 | 2002 | 2002 | 11 | 11 | 11 |
| Yard Tractor | Diesel | 36 | 174 | 245 | 224 | 2000 | 2005 | 2004 | 0 | 1,246 | 675 |
| Forklift | Propane | 1 | 120 | 120 | 120 | 1988 | 1988 | 1988 | 4 | 4 | 4 |
| **Total** | | **50** | | | | | | | | | |
| **PST055** | | | | | | | | | | | |
| Forklift | Diesel | 9 | 50 | 100 | 73 | 1976 | 2009 | 1991 | 73 | 542 | 316 |
| Top Handler | Diesel | 2 | 330 | 330 | 330 | 2000 | 2007 | 2004 | 407 | 1,271 | 839 |
| Yard Tractor | Diesel | 12 | 174 | 174 | 174 | 2006 | 2006 | 2006 | 1,500 | 1,500 | 1,500 |
| Forklift | Electric | 3 | 55 | 55 | 55 | 1988 | 1988 | 1988 | 285 | 1,199 | 606 |
| Forklift | Propane | 9 | 55 | 55 | 55 | 1988 | 2009 | 1994 | 352 | 981 | 616 |
| **Total** | | **35** | | | | | | | | | |
| **PST060** | | | | | | | | | | | |
| Forklift | Diesel | 2 | 130 | 130 | 130 | 1964 | 1999 | 1982 | 30 | 54 | 42 |
| Reach Stacker | Diesel | 6 | 330 | 375 | 360 | 1998 | 2001 | 1999 | 615 | 1,321 | 921 |
| Side Handler | Diesel | 1 | 228 | 228 | 228 | 1998 | 1998 | 1998 | 171 | 171 | 171 |
| Top Handler | Diesel | 3 | 365 | 365 | 365 | 2005 | 2010 | 2007 | 474 | 1,787 | 1,254 |
| Yard Tractor | Diesel | 53 | 174 | 215 | 184 | 1998 | 2008 | 2001 | 149 | 2,550 | 1,003 |
| **Total** | | **65** | | | | | | | | | |

**Table 5.10: Port of Tacoma 2011 CHE Characteristics by Terminal (cont'd)**

| Equipment | Engine Type | Count | Power (horsepower) | | | Model Year | | | Annual Hours | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Avg | Min | Max | Avg | Min | Max | Avg |
| **PST070** | | | | | | | | | | | |
| Forklift | Diesel | 4 | 70 | 200 | 108 | 1967 | 1998 | 1982 | 53 | 1,501 | 483 |
| Side Handler | Diesel | 3 | 210 | 210 | 210 | 2000 | 2000 | 2000 | 185 | 642 | 374 |
| Top Handler | Diesel | 1 | 300 | 300 | 300 | 1995 | 1995 | 1995 | 60 | 60 | 60 |
| Yard Tractor | Diesel | 3 | 174 | 174 | 174 | 2001 | 2001 | 2001 | 272 | 857 | 567 |
| **Total** | | **11** | | | | | | | | | |
| **PST080** | | | | | | | | | | | |
| Forklift | Propane | 1 | na | na | na | 2002 | 2002 | 2002 | 660 | 660 | 660 |
| **PST100** | | | | | | | | | | | |
| Top Handler | Diesel | 3 | 250 | 335 | 278 | 1993 | 1994 | 1993 | 480 | 1,500 | 820 |
| Yard Tractor | Diesel | 8 | 148 | 160 | 157 | 2003 | 2008 | 2006 | 1,300 | 1,300 | 1,300 |
| Manlift | Gasoline | 1 | 30 | 30 | 30 | 1987 | 1987 | 1987 | 25 | 25 | 25 |
| Forklift | Propane | 1 | 45 | 45 | 45 | 1989 | 1989 | 1989 | 24 | 24 | 24 |
| **Total** | | **13** | | | | | | | | | |
| **PST110** | | | | | | | | | | | |
| Loader | Diesel | 4 | na | na | na | 1986 | 1990 | 1988 | na | na | na |
| Truck | Diesel | 1 | 150 | 150 | 150 | 1972 | 1972 | 1972 | na | na | na |
| Forklift | Propane | 1 | na | na | na | 1989 | 1989 | 1989 | na | na | na |
| **Total** | | **6** | | | | | | | | | |
| **PST120** | | | | | | | | | | | |
| Backhoe | Diesel | 1 | 65 | 65 | 65 | 1991 | 1991 | 1991 | na | na | na |
| Loader | Diesel | 15 | 51 | 440 | 274 | 1987 | 2011 | 2004 | na | na | na |
| Truck | Diesel | 1 | 210 | 210 | 210 | 1995 | 1995 | 1995 | na | na | na |
| **Total** | | **17** | | | | | | | | | |
| **PST130** | | | | | | | | | | | |
| Forklift | Diesel | 2 | 165 | 165 | 165 | 1990 | 1998 | 1994 | 2,000 | 2,000 | 2,000 |
| Reach Stacker | Diesel | 2 | 325 | 325 | 325 | 2001 | 2001 | 2001 | 2,000 | 2,000 | 2,000 |
| Forklift | Propane | 1 | 80 | 80 | 80 | 1997 | 1997 | 1997 | 200 | 200 | 200 |
| **Total** | | **5** | | | | | | | | | |

## 5.5 Emission Reduction Technologies Identified

For cargo handling equipment operated at the Puget Sound ports in 2011, emission control measures include the use of electric equipment, diesel oxidation catalyst retrofits, diesel particulate filter retrofits, and on-road engines in place of non-road engines. Table 5.11 summarizes the count of emission reduction technologies for cargo handling equipment.

**Table 5.11: 2011 CHE Count of Emission Reduction Technologies**

| Port | Electric | Diesel Oxidation Catalyst | Diesel Particulate Filter | On-road Engine |
|---|---:|---:|---:|---:|
| Anacortes | 0 | 0 | 0 | 0 |
| Everett | 6 | 0 | 0 | 0 |
| Olympia | 0 | 1 | 0 | 5 |
| Seattle | 58 | 164 | 5 | 67 |
| Tacoma | 53 | 117 | 48 | 42 |
| BNSF SIG Rail Yard | 0 | 0 | 0 | 0 |
| **Total** | **117** | **282** | **53** | **114** |

## 5.6 Emissions Estimating Methodology

Cargo handling equipment emissions were estimated using the NONROAD2008a emissions estimating model[32], a tool developed by EPA to estimate fleet emissions of non-road equipment. As an overview, the NONROAD model estimates the emissions for a population of equipment as being:

Equation 5.1

$$\boldsymbol{E_{MY} = EF \times HP \times LF \times A \times CF}$$

Where:

$E_{MY}$ = emissions from a given model year of equipment
EF = emission factor
HP = maximum rated horsepower, hp
LF = load factor, dimensionless
A = activity, hours of use per year
CF = control factor for emission reduction technologies or on-road engines. Control factors represent the remaining emissions after a control has been added to an engine. For example, if a control technology provides a 20% reduction in emissions the CF = 0.8.

In 2011, all diesel equipment used ULSD fuel with 15 ppm sulfur content. Equipment with zero hours of operational use in 2011, due to new purchases or other reasons, as well as electric equipment, are included in the inventory count, but do not have emissions associated with them.

The marine terminal equipment identified by survey was categorized into the most closely corresponding NONROAD equipment type, shown in Table 5.12, which presents equipment types by Source Classification Code (SCC), load factor, and NONROAD category common name. The categorizations from the previous inventory were replicated for the purpose of this inventory as much as possible. For the 2011 PSEI, the same load factors are used as those found in the 2005 PSEI, with the exception of the load factor for diesel yard tractors. The 0.59 EPANONROAD load factor is based on a 1997 study[33] prepared for the EPA. For the 2011 PSEI, a load factor of 0.39 is used for diesel yard tractors based on a 2008 study[34] prepared for the Port of Los Angeles and Port of Long Beach by Starcrest Consulting Group., LLC. The 0.39 load factor is based on the analysis of eighty five yard tractors that work at port terminals and is reflective of typical operating parameters of yard tractors in a port environment. Load data was downloaded from the vehicles' computers and more than a year's worth of data was collected for the 85 yard tractors. The California Air Resources Board, as part of the Port's Emissions Inventory Technical Working Group, reviewed and approved the 0.39 load factor for yard tractors in cargo handling equipment emissions inventory development in California. This load factor is the most current and appropriate load factor representing diesel yard tractors in port operations.

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[32] EPA, *http://www.epa.gov/otaq/nonrdmdl.htm.*
[33] EPA, *Evaluation of Power Systems Research (PSR) Nonroad Population Data Base*, 1997.
[34] Ports of Los Angeles and Long Beach, San Pedro Bay Ports Yard Tractor Load Factor Study, December 2008.

**Table 5.12: NONROAD Engine Source Categories**

| Equipment Type | SCC | Load Factor | NONROAD Category |
|---|---|---|---|
| Backhoe | 2270002066 | 0.21 | Tractors/Loaders/Backhoe |
| Car Loader, diesel | 2265003050 | 0.43 | Other Industrial Equipment |
| Car Loader, gasoline | 2270003040 | 0.54 | Other Industrial Equipment |
| Car Loader, propane | 2265003040 | 0.54 | Other Industrial Equipment |
| Compressor, diesel | 2270006015 | 0.43 | Air compressor |
| Compressor, gasoline | 2265006015 | 0.56 | Air compressor |
| Crane | 2270002045 | 0.43 | Crane |
| Forklift, diesel | 2270003020 | 0.59 | Forklift |
| Forklift, gasoline | 2265003020 | 0.3 | Forklift |
| Forklift, propane | 2267003020 | 0.30 | Forklift |
| Generator, diesel | 2270006005 | 0.43 | Generator |
| Generator, gasoline | 2265006005 | 0.68 | Generator |
| Light Tower | 2270002027 | 0.43 | Signal Boards/Light plant |
| Loader, diesel | 2270002060 | 0.59 | Rubber Tired Loader |
| Skid Steer Loader, diesel | 2270002072 | 0.21 | Skid Steer Loader |
| Skid Steer Loader, propane | 2267002072 | 0.58 | Skid Steer Loader |
| Manlift, diesel | 2270003010 | 0.21 | Aerial Lifts |
| Manlift, gasoline | 2265003010 | 0.46 | Aerial Lifts |
| Manlift, propane | 2267003010 | 0.46 | Aerial Lifts |
| Reach Stacker | 2270003020 | 0.59 | Forklift |
| Side Handler | 2270003020 | 0.59 | Forklift |
| Top Handler | 2270003020 | 0.59 | Forklift |
| RTG Crane | 2270003050 | 0.21 | Other Material Handling Equipment |
| Straddle Carrier | 2270003050 | 0.21 | Other Material Handling Equipment |
| Sweeper, diesel | 2270003030 | 0.43 | Sweeper / scrubber |
| Sweeper, propane | 2267003030 | 0.71 | Sweeper / scrubber |
| Truck, diesel | 2270002051 | 0.59 | Non-road Truck |
| Truck, propane | 2265002051 | 0.70 | Non-road Truck |
| Welder | 2265006025 | 0.21 | Welder |
| Yard Tractor | 2270003070 | 0.39 | Terminal Tractor |

Since the NONROAD model outputs emissions for a limited set of pollutants, post-processing is required to develop emission estimates for VOC, $PM_{2.5}$, DPM, $CH_4$, and $N_2O$. VOC correction factors were applied based on fuel type.[35] For purposes of this analysis, total particulate matter is set equal to $PM_{10}$, and $PM_{2.5}$ is calculated as 97% of $PM_{10}$ for diesel fueled equipment, and 100% of $PM_{10}$ for other equipment.[36] Diesel particulate matter includes the emissions from those vehicles fueled by diesel fuel only, as opposed to those fueled by propane or gasoline. Post-processing factors were applied to NONROAD emissions for emission control measures and are discussed in section 5.6.1. The $N_2O$ and $CH_4$ factors are discussed in section 5.6.2 below.

### *5.6.1 Emission Control Factors*

Control factors are applied to equipment that have an emissions control device or technology applied such that there is a reduction in emissions. Control factors represent the remaining emissions after a control has been added to an engine. For example, if a control technology provides a 40% reduction in emissions the CF = 0.6.

Table 5.13 summarizes the emission control factors used in the emissions calculations for the various emission control measures implemented at the major Puget Sound ports. The DOC and DPF control factors are based on EPA verified technology. Since factors may vary by technology and manufacturer, for the purpose of this analysis, the factors are the same as those found in EPA's Diesel Emissions Quantifier[37]. The Diesel Emissions Quantifier is an interactive tool that can help evaluate clean diesel projects and options by estimating emission reductions. Table 5.14 presents the control factors for the use of on-road engines in non-road applications.

**Table 5.13: Emission Control Factors for CHE Retrofits**

| Technology or Fuel | $NO_x$ | VOC | CO | $SO_2$ | PM |
|---|---|---|---|---|---|
| Diesel oxidation catalyst | 1.00 | 0.50 | 0.60 | 1.00 | 0.80 |
| Diesel particulate filter | 1.00 | 0.10 | 0.10 | 1.00 | 0.15 |

---

[35] EPA 2005.

[36] EPA 2003.

[37] EPA, *www.epa.gov/cleandiesel/quantifier/*

### Table 5.14: Emission Control Factors for On-road Engines

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $CO_2$ |
|---|---|---|---|---|---|---|
| 1999 | 0.58 | 0.34 | 1.00 | 1.00 | 0.26 | 1.00 |
| 2000 | 0.58 | 0.34 | 1.00 | 1.00 | 0.25 | 1.00 |
| 2005 | 0.40 | 0.34 | 1.00 | 1.00 | 0.57 | 1.00 |
| 2006 (up to 175 hp) | 0.42 | 0.34 | 1.00 | 1.00 | 0.45 | 1.00 |
| 2006 (176-300) | 0.42 | 0.34 | 1.00 | 1.00 | 0.067 | 1.00 |
| 2007-2011 | 0.42 | 0.34 | 1.00 | 1.00 | 0.067 | 1.00 |

Emission control factors were also applied to cargo handling equipment with on-road engines, such as yard tractors and trucks with on-road engines that operate at the terminals. The on-road engine control factors vary by model year and horsepower.

*5.6.2 Greenhouse Gas Emission Factors*

The NONROAD model outputs $CO_2$ emissions, but does not estimate $CH_4$ and $N_2O$, thus alternative processing calculations were used to derive values for these greenhouse gases. The emission factors for $CH_4$ and $N_2O$ are based on fuel consumption (and are the same for gasoline and diesel fuel and in the absence of literature, assumed to be the same for propane)[38]:

- 0.0800 g $N_2O$/kilogram (kg) fuel consumed
- 0.1800 g $CH_4$/kilogram (kg) fuel consumed

However, fuel consumption data was not collected. In order to convert operational hours to volume of fuel consumed, a method was used to activate the fuel economy feature of the NONROAD model by locating it in the by-model-year-output and re-running the data file.[39] Fuel consumption was then transformed into pounds. Diesel is assumed to be 7.0 pounds per gallon and gasoline (along with propane) was assumed to be 6.2 pounds per gallon.[40]

Equation 5.2

$$\boldsymbol{Emissions, tpy} = \frac{\left(\boldsymbol{FUELCONS, gal/yr \times fuel\ density, \frac{lb}{gal} \times 0.454\frac{kg}{lb} \times EF, \frac{g}{kg}}\right)}{\left(\boldsymbol{453.6\frac{g}{lb} \times 2,000\frac{lb}{ton}}\right)}$$

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[38] EPA 2006

[39] This variable is called FUELCONS and the units are gallons per year (estimated by NONROAD). NONROAD estimates fuel consumption empirically and no actual fuel consumption data was used.

[40] Adapted from NREL 2006.

## 5.7 Emission Estimates

The cargo-handling emissions are summarized by port in Table 5.15.

**Table 5.15: 2011 CHE Total Emissions, tpy**

| Port | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Anacortes | 0.4 | 0.1 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 22 |
| Everett | 23.4 | 2.4 | 24.6 | 0.0 | 2.3 | 2.2 | 2.3 | 1,375 |
| Olympia | 42.9 | 2.7 | 17.4 | 0.0 | 2.6 | 2.5 | 2.6 | 4,408 |
| Seattle | 305.5 | 18.4 | 158.0 | 0.3 | 16.7 | 16.2 | 16.7 | 34,561 |
| Tacoma | 205.9 | 12.6 | 88.0 | 0.2 | 10.0 | 9.7 | 10.0 | 22,486 |
| **Port Total** | **578.2** | **36.2** | **289.3** | **0.6** | **31.6** | **30.7** | **31.6** | **62,852** |
| BNSF SIG Rail Yard | 8.5 | 0.6 | 3.8 | 0.0 | 0.5 | 0.5 | 0.5 | 762 |
| Argo Rail Yard | 7.5 | 0.6 | 3.4 | 0.0 | 0.5 | 0.5 | 0.5 | 661 |
| **PSEI Total** | **594.2** | **37.4** | **296.5** | **0.6** | **32.6** | **31.7** | **32.6** | **64,275** |

### *5.7.1 Port of Anacortes Emission Estimates*

Table 5.16 presents Port of Anacortes' cargo handling equipment emission estimates.

**Table 5.16: Port of Anacortes 2011 CHE Emissions by Terminal, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSA010 | 0.4 | 0.1 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 22 |

### *5.7.2 Port of Everett Emission Estimates*

Table 5.17 presents Port of Everett's cargo handling equipment emission estimates by terminal.

**Table 5.17: Port of Everett 2011 CHE Emissions, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSE010 | 5.3 | 0.9 | 16.2 | 0.0 | 0.3 | 0.3 | 0.3 | 329 |
| PSE020 | 13.5 | 1.0 | 6.4 | 0.0 | 1.6 | 1.5 | 1.6 | 810 |
| PSE030 | 2.3 | 0.2 | 0.9 | 0.0 | 0.2 | 0.2 | 0.2 | 103 |
| PSE040 | 2.3 | 0.2 | 1.1 | 0.0 | 0.2 | 0.2 | 0.2 | 133 |
| **Total** | **23.4** | **2.4** | **24.6** | **0.0** | **2.3** | **2.2** | **2.3** | **1,375** |

### *5.7.3 Port of Olympia Emission Estimates*

Table 5.18 presents Port of Olympia's cargo handling equipment emission estimates by terminal.

**Table 5.18: Port of Olympia 2011 CHE Emissions, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSO010 | 3.7 | 0.2 | 1.8 | 0.0 | 0.2 | 0.2 | 0.2 | 311 |
| PSO020 | 16.9 | 0.9 | 6.2 | 0.0 | 1.2 | 1.1 | 1.2 | 1,768 |
| PSO030 | 22.4 | 1.5 | 9.4 | 0.0 | 1.3 | 1.2 | 1.3 | 2,329 |
| **Total** | **43.0** | **2.6** | **17.4** | **0.0** | **2.7** | **2.5** | **2.7** | **4,408** |

### *5.7.4 Port of Seattle Emission Estimates*

Table 5.19 presents Port of Seattle's cargo handling equipment emission estimates by terminal.

**Table 5.19: Port of Seattle 2011 CHE Emissions, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSS010 | 2.6 | 0.4 | 7.1 | 0.0 | 0.1 | 0.1 | 0.1 | 144 |
| PSS020 | 4.1 | 0.7 | 14.7 | 0.0 | 0.1 | 0.1 | 0.1 | 335 |
| PSS030 | 10.3 | 0.8 | 4.0 | 0.0 | 0.7 | 0.7 | 0.7 | 1,039 |
| PSS040 | 0.4 | 0.1 | 0.4 | 0.0 | 0.1 | 0.1 | 0.1 | 39 |
| PSS050 | 118.4 | 6.4 | 36.1 | 0.1 | 6.0 | 5.8 | 6.0 | 14,239 |
| PSS060 | 19.1 | 0.8 | 4.3 | 0.0 | 0.9 | 0.8 | 0.9 | 2,068 |
| PSS070 | 60.1 | 2.9 | 20.3 | 0.1 | 3.6 | 3.5 | 3.6 | 5,741 |
| PSS080 | 90.5 | 6.4 | 71.1 | 0.1 | 5.3 | 5.1 | 5.2 | 10,957 |
| **Total** | **305.5** | **18.4** | **158.0** | **0.3** | **16.7** | **16.2** | **16.7** | **34,561** |

### *5.7.5 Port of Tacoma Emission Estimates*

Table 5.20 presents Port of Tacoma's cargo handling equipment emission estimates by terminal.

**Table 5.20: Port of Tacoma 2011 CHE Emissions, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PST010 | 23.6 | 1.5 | 18.5 | 0.0 | 0.9 | 0.9 | 0.9 | 2,211 |
| PST020 | 64.2 | 5.0 | 32.6 | 0.1 | 3.3 | 3.2 | 3.3 | 7,201 |
| PST030 | 32.3 | 1.9 | 7.3 | 0.0 | 1.6 | 1.5 | 1.6 | 3,633 |
| PST040 | 7.4 | 0.5 | 2.0 | 0.0 | 0.4 | 0.3 | 0.4 | 759 |
| PST050 | 8.2 | 0.3 | 2.3 | 0.0 | 0.4 | 0.4 | 0.4 | 1,403 |
| PST055 | 4.5 | 0.5 | 6.4 | 0.0 | 0.3 | 0.3 | 0.3 | 698 |
| PST060 | 29.8 | 1.0 | 5.5 | 0.0 | 1.0 | 1.0 | 1.0 | 3,346 |
| PST070 | 3.0 | 0.2 | 0.8 | 0.0 | 0.2 | 0.2 | 0.2 | 260 |
| PST080 | 0.2 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 12 |
| PST100 | 6.6 | 0.3 | 2.2 | 0.0 | 0.3 | 0.3 | 0.3 | 626 |
| PST110 | 5.7 | 0.5 | 2.9 | 0.0 | 0.5 | 0.5 | 0.5 | 348 |
| PST120 | 13.3 | 0.7 | 4.9 | 0.0 | 0.9 | 0.9 | 0.9 | 1,292 |
| PST130 | 7.2 | 0.3 | 1.7 | 0.0 | 0.3 | 0.2 | 0.3 | 699 |
| **Total** | **205.9** | **12.6** | **88.0** | **0.2** | **10.0** | **9.7** | **10.0** | **22,486** |

## 5.8 Emission Comparison, 2011 vs 2005

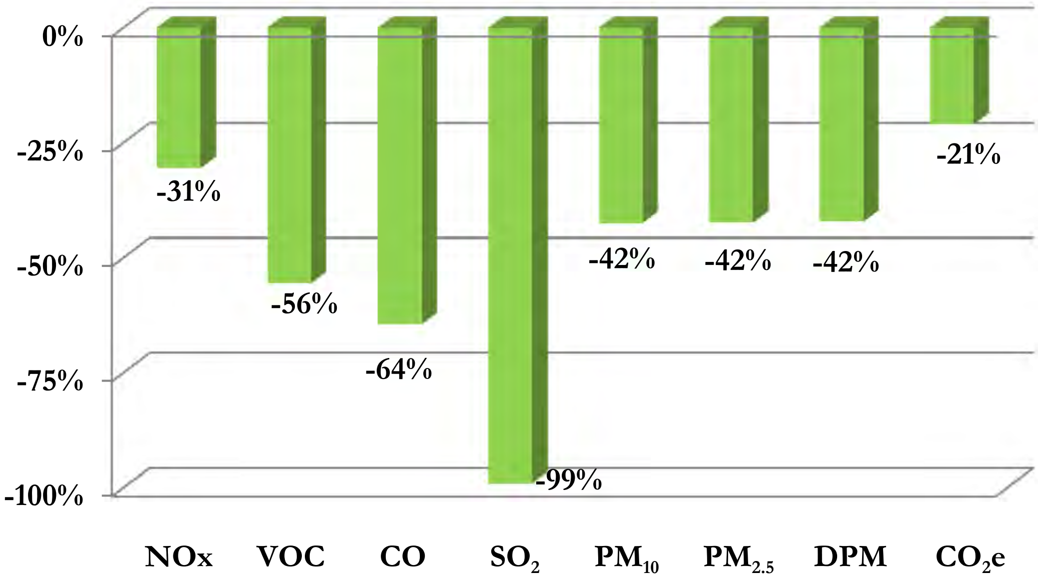
The emission calculation methodology stayed the same in 2011, except for an update to the yard tractor load factor. 2005 yard tractor emissions were re-calculated using the fraction of the new load factor divided by the old load factor so that the emissions would be comparable to the 2011 emissions. Table 5.21 presents the total net change in emissions for cargo handling equipment in 2011 as compared to 2005 at the Puget Sound ports. Port-related emissions decreased for all pollutants by 21% to 99% in 2011 when compared to 2005 due to reduced equipment activity, implementation of emission reduction strategies (retrofits), fleet turnover and use of ULSD in 2011.

**Table 5.21: 2011 vs 2005 Port Total CHE Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 578.2 | 36.2 | 289.3 | 0.6 | 31.6 | 30.7 | 31.6 | 62,852 |
| 2005 | 832.1 | 81.4 | 813.7 | 61.8 | 54.9 | 53.2 | 54.6 | 79,581 |
| **Change, tpy** | **-253.9** | **-45.2** | **-524.4** | **-61.2** | **-23.3** | **-22.5** | **-23.0** | **-16,729** |
| **Change, %** | **-31%** | **-56%** | **-64%** | **-99%** | **-42%** | **-42%** | **-42%** | **-21%** |

Figure 5.15 compares the 2011 vs 2005 percent change in emissions for cargo handling equipment operations.

**Figure 5.15: 2011 vs 2005 Total CHE Emissions Change**



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

Table 5.22 presents a 45% decrease in activity in 2011 as compared to 2005. The equipment count increased by 4% in 2011.

**Table 5.22: 2011 vs 2005 Total CHE Activity and Count Comparison**

| Year | Activity (hp hr) | CHE Count |
|---|---|---|
| 2011 | 100,280,404 | 1,196 |
| 2005 | 181,101,761 | 1,145 |
| **Change, %** | **-45%** | **4%** |

# SECTION 6 LOCOMOTIVES

Section 6 provides an overview of the railroad locomotives operating in and around the Puget Sound study area. A description of the methodology used to estimate emissions is provided in this section, as well as the emission estimates for this source category.

## 6.1 Source Description

Locomotive operations are typically described in terms of two different types, line-haul and switching. Line-haul refers to the movement of cargo over long distances (e.g., cross-country) and occurs within a port, marine terminal, or rail yard as the initiation or termination of a line-haul trip, as cargo is either picked up for transport to destinations across the country or is dropped off for shipment overseas. Switching refers to the assembling and disassembling of trains, sorting of the railcars of inbound cargo trains into contiguous "fragments" for subsequent delivery to terminals, and the short distance hauling of rail cargo within a port or rail yard.

Locomotives used for line-haul operations are typically large, powerful diesel engines of 3,000 hp or more, while switch engines are smaller, typically having 1,200 to 3,000 hp. Older line-haul locomotives have often been converted to switch duty as newer line-haul locomotives with more horsepower become available. Rather than having finely adjustable throttle controls such as those used in automobiles and most powered equipment, locomotive throttles are operated in a series of discrete power steps called notches, which range from positions one through eight (with one being the lowest power setting and eight providing full power), plus an idle setting. Many locomotives also have a setting called dynamic braking, which is a means of slowing the locomotive using the drive system.

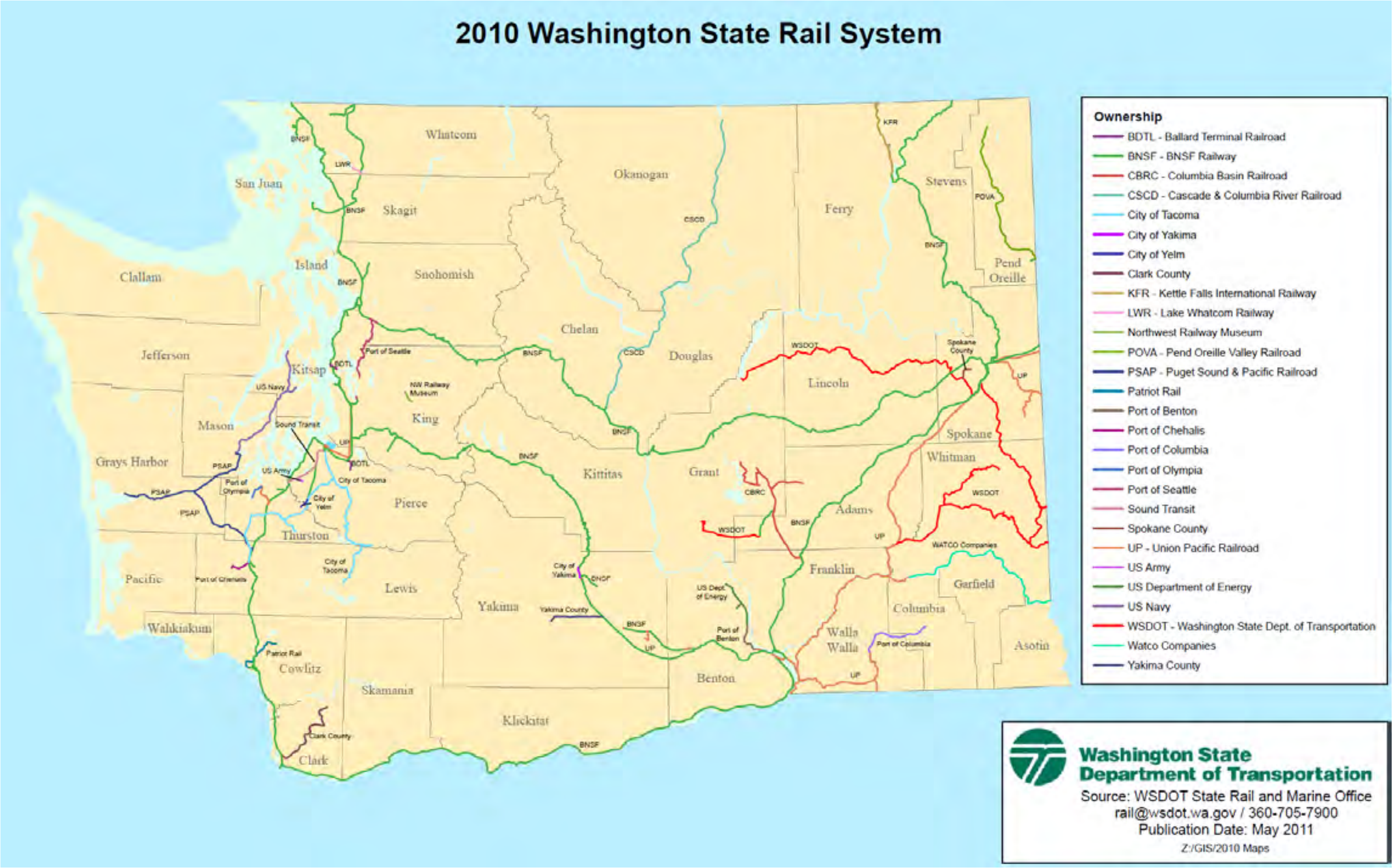
Emissions from locomotives transporting cargo to or from the ports on the rail lines outside the ports have also been estimated along with estimates of the emissions from line-haul locomotive activity in the region. These estimates have been coordinated to avoid double counting of emissions.

## 6.2 Geographical Delineation

The geographical parameters of the emissions inventory summarized in this section for railroad-related sources include primarily the Port of Olympia, the Port of Seattle, the Port of Tacoma, and the Port of Everett, as well as several off-port rail yards: the Fife Yard in Tacoma (a storage and switching yard), the BNSF SIG Yard, the Argo Yard in Seattle, and rail operations associated with the Port of Everett. The BNSF SIG and Argo yards are intermodal yards (where cargo is transferred from or to railcars prior to or following international shipment). The off-terminal rail emissions were estimated for rail lines typically utilized in moving port-related cargo within the Puget Sound airshed. The covered areas and activities are consistent with the areas and activities addressed in the 2005 emissions inventory.

Two railroad companies provide line-haul rail services to the Puget Sound area ports, Union Pacific and BNSF.[41] These railroads are known as Class 1 railroads, a designation based on annual revenues.[42] The Class 1 railroads, of which there are currently seven in the U.S., are the largest of the railroads in terms of revenue. In addition, switching and terminal rail service is provided at the Port of Tacoma and the Port of Olympia by Tacoma Rail, a division of Tacoma Public Utilities. Figure 6.1 illustrates an overall view of the rail system within the State of Washington.[43] This map presents the Union Pacific's tracks running north and south from Seattle through Tacoma and south toward Portland, Oregon, whereas BNSF's tracks run north to Canada and east from Seattle and Tacoma to points in eastern Washington and further east.

**Figure 6.1: State of Washington Rail System Map**



Source: WSDOT State Rail and Marine Office
rail@wsdot.wa.gov / 360-705-7900
Publication Date: May 2011
Z:/GIS/2010 Maps

Figure 6.2 provides detail on the rail system within and near the Port of Seattle, while Figure 6.3 presents the Port of Tacoma's rail lines, and Figure 6.4 presents the Port of Olympia's rail lines. These graphics were provided by the respective ports.

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[41] American Association of Railroads, *http://www.aar.org*.

[42] Railroad classes are based on annual revenues and the Class 1 railroads are the largest of the railroads in terms of revenue. There are currently seven Class 1 railroads in the U.S.

[43] Union Pacific, *Maps of the Union Pacific*, 2006.

**Figure 6.2: Port of Seattle Harbor Rail System Map**

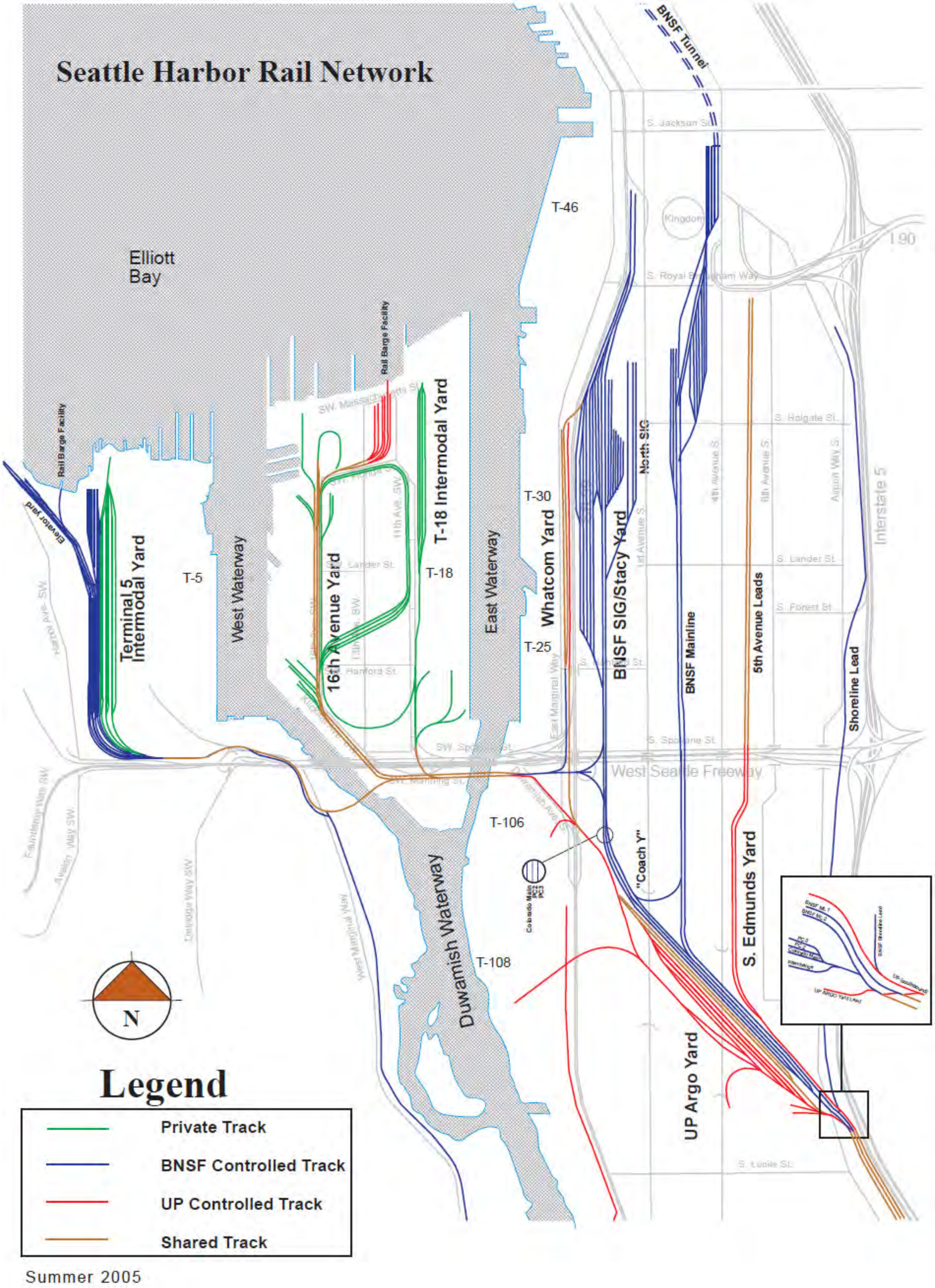
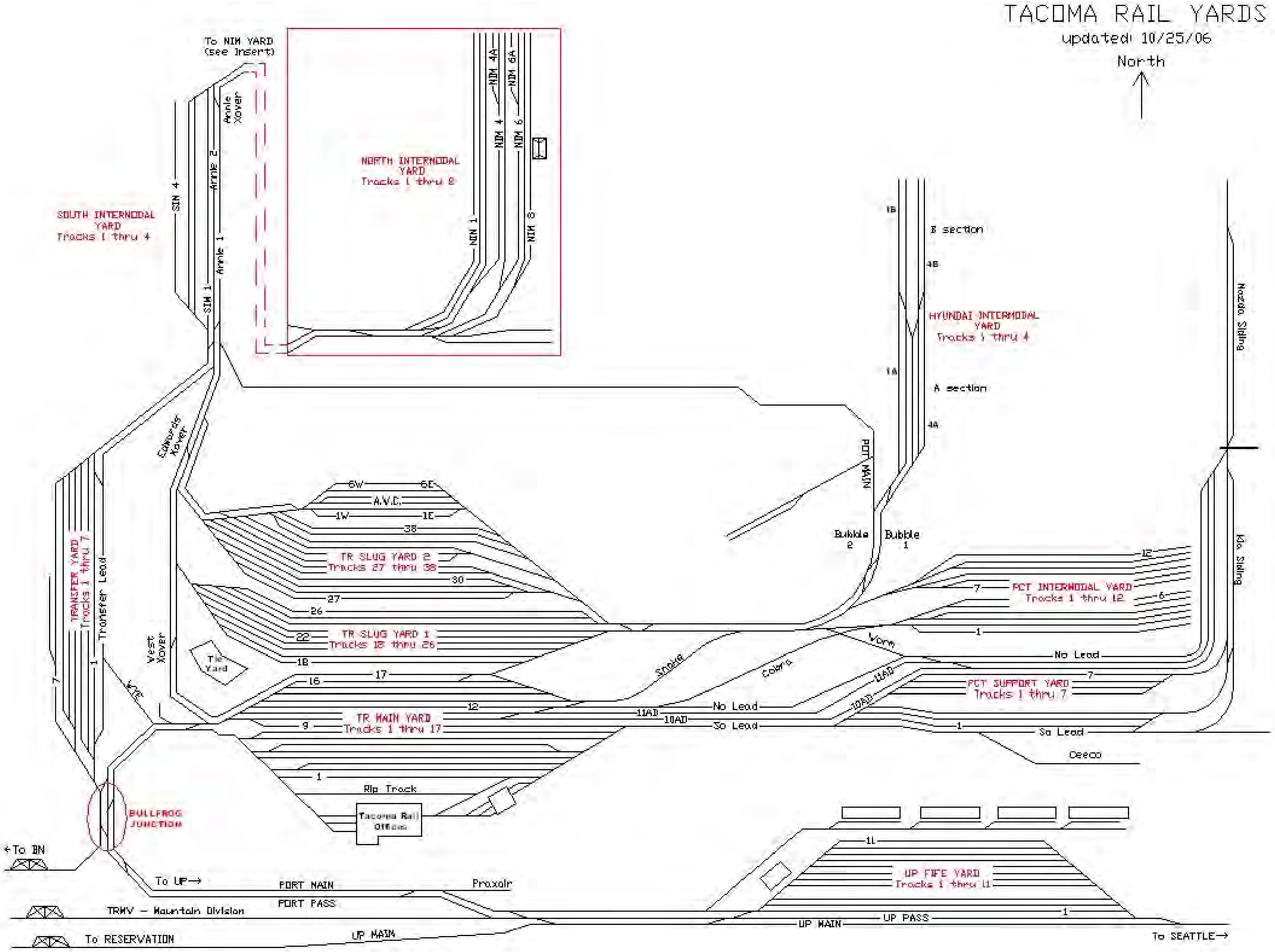
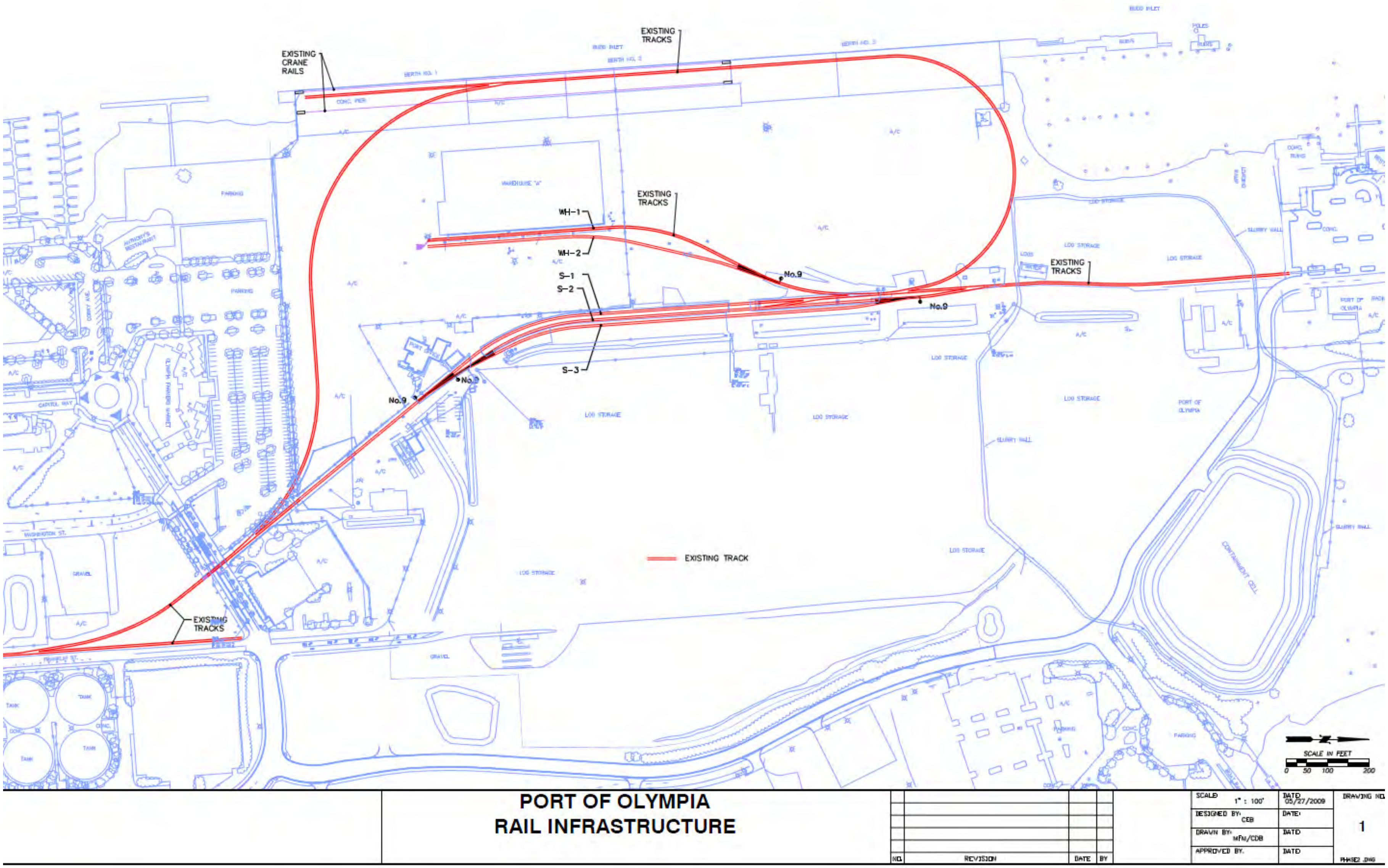


Figure 6.3: Port of Tacoma Rail System Map



## Figure 6.4: Port of Olympia Rail System Map



## 6.3 Data and Information Acquisition

The rail locomotive source category is comprised of two components: on-terminal activity and port-related off-port activity. The data collection processes for each are summarized below.

### *6.3.1 On-Terminal*

Information used to develop the emission estimates presented in this report was provided by the Class 1 railroads (BNSF and Union Pacific), the local railroad Tacoma Rail, grain terminal operators Louis Dreyfus and TEMCO, the Ports of Seattle and Tacoma, individuals with expertise in the local rail transportation system, and from the 2005 emissions inventory report and underlying data.

BNSF, a member of the Air Forum's Steering Committee, provided data on the number and percentage of line-haul locomotives that made calls to the Puget Sound ports in 2011. Union Pacific provided fuel consumption information for switching and line-haul activities by county within the State of Washington. The companies providing this information have designated it confidential material, so while the emission estimates are presented in the following subsections, the data underlying those estimates has not been released, and thus no supporting data is provided in the appendices. Tacoma Rail provided detailed information on their switching locomotives (e.g., make, model, year, and emissions tier level), fuel consumption information, and operational information such as the number of hours of operation during 2011.

The Ports of Seattle and Tacoma provided information on the number of trains and the amount of cargo entering and leaving their terminals in 2011, which was invaluable in estimating emissions from line-haul locomotives operating within and near the Ports. While specific data related to the Port of Everett were not available, emissions related to their rail operations are reflected in the area totals for Snohomish County, based on data provided by BNSF.

### *6.3.2 Regional Port-Related*

The regional port-related locomotive emission estimates have been based primarily on information provided by the railroads (BNSF and Union Pacific), the Port of Seattle, and the Port of Tacoma, in the form of fuel consumption information (by county), cargo movement information, and train arrival/departure records.

## 6.4 Operational Profiles

The railroad system is a nationwide enterprise consisting of national and local railroad companies that together serve to move a diverse variety of cargo over long distances. The activity and emission estimates presented in this section represent emissions from locomotive activities that take place within and between ports and the near-dock rail yards that handle port-related cargos. Port terminals that offer on-dock rail service, such as the Port of Seattle's Terminal 5, and most of Port of Tacoma's container terminals, are able to load cargo directly onto railcars, which are either taken from the terminal to destinations across the country or are moved to a rail yard for consolidation into a cross-country train. Near-dock services, such as offered at the Port of Tacoma's APM Terminal where on-port intermodal yards require the cargo to be moved a short distance off-terminal by truck before it is loaded onto railcars. In addition to these on-port rail-related activities, cargo can be moved between the ports and nearby rail yards, which may also handle cargo that is not related to port activity. The cargo movements are bi-directional, with cargo being brought into the ports by rail for export on ships as well as being transported from the ports to points around the country.

### *6.4.1 Line-Haul Locomotives*

The Puget Sound area is served by two major Class 1 railway companies, BNSF and Union Pacific. The Port of Tacoma offers on-dock or near-dock rail service at four locations, the North Intermodal Rail Yard, the South Intermodal Rail Yard, the Hyundai Intermodal Rail Yard, and the Pierce County Intermodal Rail Yard. In each of these yards, containers are loaded onto railcars for rail shipment across the country or are unloaded from railcars for placement onto ships for export. As mentioned, the Port of Seattle's Terminal 5 offers on-dock rail service; the other Port of Seattle terminals move rail-bound cargo to one of the near-port rail yards operated by BNSF or Union Pacific. Cargo moving through the Port of Everett is transported by BNSF.

The number of locomotives that are assigned to pull each train varies with the weight of the train, and estimates were made of the number of locomotives used to pull each train. Typically, eastbound trains carry more cargo (imported goods) than westbound trains and the terrain is more challenging in the eastbound direction. Accordingly, the assumption was made, consistent with the 2005 emissions inventory calculations, that eastbound trains average four locomotives while westbound trains average three locomotives.

When a westbound train enters a port terminal or an off-port rail yard, the locomotives can be detached from the railcars and can depart in a fairly short period of time, leaving the railcars to be emptied of their cargo and to wait for reloading. Eastbound trains can be loaded and made ready before the locomotives that will pull them arrive. An eastbound train, however, must go through lengthy safety checks attached to the locomotives before it can depart. Because the line-haul railroads were not able to provide records of actual on-site times, estimates of one hour per train for westbound trains and two hours per train for eastbound trains were used in the emission calculations, consistent with the 2005 emissions inventory calculations.

The locomotives in line-haul service vary in their horsepower ratings. Data provided by BNSF on the horsepower and engine tier level of locomotives calling in 2011 indicates that the BNSF locomotives averaged approximately 4,300 hp. This is similar to 2005, when an average of 4,000 horsepower was used in developing emission estimates. Based on the information provided by BNSF, the value of 4,300 hp was chosen to represent the average rated power of locomotives servicing the Puget Sound ports in 2011.

Locomotives seldom operate at their peak horsepower ratings, so the average in-use horsepower of the locomotives was estimated to calculate horsepower-hours of activity, consistent with the emission factors, which are expressed in units of mass of emissions per horsepower-hour. The same approach was taken for the 2005 emissions inventory, in which information from a Regulatory Support Document (RSD) published by EPA in support of rulemaking[44]was used to estimate an average locomotive load factor of 28% in normal operation. This is less than ideal because it represents the average of normal overall line-haul locomotive activity, which includes cross-country travel as well as activity at each end of a trip, so the percentages of time in each notch setting may not accurately represent rail yard or port terminal activity. However, the RSD averages have been used in lieu of locally specific information or information specifically representing the activities at each end of a line-haul trip.

This average load factor was combined with the assumptions of average locomotive horsepower, number of locomotives per train, and annual number of arriving and departing trains to develop estimates of on-port locomotive horsepower-hours, as described in Section 6.6, Emissions Estimating Methodology.

### *6.4.2 Switching Locomotives*

In addition to moving line-haul trains into and out of the port areas, BNSF and Union Pacific operate switching locomotives in their rail yards. Switching activities are also performed by Tacoma Rail within and near the Port of Tacoma and the Port of Olympia. Switching consists of short distance moves of railcars and the assembly of trains in a pre-ordered sequence. A train is organized according to where the cargo in each railcar is destined and the nature of the cargo. There are safety requirements concerning whether certain materials can be in adjacent cars and by how many cars they must be separated, so railcars and groups of railcars are moved around a switching yard to appropriately organize the train as a whole.

The information provided by BNSF, Union Pacific, and Tacoma Rail was the annual amount of fuel used in their rail yard locomotives. Union Pacific cited an EPA estimate of 82,490 gallons of fuel per locomotive per year[45], basing their overall estimate on the number of locomotives and their normal operating schedule. BNSF, for the 2005 emissions inventory, used an estimate of 50,000 gallons of fuel per yard locomotive, citing an internal yard equipment fuel study. The fuel usage was factored for 2011 based on the activity growth Union Pacific reported, for the period between 2011 and 2005, using the assumption that the two railroad companies experienced a similar change in activity levels. Tacoma Rail provided an estimate of the amount of fuel consumed annually by their locomotives.

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[44] EPA, *Locomotive Emission Standards Regulatory Support Document*, revised, April 1998.

[45] EPA, *Procedures for Emission Inventory Preparation – Vol. IV: Mobile Source*, December 1992.

These annual fuel use amounts were converted to horsepower-hour estimates using a fuel consumption factor published by EPA, 15.2 horsepower-hours per gallon of fuel.[46] The horsepower-hour estimates were combined with emission factors expressed in terms of mass of emissions per horsepower-hour to estimate switching emissions.

## 6.5 Emission Reduction Technologies Identified

Tacoma Rail has implemented several emission reduction techniques over the past few years.[47] Twelve of fourteen of their switching locomotives are equipped with an idle reduction technology that reduces idling while keeping the locomotive's battery charged and its engine ready to run when needed. One of their switchers is a genset locomotive, powered by three small, Tier 3 diesel engine/electrical generator sets (gensets) that provide only the level of power needed for a particular job, saving fuel and lowering emissions. Two of Tacoma Rail's switchers have been repowered to meet Tier 2 emission levels, and all of their locomotives operate on ULSD fuel and have been equipped with improved fuel injectors that lower smoke and particulate emissions.

Three switching locomotives at the Port of Tacoma's TEMCO Grain Terminal and two at the Port of Seattle's Louis Dreyfus Grain Terminal were equipped with automatic engine startup-shutdown (AESS) devices to reduce idling and all of their locomotives operate on ULSD fuel. BNSF has also reported installing AESS devices.

In 2008, the federal Inland Marine and Locomotive Rule came into effect. It requires that when locomotive engines meeting certain criteria are overhauled, an EPA certified kit that reduces PM emissions by at least 25% must be installed. In the absence of a program to track the installation of these kits, these emission reductions are not included in the 2011 inventory.

## 6.6 Emissions Estimating Methodology

Emission estimation methodologies for the port and airshed port-related locomotive activities are summarized below.

### *6.6.1 Port Emissions – On-Terminal and Adjacent Rail Yards*

A combination of emission estimation methods was used due to the differences in type and level of detail of the data that was obtained. For line-haul locomotives, horsepower-hour estimates were developed from the operating parameters described above, and emission factors expressed in terms of mass of emissions per horsepower-hour were used to estimate emissions. The following terms are multiplied in the basic calculation:

- Number of trains per year
- Average number of locomotives per train
- Average locomotive rated horsepower
- Average in-use locomotive load factor
- Average on-port time per train

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[46] EPA, *Emission Factors for Locomotives*, April 2009.

[47] Tacoma Public Utilities, *http://www.mytpu.org/tacomarail/environment/eco-friendly-equipment.htm*

The equation can be summarized as:

Equation 6.1

$$\boldsymbol{Activity} = \frac{\boldsymbol{trains}}{\boldsymbol{year}} \times \frac{\boldsymbol{locomotives}}{\boldsymbol{train}} \times \boldsymbol{HP} \times \boldsymbol{LF} \times \boldsymbol{hours}$$

Where:

Activity = activity, hp-hr/year

The result is multiplied by a pollutant-specific emission factor in grams per horsepower-hour (and divided by 453.59 g/lb x 2,000 pounds [lbs]/ton) to calculate tons per year.

Equation 6.2

$$\boldsymbol{Emissions, tpy} = \frac{\frac{\boldsymbol{hp\ hr}}{\boldsymbol{year}} \times \frac{\boldsymbol{g}}{\boldsymbol{hp\ hr}}}{\left(\boldsymbol{453.59}\frac{\boldsymbol{g}}{\boldsymbol{lb}} \times \boldsymbol{2,000}\frac{\boldsymbol{lbs}}{\boldsymbol{ton}}\right)}$$

The switching locomotive emissions were developed from fuel consumption figures converted to horsepower-hour estimates using a fuel consumption factor published by EPA.[48] Emission factors specific to switching locomotives expressed in terms of mass of emissions per horsepower-hour were used with equation 6.2 above. For line-haul locomotives, information provided by one of the Class 1 railroads on their 2011 fleet mix was used to develop composite emission factors. The fleet mix information consisted of the number of locomotives of each emissions tier level that called at the Puget Sound ports during 2011. Composite emission factors were developed using the percentage of each tier level and tier-specific emission factors reported by EPA in the document cited above.

$SO_2$ emission factors were developed using a mass balance approach assuming all sulfur in the fuel is emitted as $SO_2$. The standard non-road diesel used by line-haul locomotives was estimated to contain 234 ppm sulfur[49] and the ULSD used by Tacoma Rail was estimated to contain 15 ppm sulfur.

### *6.6.2 Airshed Emissions*

Airshed port-related locomotive emissions have been estimated using the 2011 fleet mix information and the tier-specific EPA emission factors noted above to develop fleet composite emission factors. Emission estimates for port-related locomotive activity were developed using fuel consumption estimates converted to horsepower-hours and the fleet composite emission factors. The railroads provided information on the tons of freight moved over specific portions of their trackage to and from the ports.

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[48] EPA, *Emission Factors for Locomotives*, April 2009.

[49] EPA, *Final Regulatory Analysis: Control of Emissions from Nonroad Diesel Engines*, May 2004.

This freight information was paired with route-specific fuel consumption estimates developed for the 2005 emissions inventory, combined with average train weight information provided by the Port of Tacoma and adjusted for improvements in the railroads' operating fuel efficiency.[50] In sequence, estimates were made of the number of gross tons (weight of all cargo, rail equipment, and locomotives combined), gross ton-miles (freight transported a certain distance), gallons of fuel (from route-specific fuel consumption estimates), and horsepower-hours (using the EPA' recommended line-haul fuel consumption factor).[51] These estimates were made for each of the major port rail centers (the Port of Tacoma and the Port of Seattle) traveling inbound and outbound on both the northern and southern routes, on a county-specific basis. Emissions were estimated using the horsepower-hour estimates and the same emission factors used for on-terminal line-haul emissions.

## 6.7 Emission Estimates

Port-related locomotive emission estimates for port and airshed zones are presented below.

### *6.7.1 Port Emissions – On-Terminal and Adjacent Rail Yards*

The 2011 maritime-related port emissions for the Puget Sound area are summarized in this section. Table 6.1 presents the estimates of 2011 criteria pollutant and greenhouse gas emissions from switching emissions on and near the Ports of Seattle, Tacoma, and Olympia, and switching activity in Snohomish County associated with the Port of Everett. Table 6.2 presents the estimates of 2011 criteria pollutant and greenhouse gas emissions from line-haul locomotives as they move maritime-related cargo within the Ports of Seattle and Tacoma, and within the near-port/adjacent rail yards in King and Pierce Counties that handle port cargo. Emissions from line-haul locomotive operations associated with the Ports of Olympia and Everett have not been included in these tables because sufficient information was not collected to differentiate maritime-related from other locomotive activities in the region.

**Table 6.1: 2011 Switching Locomotive Port Emissions,tpy**

| Port | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Port of Seattle | 162.4 | 13.0 | 23.6 | 1.3 | 5.8 | 5.3 | 5.8 | 8,619 |
| Port of Tacoma | 230.1 | 17.2 | 31.3 | 1.2 | 7.5 | 6.9 | 7.5 | 11,422 |
| Snohomish Co. | 62.1 | 5.0 | 9.0 | 0.5 | 2.2 | 2.0 | 2.2 | 3,298 |
| Port of Olympia | 3.7 | 0.2 | 0.4 | 0.002 | 0.1 | 0.1 | 0.1 | 164 |
| **Total** | **458.3** | **35.4** | **64.3** | **3.0** | **15.6** | **14.3** | **15.6** | **23,503** |

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[50] Fuel efficiency improvements estimated using information contained in the R-1 reports filed by the Class 1 railroads with the Surface Transportation Board each year.

[51] EPA, *Emission Factors for Locomotives*, April 2009.

**Table 6.2: 2011 Line-Haul Locomotive Port Emissions, tpy**

| Port | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Port of Seattle | 127.8 | 7.1 | 21.6 | 1.2 | 4.7 | 4.3 | 4.7 | 8,209 |
| Port of Tacoma | 133.7 | 7.4 | 22.5 | 1.2 | 4.9 | 4.5 | 4.9 | 8,593 |
| **Total** | **261.5** | **14.5** | **44.1** | **2.4** | **9.6** | **8.8** | **9.6** | **16,802** |

### *6.7.2 Airshed Emissions Exclusive of Port Emissions*

The 2011 maritime related line-haul locomotive airshed emissions for are summarized in this section. Table 6.3 presents estimated 2011 line-haul locomotive emissions associated with the Ports of Seattle and Tacoma, while Table 6.4 presents these emissions on a county-specific basis, based on the routes taken by the trains into and out of the inventory domain.

**Table 6.3: 2011 Line-Haul Locomotive Airshed Emissions Exclusive of Port Emissions, tpy**

| Port | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Port of Seattle | 388.5 | 21.4 | 65.4 | 3.6 | 14.3 | 13.2 | 14.3 | 24,969 |
| Port of Tacoma | 155.8 | 8.6 | 26.3 | 1.5 | 5.7 | 5.1 | 5.7 | 10,015 |
| **Total** | **544.3** | **30.0** | **91.7** | **5.1** | **20.0** | **18.3** | **20.0** | **34,984** |

**Table 6.4: 2011 Line-Haul Locomotive Airshed Emissions by County Exclusive of Port Emissions, tpy**

| County | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Clallam | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Island | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Jefferson | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| King | 190.9 | 10.5 | 32.2 | 1.8 | 7.0 | 6.4 | 7.0 | 12,269 |
| Kitsap | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Mason | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Pierce | 57.1 | 3.1 | 9.6 | 0.5 | 2.1 | 1.9 | 2.1 | 3,670 |
| San Juan | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Skagit | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 |
| Snohomish | 204.1 | 11.3 | 34.4 | 1.9 | 7.5 | 6.9 | 7.5 | 13,114 |
| Thurston | 92.2 | 5.1 | 15.5 | 0.9 | 3.4 | 3.1 | 3.4 | 5,931 |
| Whatcom | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Total** | **544.3** | **30.0** | **91.7** | **5.1** | **20.0** | **18.3** | **20.0** | **34,984** |

## 6.8 Emission Comparison, 2011 vs 2005

Activity and emissions 2011 vs 2005 comparisons for locomotives are presented in this section. Table 6.5 presents a comparison of 2011 vs 2005 activity levels for locomotives in terms of annual horsepower-hours and fuel consumption in gallons.

**Table 6.5: 2011 vs 2005 Locomotive Activity and Fuel Consumption Comparison**

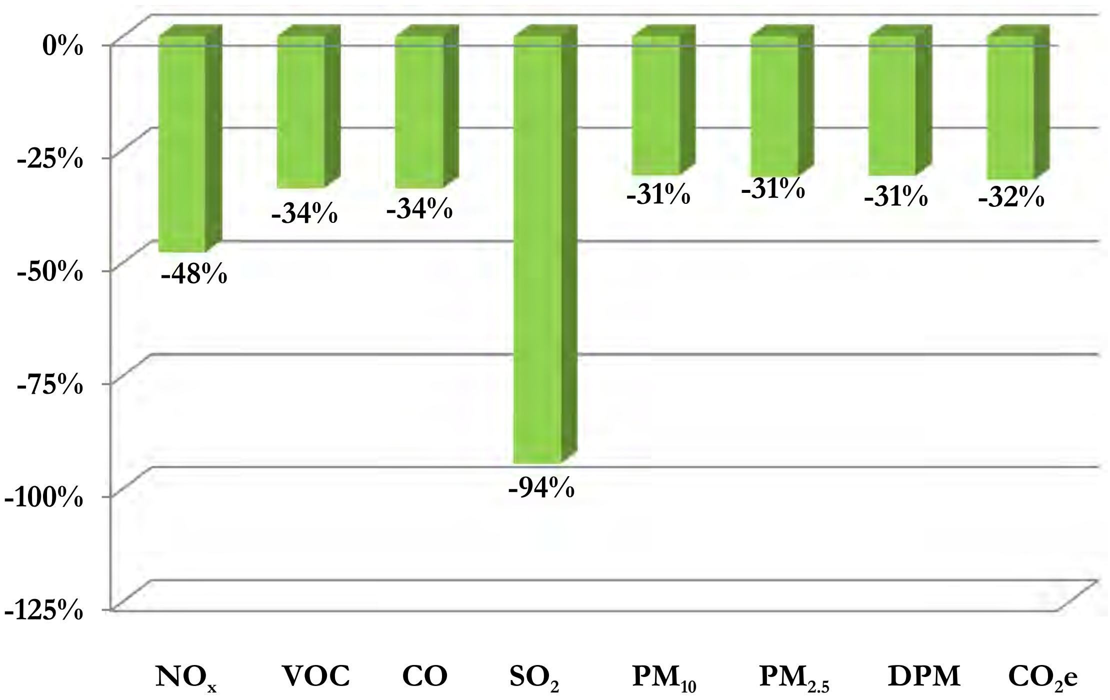
| Year | Activity hp-hr | Fuel Usage gallons |
|---|---|---|
| 2011 | 123,623,669 | 6,429,803 |
| 2005 | 178,616,613 | 9,013,083 |
| **Change, %** | **-31%** | **-29%** |

The 2011 vs 2005 comparison for locomotive airshed emissions is summarized in Table 6.6. Airshed emissions in 2011 were lower than 2005 emissions by 24% to 94%, primarily due to lower overall throughput, newer, lower emitting switching and line-haul locomotives, and improved fuel efficiency of locomotive operations. The large decrease in $SO_2$ emissions was a result of the continued lowering of the sulfur content of diesel fuels.

**Table 6.6: 2011 vs 2005 Locomotive Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 1,264 | 80 | 200 | 11 | 45 | 41 | 45 | 75,289 |
| 2005 | 2,416 | 120 | 302 | 188 | 65 | 60 | 65 | 110,431 |
| **Change, tpy** | **-1,152** | **-40** | **-101** | **-177** | **-20** | **-19** | **-20** | **-35,142** |
| **Change, %** | **-48%** | **-34%** | **-34%** | **-94%** | **-31%** | **-31%** | **-31%** | **-32%** |

Figure 6.5: 2011 vs 2005 Airshed Locomotive Emissions Change



*Note: 2005 emissions were recalculated using the same methods used for the 2011 emission estimates. The above figure accounts for these changes so that a direct comparison can be made between 2011 vs 2005.*

# SECTION 7 HEAVY-DUTY VEHICLES

Section 7 provides an overview of the emissions from on-road heavy-duty diesel-fueled vehicles that transport port-related cargo, and from buses that shuttle cruise passengers at the cruise terminals to and from the airport and area hotels. A description of the methodology used to estimate emissions is provided in this section, as well as the emissions estimates for this source category.

## 7.1 Source Description

Heavy-duty trucks are used extensively to move cargo to and from the terminals that serve as the bridge between land and sea transportation. Trucks deliver cargo to and from local and national destinations, and they also transfer cargo between terminals and off-port railcar loading facilities, an activity known as drayage. In the course of their daily operations, trucks are driven onto and through the terminals, where they deliver and/or pick up cargo. They are also driven on the public roads near ports and throughout the region. Marine cargo transportation by truck is a complex system because generally the vehicles and associated equipment, such as chassis and refrigeration gensets, are not under the direct control of the ports, their terminals, or most of the shippers who use the terminals. The vehicles are largely a combination of fleet vehicles owned by transport companies and independently owned and operated trucks.

This section details the estimated emissions from truck activities within the ports' terminals as they drop off or pick up cargo. The on-terminal cargo truck activities covered include idling at pre-gate queue lines prior to entering terminal gates, idling within the terminals, and travel within the terminals. Estimates of idling emissions from the heavy-duty diesel-fueled buses that transport cruise line passengers to and from the airport and hotels in the area are also included in the on-terminal HDV emissions, for the time that they idle during unloading and loading of cruise passengers. Emissions from trucks transporting cargo on the public roadways to or from the ports have been estimated by the Puget Sound Regional Council (PSRC) and the WDOE's Air Quality Section, and are presented in this section as representing regional port-related emissions.

The EPA on-road vehicle emission modeling software, MOBILE6.2 model, has been used to estimate emissions from these on-road mobile sources. Virtually all of these vehicles are diesel-fueled because of the economic and operational characteristics of diesel engines as opposed to engines fueled by gasoline or other fuels.

The most common configuration of HDVs in maritime freight service is the articulated tractor-trailer (truck and semi-trailer) having five axles, including the trailer axles. A common type of trailer in the study area is the container trailer or chassis, which is built to accommodate standard-sized cargo containers. Additional trailer types include tankers, boxes, and flatbeds. A tractor traveling without an attached trailer is called a "bobtail," while a tractor pulling an unloaded container chassis is known simply as a "chassis." These vehicles are all classified as HDVs regardless of their actual weight because the classification is based on gross vehicle weight rating (GVWR), which is a rating of the vehicle's total potential weight including its carrying capacity. Because MOBILE6.2 does not distinguish between loaded and unloaded trucks, the emission estimates include all of the different configurations combined. This may result in a slight overestimation of emissions from the unloaded HDVs, but the inertial effects of the additional weight of a loaded truck would probably limit the overestimate to periods of acceleration.

Port-related, on-road trucking, known as drayage, is a unique subset of the overall truck activity that occurs in the Puget Sound region. Unlike long-haul trucking, which transports goods out of the region to remote destinations, drayage trucks drive short distances to deliver containers to and from terminals, intermodal yards, and local distribution centers. In Seattle, the intermodal yards are approximately one to two miles from the terminals, while the local distribution centers, concentrated in the Green River Valley area, are approximately 10 to 35 miles from the terminals; additionally, many port-related truck trips stay within the Duwamish Industrial Area. In Tacoma, the majority of containers bound to and from intermodal yards are transported via on-dock rail, while containers bound for the local distribution centers travel approximately 15 to 25 miles to the Green River Valley.

As examples of typical HDVs, Figure 7.1 presents a container truck transporting a container in a terminal, and Figure 7.2 presents a bobtail. The equipment images shown in the figures are not photographs of actual pieces of equipment used at the surveyed terminals but are for illustrative purposes only.

**Figure 7.1: Truck with Container**

**Figure 7.2: Bobtail Truck**

## 7.2 Geographical Delineation

The heavy-duty vehicle emissions were estimated separately for on-terminal and on-road port-related activity. The geographical extent of the on-terminal portion consists of the marine terminals footprint and associated facilities of the following Puget Sound area ports:

- Port of Anacortes
- Port of Everett
- Port of Olympia
- Port of Seattle
- Port of Tacoma
- BNSF SIG Rail Yard
- Argo Rail Yard

The locations of the ports and their respective marine terminals are illustrated in the figures in Section 1.

The geographical extent of the on-road port-related emissions is shown in Figure 7.3,[52] and is comprised of the public roadways and rail corridors within the Puget Sound airshed, including Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom Counties. This includes trips between the terminals and the first pickup/drop or the boundary of the study area for cargo being transported in or out of the study area directly to or from the terminals, as well as trips between terminals and nearby rail yards. Queuing time for entering terminals is included in the on-terminal portion.

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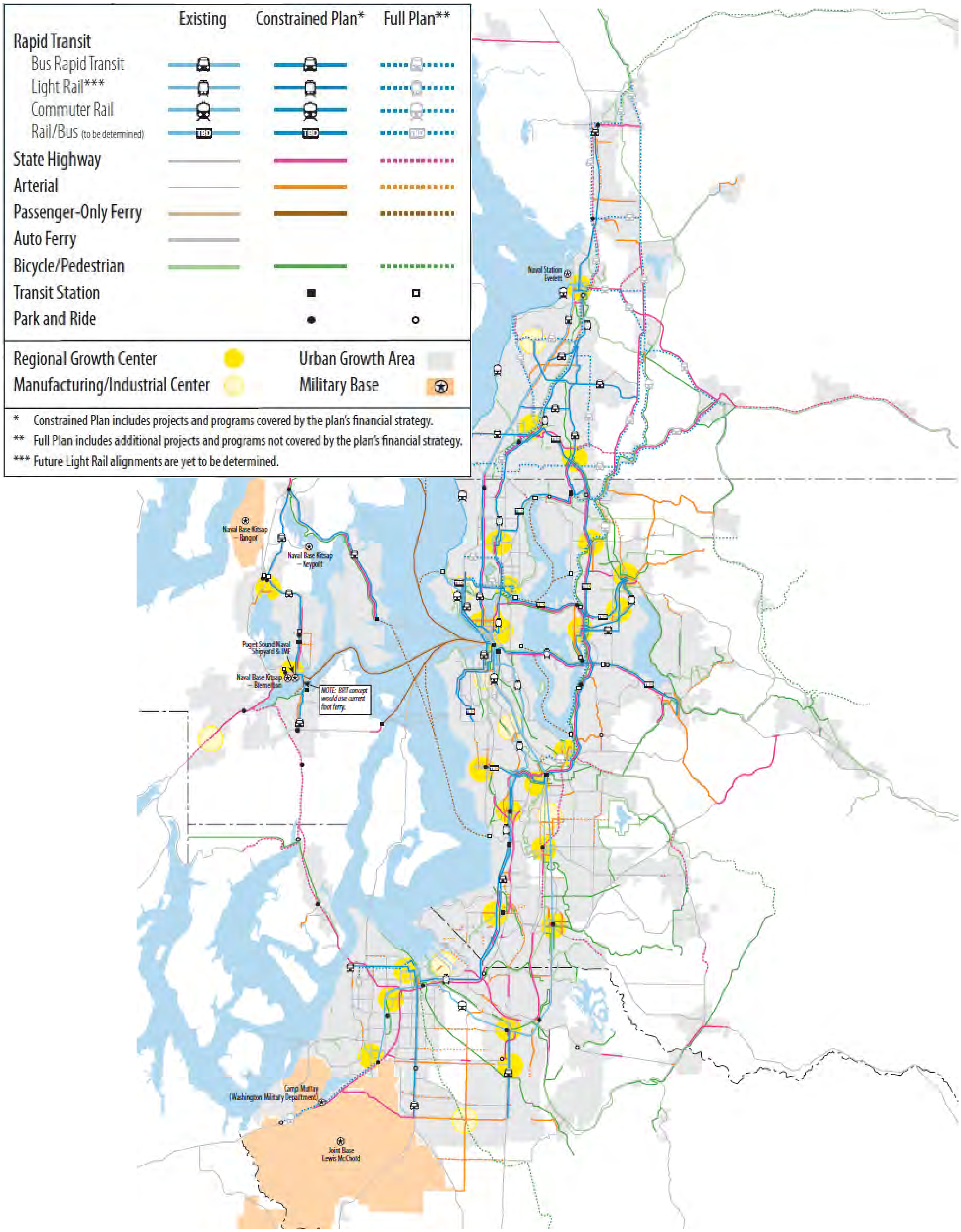
[52] Puget Sound Regional Council, *Destination 2040 Plan*, 2010.

Figure 7.3: Puget Sound Metropolitan Transportation System Map



* Constrained Plan includes projects and programs covered by the plan's financial strategy.

** Full Plan includes additional projects and programs not covered by the plan's financial strategy.

*** Future Light Rail alignments are yet to be determined.

NOTE: BRT concept would use current foot ferry.

## 7.3 Data and Information Acquisition

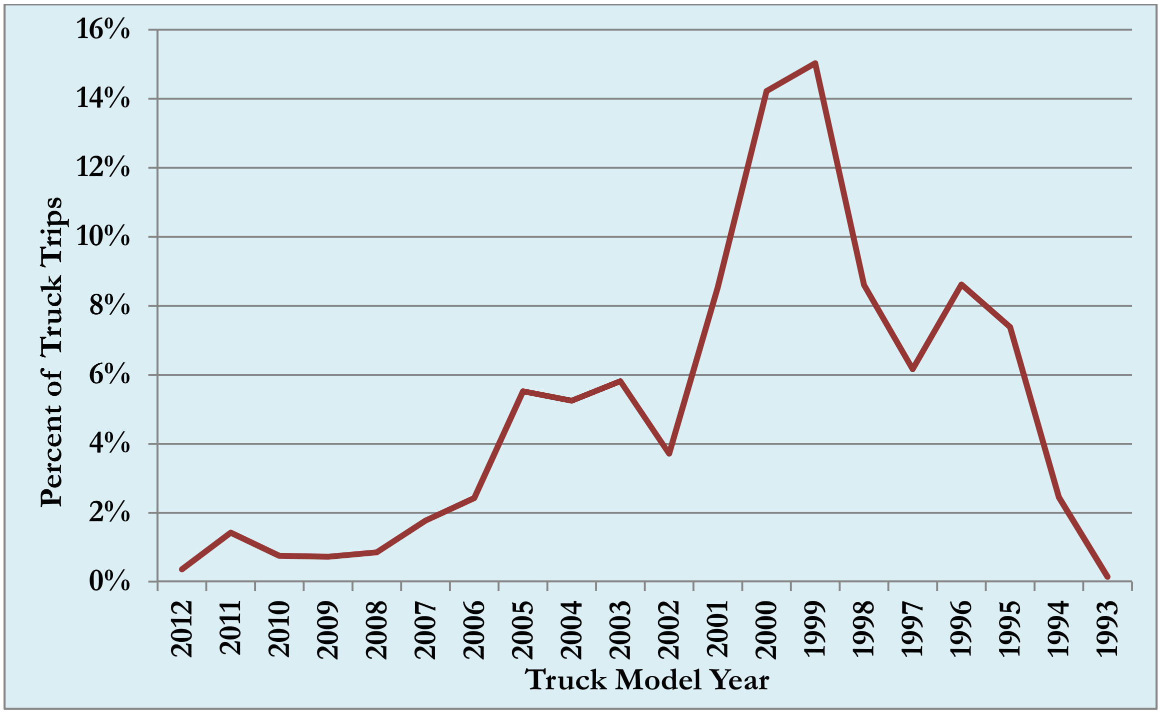
The HDV source category is comprised of two activity components: on-terminal and port-related on-road activity. The data collection methods for each are summarized below.

### *7.3.1 On-Terminal*

Terminal operators provided information on truck throughput for calendar year 2011, the terminal gate schedule (when trucks are admitted for drop-off or pick-up of cargo), the average speed and distance driven on-terminal, and the average amounts of time trucks wait at the entrance gate, the exit gate, and while loading/unloading.

The Port of Seattle, Port of Tacoma, and Port of Olympia provided model year information for 2011 consisting of the number of truck calls made by each model year of truck. This is important because vehicle emissions vary by model year, and newer model vehicles generally emit less than older vehicles. This represents an improvement over 2005, for which the Washington state vehicle registration distribution formed the basis of the model year distribution. The combined 2011 port-related model year distribution that takes into account the calls to all three ports that provided data is illustrated in Figure 7.4, which presents the percentage of truck trips by model year.

**Figure 7.4: 2011 Heavy-Duty Vehicle Age Distribution**



*7.3.2 Regional Port-Related*

The PSRC and the Washington Department of Ecology (WDOE) developed estimates of on-road HDV emissions within the Puget Sound area from trucks engaging in port-related freight movements. They based these estimates on their regional travel demand model and emission factors obtained from the MOBILE6.2 model, using the port-specific model year distribution discussed above. Details of their methodology are reported in a memorandum prepared by the PSRC and included in Appendix B.

## 7.4 Operational Profiles

The number of HDV trips through the terminals is a function of cargo throughput (or number of cruise passengers and frequency of cruises, for the buses). The vehicles have periods of idling during each trip, for example while waiting to enter the terminal or while waiting to drop off and/or pick up cargo. The vehicles also travel a certain distance within the terminal from entry gate to drop-off/pick-up locations, and to the exit gate. The amount of on-terminal idling depends in part on the mode of operation – idling is reduced if cargo is ready to be loaded upon the vehicle's arrival compared to operations in which a vehicle must wait for a loader to bring the cargo. On-terminal travel distance depends on the size of the terminal and on the route taken by the vehicles within the terminal. The bus idling times are for idling while queuing to park in designated areas and while loading or discharging passengers.

The operational information provided by the terminals has been summarized and is presented in Table 7.1. The values presented for idling times and driving distances are averages for each terminal, while the assumed speed for cargo terminals is the average reported from all terminals. The terminals identified as PSS020A and PSS020B are cruise terminals; emissions have been estimated from idling of buses as cruise passengers unload and load at the cruise terminals, but driving emissions have not been included to be consistent with the 2005 approach. The Port of Seattle discourages unnecessary bus idling by signage and communications with the companies involved. An example of the signage is shown in Figure 7.5.

Port-related on-road HDV's vehicle miles traveled (VMT) depends on the destination of the cargo being transported. Idling of HDV while in transit, such as at traffic signals, is included in the emission factors produced by the MOBILE6.2 model.

Figure 7.5: Port of Seattle Cruise Terminal Anti-Idling Signage

Table 7.1: 2011 On-Terminal HDV Operational Profiles

| | | Idling (hours) | | | | | Avg. | Driving | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Terminal ID | Trips in 2011 | Gate In | Loading/ Unloading | Gate Out | Total Per Trip | Total All Trips | Speed (mph) | Per Trip (hours) | Per Trip (miles) | All Trips (miles) |
| PSS070 | 301,444 | 0.17 | 0.43 | 0.05 | 0.65 | 195,939 | 15 | 0.07 | 1.00 | 301,444 |
| PSS050 | 643,666 | 0.33 | 0.27 | 0.08 | 0.68 | 437,693 | 15 | 0.12 | 1.75 | 1,126,416 |
| PSS060 | 88,717 | 0.23 | 0.15 | 0.10 | 0.48 | 42,584 | 15 | 0.13 | 1.90 | 168,562 |
| PSS080 | 320,268 | 0.07 | 0.32 | 0.03 | 0.42 | 134,513 | 15 | 0.07 | 1.00 | 320,268 |
| PSS030 | 38,480 | 0.05 | 0.08 | 0.00 | 0.13 | 5,002 | 10 | 0.05 | 0.50 | 19,240 |
| PSS020A | 6,619 | 0.00 | 0.17 | 0.00 | 0.17 | 1,125 | na | na | na | na |
| PSS020B | 3,115 | 0.00 | 0.17 | 0.00 | 0.17 | 530 | na | na | na | na |
| PST070 | 91,800 | 0.08 | 0.18 | 0.00 | 0.26 | 23,868 | 15 | 0.02 | 0.28 | 25,704 |
| PST030 | 54,670 | 0.17 | 0.32 | 0.08 | 0.57 | 31,162 | 10 | 0.10 | 0.95 | 51,937 |
| PST050 | 144,300 | 0.08 | 0.23 | 0.08 | 0.39 | 56,277 | 15 | 0.07 | 1.00 | 144,300 |
| PST020 | 208,000 | 0.08 | 0.26 | 0.00 | 0.34 | 70,720 | 15 | 0.04 | 0.66 | 137,280 |
| PST040 | 92,880 | 0.00 | 0.21 | 0.00 | 0.21 | 19,505 | 15 | 0.05 | 0.68 | 63,158 |
| PST060 | 126,971 | 0.17 | 0.19 | 0.08 | 0.44 | 55,867 | 15 | 0.10 | 1.53 | 194,266 |
| PST100 | 75,000 | 0.00 | 0.07 | 0.02 | 0.09 | 6,750 | 25 | 0.04 | 1.04 | 78,000 |
| PST010 | 7,178 | 0.08 | 0.02 | 0.00 | 0.10 | 718 | 8 | 0.03 | 0.25 | 1,795 |
| PST090 | 4,061 | 0.08 | 0.20 | 0.04 | 0.32 | 1,300 | 15 | 0.03 | 0.50 | 2,031 |
| PST120 | 15,000 | 0.00 | 0.11 | 0.00 | 0.11 | 1,650 | 5 | 0.06 | 0.30 | 4,500 |
| PST110 | 10,125 | 0.07 | 0.30 | 0.00 | 0.37 | 3,746 | 10 | 0.02 | 0.24 | 2,430 |
| PST130 | 39,600 | 0.00 | 0.17 | 0.00 | 0.17 | 6,732 | 5 | 0.08 | 0.40 | 15,840 |
| PSA010 | 7,994 | 0.03 | 0.08 | 0.03 | 0.14 | 1,119 | 5 | 0.05 | 0.25 | 1,999 |
| PSE010 | 4,025 | 0.00 | 0.25 | 0.00 | 0.25 | 1,006 | 8 | 0.13 | 1.00 | 4,025 |
| PSO010 | 7,608 | 0.03 | 0.08 | 0.03 | 0.14 | 1,065 | 5 | 0.05 | 0.25 | 1,902 |
| BNSF SIG | 217,264 | 0.11 | 0.33 | 0.03 | 0.47 | 102,114 | 15 | 0.07 | 1.00 | 217,264 |
| UP Argo | 193,333 | 0.17 | 0.40 | 0.03 | 0.60 | 116,000 | 15 | 0.07 | 1.00 | 193,333 |
| **Totals** | **2,702,119** | | | | | **1,316,985** | | | | **3,075,692** |
| **Weighted averages** | | **0.16** | **0.28** | **0.05** | **0.49** | | **15** | **0.08** | **1.14** | |

## 7.5 Emission Reduction Technologies Identified

In 2011, the diesel trucks and buses addressed in this section used ULSD with a sulfur content of 15 ppm or less since this is the fuel available nation-wide for on-road vehicle use. This diesel fuel sulfur control program significantly reduces sulfate and particulate emissions by a nominal amount. Fleet turnover to newer vehicles with 2007 and newer engine model years has also had an effect on reducing overall HDV emissions. Both the Port of Tacoma and Port of Seattle have banned trucks with engines older than 1994 from calling at their terminals.

## 7.6 Emissions Estimating Methodology

The methodologies for estimating the on-terminal and port-related on-road HDV emissions are presented below.

*Emission Factors*

The MOBILE6.2 model was used to calculate emission factors for HDVs. The MOBILE6.2 vehicle types[53] most representative of the trucks covered by this section. HDDV8A[54] and HDDV8B, were used to develop the composite emission factors for heavy-duty trucks. The composites were based on the MOBILE6.2 emission factors for the two classes apportioned according to the MOBILE6.2 mileage distribution for each of the classes.

The MOBILE6.2 model estimates vehicle emissions in terms of grams per mile, and these estimates are specific to the vehicles' model year and average speed. The emission factors presented in Tables 7.2 and 7.3 include the on-terminal emission factors specific to each terminal based on the reported average speed on each terminal, and represent the overall model year distribution of the three ports that provided data, as discussed above in subsection 7.3, Data and Information Acquisition. The emission factors for on-road travel vary by speed, and are included as average grams-per-mile for driving emissions in Table 7.2. The emission factors by speed are included in Appendix B. Emission factors for methane and nitrous oxide were developed from EPA's national greenhouse gas emissions inventory report.[55] Idling emission factors were developed to account for the on-terminal idling periods. These factors were developed according to previous EPA guidance based on the 2.5 miles per hour (mph) emission factors (in g/miles) multiplied by 2.5.[56] On-road idling emission factors are not included because the on-road emission factors include a normal amount of in-traffic idling.

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[53] EPA, *User's Guide to MOBILE6.1 and MOBILE6.2 Mobile Source Emission Factor Model*, EPA420-R-03-010, 2003. See: *http://www.epa.gov/otaq/models/mobile6/420r03010.pdf.*

[54] HDDV - heavy-duty diesel vehicle

[55] EPA 2006. See Annex 3, Table A-95.

[56] EPA, *Technical Guidance on the Use of MOBILE6 for Emission Inventory Preparation*, EPA420-R-04-013, August 2004. See: *http://www.epa.gov/otaq/models/mobile6/420r04013.pdf.*

### Table 7.2: HDV Emission Factors – Driving, g/mile

| Terminal ID | Avg. Speed (mph) | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS070 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSS050 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSS060 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSS080 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSS030 | 10 | 14.1942 | 1.1752 | 6.8697 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSS020A | na | na | na | na | na | na | na | na | na | na | na |
| PSS020B | na | na | na | na | na | na | na | na | na | na | na |
| PST070 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST030 | 10 | 14.1942 | 1.1752 | 6.8697 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST050 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST020 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST040 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST060 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST100 | 25 | 10.4167 | 0.6485 | 2.9587 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST010 | 8 | 14.8553 | 1.2555 | 7.6424 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST090 | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST120 | 5 | 16.8378 | 1.4968 | 9.9626 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST110 | 10 | 14.1942 | 1.1752 | 6.8697 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PST130 | 5 | 16.8378 | 1.4968 | 9.9626 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSA010 | 5 | 16.8378 | 1.4968 | 9.9626 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSE010 | 8 | 14.8553 | 1.2555 | 7.6424 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| PSO010 | 5 | 16.8378 | 1.4968 | 9.9626 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| BNSF SIG | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| UP Argo | 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.1876 | 0.1727 | 0.1876 | 1,602 | 0.0048 | 0.0051 |
| **Weighted Avg** | **15** | **12.4822** | **0.9557** | **5.0977** | **0.0149** | **0.1869** | **0.1721** | **0.1869** | **1,596** | **0.0048** | **0.0051** |

Table 7.3: HDV Emission Factors – Idling, g/hour

| Terminal ID | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|
| PSS070 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSS050 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSS060 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSS080 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSS030 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSS020A | 41.5150 | 2.0430 | 23.8380 | 0.0545 | 0.3440 | 0.3165 | 0.3440 | 5,845 | 0.0120 | 0.0128 |
| PSS020B | 41.5150 | 2.0430 | 23.8380 | 0.0545 | 0.3440 | 0.3165 | 0.3440 | 5,845 | 0.0120 | 0.0128 |
| PST070 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST030 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST050 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST020 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST040 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST060 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST100 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST010 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST090 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST120 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST110 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PST130 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSA010 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSE010 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| PSO010 | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| BNSF SIG | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| UP Argo | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| **Weighted Avg** | **46.4500** | **4.2497** | **30.4849** | **0.0374** | **0.4686** | **0.4314** | **0.4686** | **4,012** | **0.0120** | **0.0128** |

The general form of the equation for estimating vehicle emissions is:

Equation 7.1

$$\boldsymbol{E} = (\boldsymbol{EF_d} \times \boldsymbol{A_d}) + (\boldsymbol{EF_i} \times \boldsymbol{A_i})$$

Where:

E = mass of emissions per defined period
$EF_d$ = driving emission factor (g/mile)
$A_d$ = driving activity (miles driven during the defined period)
$EF_i$ = idling emission factor (g/hour)
$A_i$ = idling activity (idling during the defined period)

Emissions were estimated by multiplying the miles driven or hours idling on each terminal by the relevant emission factor.

*Port Emissions*

Emissions from HDVs operating within the terminals and idling adjacent to the terminals were estimated by multiplying the miles driven, the hours of idling on each terminal, and the hours idling waiting to get into the terminal by the relevant emission factor representing the average speed and the overall model year distribution of the trucks calling at the terminals.

*Airshed Emissions*

The PSRC also used the EPA MOBILE6.2 model to estimate airshed emissions from port-related HDVs, consistent with the methodology used by Starcrest for the on-terminal calculations. The three largest ports in the Puget Sound region (Ports of Everett, Seattle and Tacoma) are located in Snohomish, King, and Pierce Counties, respectively, have the highest off-terminal port-related HDV activity levels in the study area and were the focus of the PSRC's modeling efforts.

The PSRC used their latest Travel Demand Model, which simulates all the travel in the airshed on an average weekday, to develop the weekday on-road port-related truck VMT for 2011. Among the vehicle classes modeled are heavy-duty trucks. The truck trip-ends are generated from estimates of employment, distributed using "typical" distributions of trip lengths, and assigned to the regional road system along with all other vehicles (personal vehicles, and light and medium trucks). PSRC's use of the latest travel demand model improved VMT estimates for 2011. In order to provide for reasonably reliable comparison between 2011 and 2005, 2005 HDV emissions were adjusted to account for the up to date methodologies. The primary difference between the 2011 and 2005 modeling is that the later modeling produces higher estimates of VMT for a given volume of cargo throughput. The 2005 emissions were adjusted to take into account these higher VMT estimates. Another difference is that the 2005 emission estimates included more weight classes of trucks than the 2011 estimates – for 2011 only the heaviest classes of trucks (HDDV8a and 8b) have been included because these classes make up the great majority of truck visits. The 2005 estimates of truck emissions were recalculated to include only the HDDV8A and 8b classes of trucks. For these reasons, the 2005 HDV emissions displayed later in this report do not correspond directly with the numbers in the 2005 PSEI report.

The updated travel demand model includes improvements with specific information provided by the Ports, thus, there was no need to make additional adjustments to the model output. Since 2010 is an existing model analysis year in the travel demand model, and since it was determined that there would be little to no differences in port-related VMT between 2010 and 2011, the PSRC decided to use the 2010 analysis year as a surrogate for the 2011 emissions inventory data. Truck trips to and from the Ports of Everett, Seattle, and Tacoma and the corresponding distances and travel times were extracted from the 2010 model run. The other ends of the trips were aggregated to the following geographies:

- Distribution Centers – all analysis zones in the Green River Valley, from Renton to Sumner
- Interstate 5 South – at the Nisqually River
- Interstate 90 at Snoqualmie Pass
- Interstate 5 North – at the Skagit/Snohomish County line
- All other external stations
- Remainder of King County
- Snohomish County
- Remainder of Pierce County
- Kitsap County
- Rail yards

As noted previously, additional documentation prepared by the PSRC is included in Appendix B. The regional port-related emission estimates developed by the PSRC and the WDOE are specific to the counties within the PSCAA area, consisting of King, Kitsap, Pierce, and Snohomish Counties. Consistent with the 2005 emissions inventory methodology, emissions from truck activities in other counties in the inventory area were extrapolated from the PSCAA emissions using the ratios of port-related HDV to total HDV emissions to develop scaling factors. For example, if VOC emissions from port-related HDVs in the PSCAA area made up 7% of all HDV emissions in the PSCAA area, then each county's overall VOC emissions (from HDVs) would be multiplied by 7% to estimate the county-level port-related VOC emissions from HDVs. The overall county-specific HDV emissions used in developing the county-level extrapolations are from the WDOE's 2005 Air Emissions Inventory,[57] the most recent complete set of county-level HDV emissions.

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[57] WA Dept. of Ecology, 29 August 2006.

The regional port-related emission estimates developed by the PSRC and the WDOE are specific to the counties within the PSCAA area, consisting of King, Kitsap, Pierce, and Snohomish Counties. Consistent with the 2005 emissions inventory methodology, emissions from truck activities in other counties in the inventory area were extrapolated from the PSCAA emissions using the ratios of port-related HDV to total HDV emissions to develop scaling factors. For example, if VOC emissions from port-related HDVs in the PSCAA area made up 7% of all HDV emissions in the PSCAA area, then each county's overall VOC emissions (from HDVs) would be multiplied by 7% to estimate the county-level port-related VOC emissions from HDVs. The overall county-specific HDV emissions used in developing the county-level extrapolations are from the WDOE 2005 Air Emissions Inventory,[58] the most recent complete set of county-level HDV emissions.

## 7.7 Emission Estimates

For HDV emissions estimates in this section, there are two geographical domains:

- Port – includes heavy-duty vehicle emissions on-terminal and in queues on-terminal and adjacent to the terminal
- Airshed – includes heavy-duty vehicle emissions beyond the port domain to the airshed boundary. Emissions are estimated for the first drop or last pick-up from/to the terminals.

It should be noted that the estimates in Sections 7.7.1 and 7.7.2 are exclusive due to the method differences described in the previous sections.

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[58] WA Dept. of Ecology, 29 August 2006.

### *7.7.1 HDV Port Emissions*

The 2011 heavy-duty vehicle port emissions are summarized in this section. Table 7.4 summarizes the port heavy-duty vehicle emission estimates for criteria pollutants and for greenhouse gases.

**Table 7.4: 2011 Total HDV Port Emissions by Terminal, tpy**

| Terminal ID | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSS070 | 14.16 | 1.23 | 8.24 | 0.013 | 0.163 | 0.150 | 0.163 | 1,399 |
| PSS050 | 37.80 | 3.22 | 20.87 | 0.037 | 0.459 | 0.422 | 0.459 | 3,926 |
| PSS060 | 4.48 | 0.38 | 2.35 | 0.005 | 0.057 | 0.052 | 0.057 | 486 |
| PSS080 | 11.26 | 0.96 | 6.27 | 0.011 | 0.136 | 0.125 | 0.136 | 1,161 |
| PSS030 | 0.56 | 0.04 | 0.32 | 0.000 | 0.007 | 0.006 | 0.007 | 56 |
| PSS020A | 0.05 | 0.00 | 0.03 | 0.000 | 0.000 | 0.000 | 0.000 | 7 |
| PSS020B | 0.02 | 0.00 | 0.01 | 0.000 | 0.000 | 0.000 | 0.000 | 3 |
| PST070 | 1.57 | 0.14 | 0.94 | 0.001 | 0.017 | 0.016 | 0.017 | 151 |
| PST030 | 2.41 | 0.22 | 1.44 | 0.002 | 0.027 | 0.025 | 0.027 | 230 |
| PST050 | 4.85 | 0.41 | 2.68 | 0.004 | 0.059 | 0.054 | 0.059 | 504 |
| PST020 | 5.49 | 0.47 | 3.13 | 0.005 | 0.065 | 0.060 | 0.065 | 555 |
| PST040 | 1.86 | 0.16 | 1.01 | 0.002 | 0.023 | 0.021 | 0.023 | 198 |
| PST060 | 5.51 | 0.46 | 2.94 | 0.005 | 0.069 | 0.064 | 0.069 | 590 |
| PST100 | 1.25 | 0.09 | 0.48 | 0.001 | 0.019 | 0.018 | 0.019 | 168 |
| PST010 | 0.07 | 0.00 | 0.04 | 0.000 | 0.000 | 0.000 | 0.000 | 6 |
| PST090 | 0.10 | 0.01 | 0.05 | 0.000 | 0.001 | 0.001 | 0.001 | 9 |
| PST120 | 0.16 | 0.02 | 0.11 | 0.000 | 0.002 | 0.002 | 0.002 | 15 |
| PST110 | 0.23 | 0.02 | 0.15 | 0.000 | 0.003 | 0.002 | 0.003 | 21 |
| PST130 | 0.63 | 0.06 | 0.40 | 0.000 | 0.006 | 0.006 | 0.006 | 58 |
| PSA010 | 0.10 | 0.01 | 0.06 | 0.000 | 0.001 | 0.001 | 0.001 | 8 |
| PSE010 | 0.12 | 0.01 | 0.06 | 0.000 | 0.002 | 0.001 | 0.002 | 12 |
| PSO010 | 0.09 | 0.00 | 0.06 | 0.000 | 0.001 | 0.001 | 0.001 | 8 |
| BNSF SIG | 8.20 | 0.71 | 4.62 | 0.008 | 0.098 | 0.090 | 0.098 | 835 |
| UP Argo | 8.58 | 0.74 | 4.96 | 0.008 | 0.100 | 0.092 | 0.100 | 855 |
| **Total** | **109.6** | **9.4** | **61.2** | **0.1** | **1.3** | **1.2** | **1.3** | **11,261** |

Tables 7.5 and 7.6 present the contribution between running (driving) and idling port emissions for heavy-duty trucks.

### Table 7.5: 2011 Total HDV Port Emissions - Driving by Terminal, tpy

| Terminal ID | Total Miles | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| PSS070 | 301,444 | 4.12 | 0.31 | 1.65 | 0.005 | 0.062 | 0.057 | 0.062 | 533 |
| PSS050 | 1,126,416 | 15.38 | 1.17 | 6.15 | 0.019 | 0.233 | 0.214 | 0.233 | 1,991 |
| PSS060 | 168,562 | 2.30 | 0.18 | 0.92 | 0.003 | 0.035 | 0.032 | 0.035 | 298 |
| PSS080 | 320,268 | 4.37 | 0.33 | 1.75 | 0.005 | 0.066 | 0.061 | 0.066 | 566 |
| PSS030 | 19,240 | 0.30 | 0.02 | 0.15 | 0.000 | 0.004 | 0.004 | 0.004 | 34 |
| PSS020A | na | na | na | na | na | na | na | na | na |
| PSS020B | na | na | na | na | na | na | na | na | na |
| PST070 | 25,704 | 0.35 | 0.03 | 0.14 | 0.000 | 0.005 | 0.005 | 0.005 | 45 |
| PST030 | 51,937 | 0.81 | 0.07 | 0.39 | 0.001 | 0.011 | 0.010 | 0.011 | 92 |
| PST050 | 144,300 | 1.97 | 0.15 | 0.79 | 0.002 | 0.030 | 0.027 | 0.030 | 255 |
| PST020 | 137,280 | 1.87 | 0.14 | 0.75 | 0.002 | 0.028 | 0.026 | 0.028 | 243 |
| PST040 | 63,158 | 0.86 | 0.07 | 0.35 | 0.001 | 0.013 | 0.012 | 0.013 | 112 |
| PST060 | 194,266 | 2.65 | 0.20 | 1.06 | 0.003 | 0.040 | 0.037 | 0.040 | 343 |
| PST100 | 78,000 | 0.90 | 0.06 | 0.25 | 0.001 | 0.016 | 0.015 | 0.016 | 138 |
| PST010 | 1,795 | 0.03 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 3 |
| PST090 | 2,031 | 0.03 | 0.00 | 0.01 | 0.000 | 0.000 | 0.000 | 0.000 | 4 |
| PST120 | 4,500 | 0.08 | 0.01 | 0.05 | 0.000 | 0.001 | 0.001 | 0.001 | 8 |
| PST110 | 2,430 | 0.04 | 0.00 | 0.02 | 0.000 | 0.001 | 0.000 | 0.001 | 4 |
| PST130 | 15,840 | 0.29 | 0.03 | 0.17 | 0.000 | 0.003 | 0.003 | 0.003 | 28 |
| PSA010 | 1,999 | 0.04 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 4 |
| PSE010 | 4,025 | 0.07 | 0.01 | 0.03 | 0.000 | 0.001 | 0.001 | 0.001 | 7 |
| PSO010 | 1,902 | 0.04 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 3 |
| BNSF SIG | 217,264 | 2.97 | 0.23 | 1.19 | 0.004 | 0.045 | 0.041 | 0.045 | 384 |
| UP Argo | 193,333 | 2.64 | 0.20 | 1.06 | 0.003 | 0.040 | 0.037 | 0.040 | 342 |
| **Total** | **3,075,692** | **42.1** | **3.2** | **16.9** | **0.05** | **0.6** | **0.6** | **0.6** | **5,438** |

### Table 7.6: 2011 Total HDV Port Emissions - Idling by Terminal, tpy

| Terminal ID | Total Hours | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|---|
| PSS070 | 195,939 | 10.04 | 0.92 | 6.59 | 0.008 | 0.101 | 0.093 | 0.101 | 866 |
| PSS050 | 437,693 | 22.42 | 2.05 | 14.72 | 0.018 | 0.226 | 0.208 | 0.226 | 1,934 |
| PSS060 | 42,584 | 2.18 | 0.20 | 1.43 | 0.002 | 0.022 | 0.020 | 0.022 | 188 |
| PSS080 | 134,513 | 6.89 | 0.63 | 4.52 | 0.006 | 0.070 | 0.064 | 0.070 | 595 |
| PSS030 | 5,002 | 0.26 | 0.02 | 0.17 | 0.000 | 0.003 | 0.002 | 0.003 | 22 |
| PSS020A | 1,125 | 0.05 | 0.00 | 0.03 | 0.000 | 0.000 | 0.000 | 0.000 | 7 |
| PSS020B | 530 | 0.02 | 0.00 | 0.01 | 0.000 | 0.000 | 0.000 | 0.000 | 3 |
| PST070 | 23,868 | 1.22 | 0.11 | 0.80 | 0.001 | 0.012 | 0.011 | 0.012 | 106 |
| PST030 | 31,162 | 1.60 | 0.15 | 1.05 | 0.001 | 0.016 | 0.015 | 0.016 | 138 |
| PST050 | 56,277 | 2.88 | 0.26 | 1.89 | 0.002 | 0.029 | 0.027 | 0.029 | 249 |
| PST020 | 70,720 | 3.62 | 0.33 | 2.38 | 0.003 | 0.037 | 0.034 | 0.037 | 313 |
| PST040 | 19,505 | 1.00 | 0.09 | 0.66 | 0.001 | 0.010 | 0.009 | 0.010 | 86 |
| PST060 | 55,867 | 2.86 | 0.26 | 1.88 | 0.002 | 0.029 | 0.027 | 0.029 | 247 |
| PST100 | 6,750 | 0.35 | 0.03 | 0.23 | 0.000 | 0.003 | 0.003 | 0.003 | 30 |
| PST010 | 718 | 0.04 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 3 |
| PST090 | 1,300 | 0.07 | 0.01 | 0.04 | 0.000 | 0.001 | 0.001 | 0.001 | 6 |
| PST120 | 1,650 | 0.08 | 0.01 | 0.06 | 0.000 | 0.001 | 0.001 | 0.001 | 7 |
| PST110 | 3,746 | 0.19 | 0.02 | 0.13 | 0.000 | 0.002 | 0.002 | 0.002 | 17 |
| PST130 | 6,732 | 0.34 | 0.03 | 0.23 | 0.000 | 0.003 | 0.003 | 0.003 | 30 |
| PSA010 | 1,119 | 0.06 | 0.01 | 0.04 | 0.000 | 0.001 | 0.001 | 0.001 | 5 |
| PSE010 | 1,006 | 0.05 | 0.00 | 0.03 | 0.000 | 0.001 | 0.000 | 0.001 | 4 |
| PSO010 | 1,065 | 0.05 | 0.00 | 0.04 | 0.000 | 0.001 | 0.001 | 0.001 | 5 |
| BNSF SIG | 102,114 | 5.23 | 0.48 | 3.43 | 0.004 | 0.053 | 0.049 | 0.053 | 451 |
| UP Argo | 116,000 | 5.94 | 0.54 | 3.90 | 0.005 | 0.060 | 0.055 | 0.060 | 513 |
| **Total** | **1,316,985** | **67.4** | **6.2** | **44.3** | **0.1** | **0.7** | **0.6** | **0.7** | **5,824** |

### *7.7.2 HDV Airshed Emissions – Exclusive of Port Emissions*

The PSRC estimated Class 8 heavy-duty vehicles emissions using MOBILE6.2 for the following pollutants: $NO_x$, VOC, CO, $SO_2$, $CO_2$, $PM_{10}$ and $PM_{2.5}$. DPM estimates were not directly calculated by the model, but are considered equal to the $PM_{10}$ values because all particulate matter emitted from diesel engines is DPM. Table 7.7 provides the estimated annual emissions for the total port-related on-road HDV activity by county, while Table 7.8 summarizes the total airshed emissions by clean air agency region. The data provided by the PSRC assumes that port-related on-road HDV activity occurs seven days per week/365 days per year. In general, cargo terminals in the Puget Sound region operate only five days per week/260 days per year and operate on nights and weekends on an as-needed basis. The assumption of 365 days of activity results in a very conservative estimate of port-related on-road HDV activity in the Puget Sound region. The number of days of port-related on-road HDV activity was not scaled back in order to maintain consistency between the WDOE and PSRC data sets.

**Table 7.7: 2011 Total HDV Airshed Emissions by County Exclusive of Port Emissions, tpy**

| County | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Clallam | 27.9 | 1.7 | 7.6 | 0.0 | 0.7 | 0.5 | 0.7 | 4,558 |
| Island | 25.2 | 1.5 | 6.8 | 0.0 | 0.6 | 0.5 | 0.6 | 4,113 |
| Jefferson | 19.8 | 1.2 | 5.4 | 0.0 | 0.5 | 0.4 | 0.5 | 3,227 |
| King | 1,026.3 | 61.6 | 278.1 | 1.6 | 24.7 | 19.5 | 24.7 | 167,441 |
| Kitsap | 99.8 | 6.0 | 27.0 | 0.2 | 2.4 | 1.9 | 2.4 | 16,279 |
| Mason | 27.0 | 1.6 | 7.3 | 0.0 | 0.6 | 0.5 | 0.6 | 4,402 |
| Pierce | 377.0 | 22.6 | 102.1 | 0.6 | 9.1 | 7.2 | 9.1 | 61,496 |
| San Juan | 2.1 | 0.1 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 335 |
| Skagit | 75.9 | 4.6 | 20.6 | 0.1 | 1.8 | 1.4 | 1.8 | 12,391 |
| Snohomish | 327.6 | 19.7 | 88.8 | 0.5 | 7.9 | 6.2 | 7.9 | 53,447 |
| Thurston | 135.4 | 8.1 | 36.7 | 0.2 | 3.3 | 2.6 | 3.3 | 22,096 |
| Whatcom | 86.0 | 5.2 | 23.3 | 0.1 | 2.1 | 1.6 | 2.1 | 14,024 |
| **Total** | **2,230** | **134** | **604** | **3** | **54** | **42** | **54** | **363,809** |

Table 7.8: Distribution of 2011 Total HDV Airshed Emissions by Clean Air Agency Exclusive of Port Emissions, tpy

| Region | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| NWCAA | 189.2 | 11.4 | 51.3 | 0.2 | 4.5 | 3.5 | 4.5 | 30,863 |
| ORCAA | 210.1 | 12.6 | 57.0 | 0.2 | 5.1 | 4.0 | 5.1 | 34,283 |
| PSCAA | 1,830.7 | 109.9 | 496.0 | 2.9 | 44.1 | 34.8 | 44.1 | 298,663 |
| **Total** | **2,230** | **134** | **604** | **3** | **54** | **42** | **54** | **363,809** |

## 7.8 Emission Comparison, 2011 vs 2005

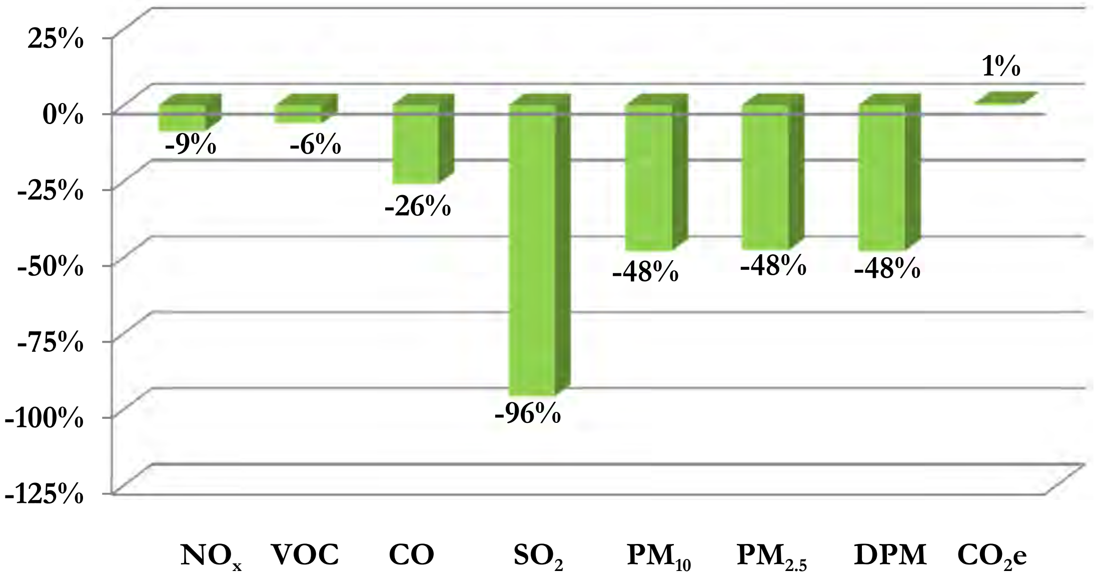
In this section, emissions in 2011 are compared back to emissions estimated in the 2005 inventory. Because of changes in estimating methodologies, adjustments have been made to the 2005 emission estimates to place them on an even footing with the 2011 estimates and allow for reasonably reliable comparisons. For this reason, the 2005 emissions displayed in the following tables do not correspond directly with the numbers in the 2005 PSEI report. The use of port-specific model year information instead of the state-wide distribution has not been accounted for, because there is no information on the actual 2005 model year distribution of trucks calling at the ports.

The 2011 vs 2005 comparison for total port heavy-duty vehicle emissions is summarized in Table 7.9 and the change 2011 vs 2005 is presented in Figure 7.6. With the exception of $CO_2e$ emissions, emissions in 2011 were lower than 2005 emissions by 6% to 96%. The on-terminal emissions are lower primarily due to the use of ULSD fuel and changes in the truck fleet caused by turnover during the six years between inventories and the "clean truck" programs implemented by the Ports of Tacoma and Seattle. The changes include both fewer old trucks and the presence of 2007 and newer trucks that were not on the market in 2005.

Table 7.9: 2011 vs 2005 Total HDV Port Emissions Comparison, tpy

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 109.6 | 9.4 | 61.2 | 0.1 | 1.3 | 1.2 | 1.3 | 11,262 |
| 2005 | 119.9 | 10.0 | 82.6 | 2.3 | 2.5 | 2.3 | 2.5 | 11,178 |
| **Change, tpy** | **-10.3** | **-0.6** | **-21.4** | **-2.2** | **-1.2** | **-1.1** | **-1.2** | **83** |
| **Change, %** | **-9%** | **-6%** | **-26%** | **-96%** | **-48%** | **-48%** | **-48%** | **1%** |

Figure 7.6: 2011 vs 2005 Total HDV Port Emissions Change



On-terminal activity is fairly similar between the two years, as presented in Table 7.10. The VMT was 4% higher in 2011 than in 2005 and the total idling time was 3% lower. These relatively minor levels of change are reflected in the minimal 1% increase in $CO_2e$ emissions, since there has been little change in the fuel efficiency of on-road trucks over the past few years, and $CO_2$ emissions are directly related to fuel consumption.

Table 7.10: 2011 vs 2005 Total HDV Port VMT and Idling Hours Comparison

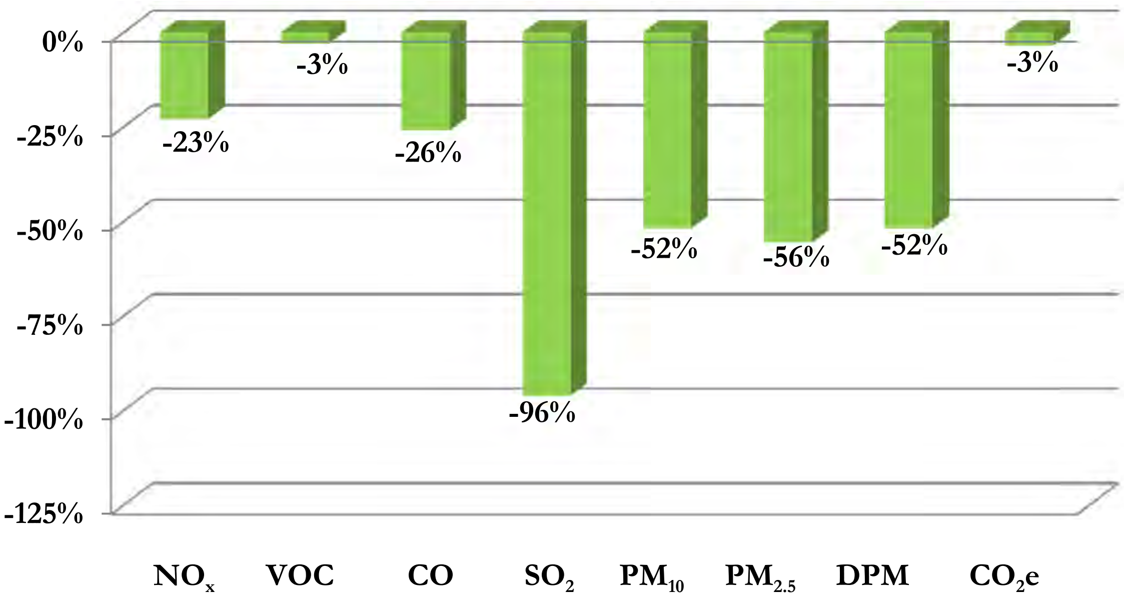
| Year | VMT | Idling Hours |
|---|---|---|
| 2011 | 3,075,692 | 1,316,985 |
| 2005 | 2,955,210 | 1,351,468 |
| **Change, tpy** | **120,482** | **-34,483** |
| **Change, %** | **4%** | **-3%** |

The 2011 vs 2005 comparison for on-road heavy-duty vehicle airshed emissions is summarized in Table 7.11. All of the pollutant emissions in 2011 were lower than in 2005. The substantial reduction in $SO_2$ emissions was due to the use of ULSD. Particulate emissions decreased due to the ports' clean truck programs, the effects of fleet turnover, and the use of ULSD.

**Table 7.11: 2011 vs 2005 Total HDV Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 2,230 | 134 | 604 | 3 | 54 | 42 | 54 | 363,809 |
| 2005 | 2,892 | 138 | 816 | 84 | 112 | 95 | 112 | 376,668 |
| **Change, tpy** | **-662** | **-4** | **-212** | **-81** | **-58** | **-53** | **-58** | **-12,859** |
| **Change, %** | **-23%** | **-3%** | **-26%** | **-96%** | **-52%** | **-56%** | **-52%** | **-3%** |

**Figure 7.7: 2011 vs 2005 Total Airshed HDV Emissions Change**



The 2011 and 2005 comparison for the total port and airshed, port-related heavy-duty vehicle emissions for Puget Sound is summarized in Table 7.12. In 2011, emissions decreased for all pollutants as compared to 2005.

**Table 7.12: 2011 vs 2005 Total HDV Port and Airshed Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 2,340 | 143 | 666 | 3 | 55 | 44 | 55 | 375,071 |
| 2005 | 3,010 | 148 | 896 | 87 | 114 | 98 | 114 | 387,633 |
| **Change, tpy** | **-670** | **-5** | **-231** | **-83** | **-59** | **-54** | **-59** | **-12,562** |
| **Change, %** | **-22%** | **-3%** | **-26%** | **-96%** | **-52%** | **-55%** | **-52%** | **-3%** |

**Figure 7.8: 2011 vs 2005 Total HDV Port and Airshed Emissions Change**

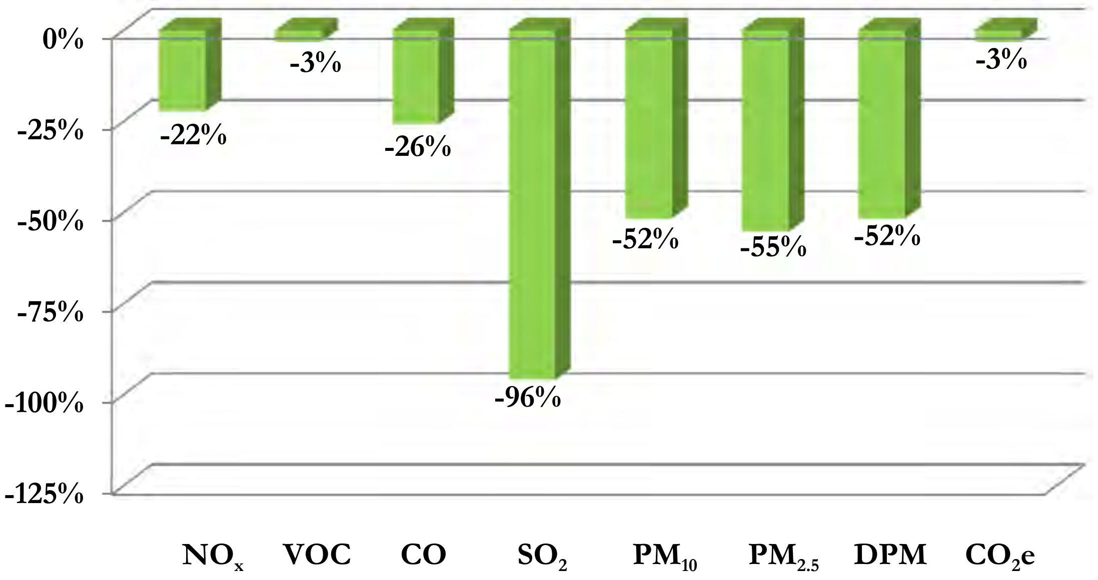
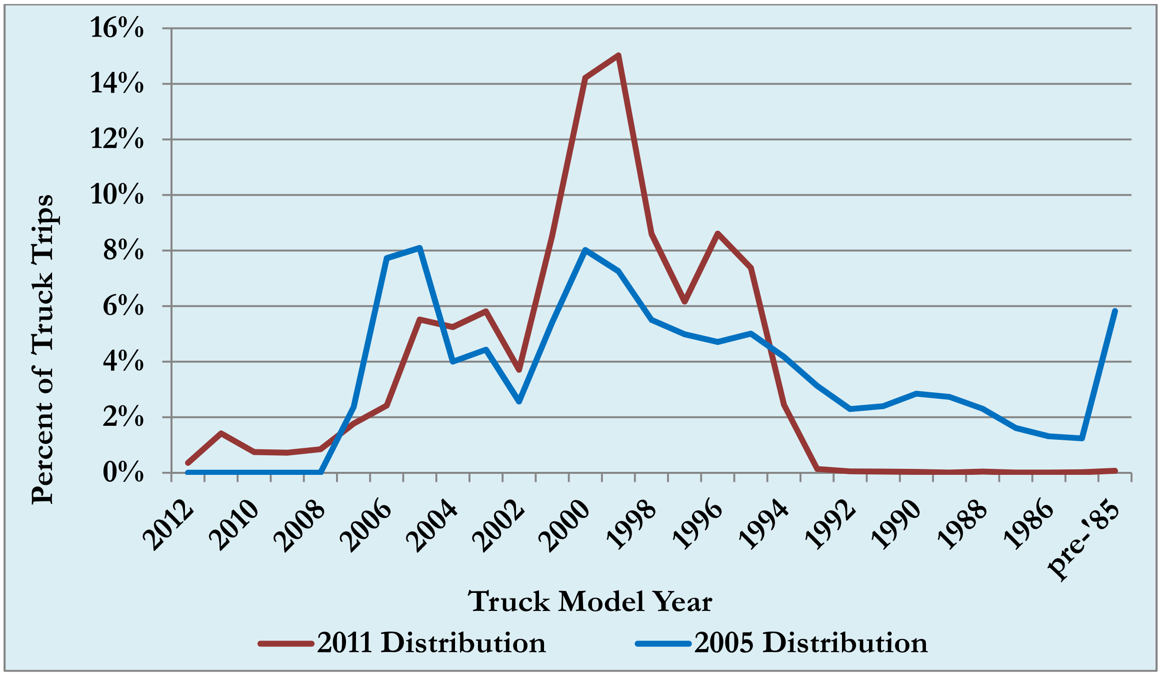


Figure 7.9 illustrates the differences in the heavy-duty vehicle model year distributions used for the 2011 and 2005 emissions inventories. Because the port truck-specific information was not available in 2005, the distribution was a general distribution of heavy-duty trucks operating in the Puget Sound area, not specific to port trucks. In 2011, the Ports of Seattle, Tacoma, and Olympia provided model year distribution information specific to trucks that called at the marine terminal truck gates at ports, providing a more accurate depiction of the distribution of port trucks by model year. It is apparent in the figure that the 2005 distribution included more gate calls by the older, high-emitting, pre-1994 trucks that have since been subject to the ports' truck programs. Albeit in small percentages, some much cleaner 2007 and newer trucks showed up in the 2011 distribution. These differences account for most of the reductions seen in the emission comparisons between 2011 and 2005.

**Figure 7.9: 2011 and 2005 HDV Age Distributions**



# SECTION 8 FLEET VEHICLES

Section 8 provides an overview of the fleet vehicle source category, which consists primarily of light-duty vehicles and some on-terminal heavy-duty vehicles. A description of the methodology used to estimate emissions is provided in this section, as well as the emission estimates for this source category.

## 8.1 Source Description

There are three categories of fleet vehicles that are included in the inventory, consistent with the 2005 approach:

- Terminal fleet vehicles - terminal-related vehicles owned and/or operated by the terminal operators and a Port that spend most of their time on the terminals and includes light-duty and heavy-duty vehicles. These vehicles include fueling trucks, shuttle/passenger, terminal cars/trucks, maintenance trucks, etc. Cargo related heavy-duty vehicles are reported in Section 7.
- Cruise terminal vehicles – vehicles that are found on cruise terminals which include privately owned vehicles owned by cruise passengers and commercial minivans picking up and dropping passengers. These are typically light-duty vehicles.
- Import/export vehicles - New import or export vehicles driven on or off ocean-going vessels at Port of Tacoma's Marshall Avenue Auto Terminal. These are typically passenger vehicles and light-duty trucks.

This section does not include emissions from:

- Commercial buses and taxis that drop off or pick up passengers at the cruise terminals. Commercial bus idling on or near cruise terminals associated the drop-off or pick-up of cruise passengers is reported in Section 7.
- Heavy-duty trucks that transport the new import or export vehicles to/from the Marshall Auto Terminal (reported in Section 7).
- Employee personal vehicles

The following marine terminals and facilities were included in the inventory:

- Port of Anacortes – terminal fleet vehicles
- Port of Everett – terminal fleet vehicles
- Port of Olympia – terminal fleet vehicles
- Port of Seattle – terminal fleet vehicles and cruise terminal vehicles
- Port of Tacoma – terminal fleet vehicles and import/export vehicles

## 8.2 Geographical Delineation

The geographical extent for fleet vehicles is described below:

- Terminal fleet vehicles – on-terminal
- Cruise terminal vehicles – on-terminal and for Pier 66 adjacent related areas
- Import/export vehicles – on-terminal

## 8.3 Data and Information Acquisition

The data collection approach focused on VMT in the geographical extents described in Section 8.2.

To determine activity for terminal fleet vehicles, one of two methods were used: 1) combining annual hours of operation and on-terminal speed limits to determine VMT or 2) reported VMT. For vehicles with no data available, VMT for other similar vehicles that had data were averaged and the averaged VMT was used. Please refer to section 8.4.1 for more information on terminal fleet vehicles.

To determine activity for cruise terminal vehicles, the following data was used: total passenger count and cruise ship call data by terminal. Please refer to section 8.4.2 for further information on cruise terminal vehicles.

To determine activity for import/export vehicles the following data was used: the annual vehicle throughput and average miles traveled on-terminal was collected. Please refer to section 8.4.3 for the count of import/export vehicles for 2011.

## 8.4 Operational Profiles

Operational profiles are described in the following subsections:

- 8.4.1 Terminal fleet vehicles
- 8.4.2 Cruise terminal vehicles
- 8.4.3 Import/export vehicles

### *8.4.1 Terminal Fleet Vehicles*

Terminal fleet vehicles consist of 805 passenger cars and trucks with a model year range of 1969 to 2012 (average model year, 2000). The 2011 mileage per vehicle ranged from zero to 40,665, with an inventory-wide average of 4,570. Table 8.1 shows the breakdown of the terminal fleet vehicles by terminal, number of vehicles, model year range and average, and fuel type.

**Table 8.1: 2011 Terminal Fleet Vehicle Characteristics**

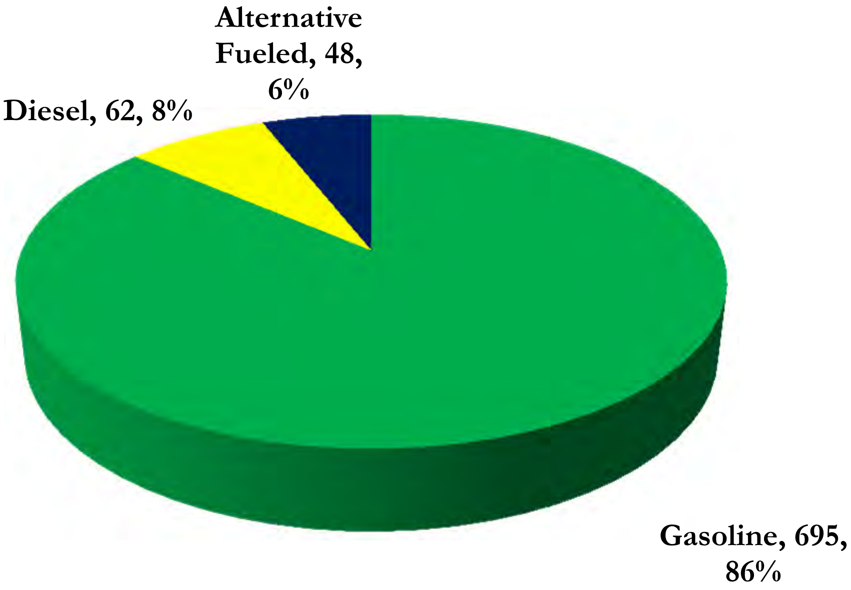
| Terminal | Count | Fuel/Engine Type | | | | | | | Model Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | | Gasoline | Diesel | Biodiesel | Hybrid | CNG | Propane | Electric | Min | Max | Avg |
| PSA010 | 12 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 1970 | 2011 | 1997 |
| PSE010 | 65 | 64 | 1 | 0 | 0 | 0 | 0 | 0 | 1978 | 2008 | 1996 |
| PSO010 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 1969 | 2005 | 1992 |
| PSS010 | 214 | 162 | 5 | 26 | 18 | 2 | 0 | 1 | 1990 | 2012 | 2001 |
| PSS050 | 126 | 115 | 11 | 0 | 0 | 0 | 0 | 0 | 1979 | 2007 | 1999 |
| PSS060 | 9 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 1994 | 2006 | 2001 |
| PSS080 | 55 | 55 | 0 | 0 | 0 | 0 | 0 | 0 | 1998 | 2008 | 2006 |
| PST010 | 101 | 100 | 0 | 0 | 0 | 0 | 1 | 0 | 1979 | 2010 | 2001 |
| PST020 | 33 | 31 | 2 | 0 | 0 | 0 | 0 | 0 | 2000 | 2005 | 2004 |
| PST030 | 32 | 30 | 2 | 0 | 0 | 0 | 0 | 0 | 1979 | 2008 | 2000 |
| PST040 | 21 | 3 | 18 | 0 | 0 | 0 | 0 | 0 | 1977 | 2004 | 1986 |
| PST050 | 29 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 1990 | 2008 | 2004 |
| PST055 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1983 | 2004 | 1995 |
| PST060 | 48 | 39 | 9 | 0 | 0 | 0 | 0 | 0 | 1999 | 2008 | 2004 |
| PST070 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 1989 | 2007 | 1999 |
| PST080 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1998 | 2009 | 2004 |
| PST100 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2000 | 2005 | 2003 |
| PST120 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2000 | 2008 | 2004 |
| PST130 | 5 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 1979 | 2010 | 2001 |
| BNSF SIG Yard | 13 | 6 | 7 | 0 | 0 | 0 | 0 | 0 | 1997 | 2008 | 2001 |
| **Total** | **805** | **695** | **62** | **26** | **18** | **2** | **1** | **1** | | | |

Table 8.2 and Figure 8.1 presents, the fuel-type distribution of terminal fleet vehicles inventoried.

**Table 8.2: 2011 Terminal Fleet Vehicle Count by Fuel Type**

| Fuel Type | Count |
|---|---|
| Gasoline | 695 |
| Diesel, ULSD | 62 |
| Biodiesel, B20 | 26 |
| Hybrid, gasoline | 18 |
| CNG | 2 |
| Propane | 1 |
| Electric | 1 |

**Figure 8.1: 2011 Terminal Fleet Vehicle Fuel Type Distribution**



### *8.4.2 Cruise Terminal Vehicles*

There are two terminals that have associated cruise terminal vehicles are Port of Seattle's Pier 66 and Terminal 91.

A total of 885,949 passengers passed through the Port of Seattle cruise terminals in 2011 for 195 vessel cruises. It was assumed that 40%[59] of the passengers used personal vehicles (rather than commercial transportation) to get to the cruise terminals, and that each personal vehicle carried an average of three persons, for a total of 118,127 vehicles. Of the 195 cruises, 63 trips (32%) were from Pier 66 and 132 trips (68%) were from Terminal 91, thus 37,800 vehicles were assigned to Pier 66 and 80,326 vehicles were assigned to Terminal 91.

In addition to the passenger-owned vehicles, commercial minivans used to transport passengers were included in the inventory. It was estimated that there were 240 commercial minivan trips in 2011 and the distance traveled on-terminal (Pier 91) or adjacent to the terminal (Pier 66) was estimated to be 0.25 miles, with a speed of 15 mph. All commercial minivans were assumed to be gasoline-fueled.

It should be noted that all off-terminal vehicle miles traveled and associated emissions are accounted for by the PSRC and regional clean air agencies in their area emissions inventories. Annual trips related to cruise operations are a very small fraction of total regional vehicle miles traveled and thus are not calculated separately in this inventory.

### *8.4.3. Import/Export Vehicles*

The Port of Tacoma Marshall Avenue Auto Terminal 2011 throughput was 162,434 vehicles. Model years were assumed to be 2011 or later, and the vehicles were estimated to be driven two miles each. Ninety nine percent of the vehicles were assumed to be cars and one percent of the vehicles were assumed to be light trucks, as reported by the Port. All vehicles were assumed to be gasoline fueled.

## 8.5 Emission Reduction Technologies Identified

Approximately six percent of the terminal fleet vehicles (48) are alternatively fueled and thus emission benefits overall are anticipated to be nominal. The alternatively fueled terminal fleet vehicles included: 26 vehicles that use biodiesel, 18 hybrid vehicles, 1 electric vehicle, 2 vehicles that use natural gas and 1 propane.

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[59] Consistent with data reported by Heffron Transportation, Inc., *Transportation Technical Report for Draft EIS Cruise Terminal at Terminal 91*, 14 September 2006.

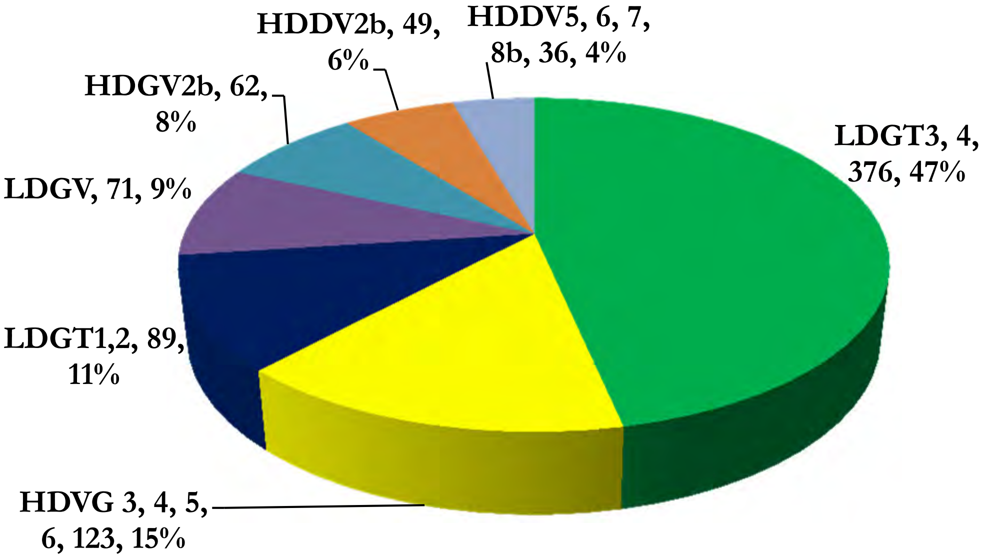
## 8.6 Emissions Estimating Methodology

The EPA MOBILE6.2 model was used to calculate vehicle emissions as described in Section 7.6. Table 8.3 and Figure 8.2 presents the 2012 terminal fleet vehicles types based on the MOBILE 6.2vehicle classifications.

**Table 8.3: 2011 Terminal Fleet Vehicle MOBILE6.2 Classifications**

| Vehicle Classification | GVWR (lbs) | Model Abbreviation | Count |
|---|---|---|---|
| Light-Duty Gasoline Trucks | 6,001 to 8,500 | LDGT3 and 4 | 376 |
| Light-Duty Gasoline Trucks | 0 – 6,000 | LDGT1 and 2 | 89 |
| Heavy-Duty Gasoline Vehicles | 8,501 – 10,000 | HDGV2b | 62 |
| Light-Duty Gasoline Vehicles | Passenger Cars | LDGV | 71 |
| Heavy-Duty Gasoline Vehicles | 10,001 – 26,000 | HDGV3, 4, 5 and 6 | 123 |
| Heavy-Duty Diesel Vehicles | 16,001 – 33,000 | HDDV5, 6, 7 and 8b | 36 |
| Heavy-Duty Diesel Vehicles | 8,501 – 10,000 | HDDV2b | 49 |

**Figure 8.2: 2011 Terminal Fleet Vehicle MOBILE6.2 Classifications**



While detailed information was not available for all terminal fleet vehicles, approximately 47% percent of these vehicles are light-duty gasoline fueled trucks with GVWR of 6,001-8,500 lbs. Approximately 11% are similar, but smaller, trucks with a GVWR of up to 6,000 lbs. About 15% are heavy-duty gasoline fueled vehicles with a GVWR of 10,001 – 26,000 lbs. Approximately 9% percent of the vehicles are passenger cars, and the remainder of the fleet consists of heavy-duty vehicles, both gasoline and diesel-fueled.

Thirty-nine terminal fleet vehicles (less than 5% of the total) had model years ranging from 1969 to 1986. These model years were reassigned to 1987, the earliest year that MOBILE6.2 can accommodate, since the model includes only the previous 25 years.

For cruise terminal vehicle, MOBILE6.2 was used to compute a fleet average emission rate for each pollutant, since vehicle model years were not available. These composite factors are weighted averages of the emission factors associated with the model years in the registration data provided by the Seattle Department of Transportation.

The emission factors for nitrous oxides ($N_2O$) and methane ($CH_4$) are presented in Tables 8.4 (alternative fuels) and 8.5 (gasoline and diesel fuels).[60]

**Table 8.4: Alternative Fueled LDV and HDV Emissions Factors for $N_2O$ and $CH_4$, g/mile**

| Vehicle Type | Fuel Type | $N_2O$ | $CH_4$ |
|---|---|---|---|
| LDV | Propane | 0.008 | 0.038 |
| LDV | Ethanol | 0.076 | 0.043 |
| HDV | Propane | 0.150 | 0.108 |

**Table 8.5: Gasoline and Diesel Fueled LDV and HDV Emissions Factors for $N_2O$ and $CH_4$, g/mile**

| | Light-Duty Vehicles | | | | | | Heavy-Duty Vehicles | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gasoline | | | | Diesel | | Gasoline | | Diesel | |
| | Passenger Car | | LDV | | Passenger Car | | All | | All | |
| Model Year | $N_2O$ | $CH_4$ | $N_2O$ | $CH_4$ | $N_2O$ | $CH_4$ | $N_2O$ | $CH_4$ | $N_2O$ | $CH_4$ |
| 2004-2011 | 0.0036 | 0.0173 | 0.0066 | 0.0163 | 0.015 | 0.0105 | 0.0134 | 0.0333 | 0.0048 | 0.0051 |
| 1994-2003 | 0.0429 | 0.0271 | 0.0871 | 0.0452 | na | na | 0.175 | 0.0655 | 0.0048 | 0.0051 |
| 1987-1993 | 0.0647 | 0.0704 | 0.1056 | 0.0776 | na | na | 0.2135 | 0.263 | 0.0048 | 0.0051 |

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[60] EPA 2006.

## 8.7 Emission Estimates

This section summarizes fleet vehicle related emissions as described above. The 2011 Terminal fleet and cruise terminal vehicles emissions are presented in Table 8.6.

**Table 8.6: 2011 Total Terminal Fleet Vehicle Emissions by Terminal, tpy**

| Terminal | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| PSA010 | 0.06 | 0.04 | 0.40 | 0.000 | 0.001 | 0.001 | 0.000 | 22 |
| PSE010 | 0.79 | 0.80 | 7.38 | 0.005 | 0.009 | 0.008 | 0.002 | 273 |
| PSO010 | 0.01 | 0.00 | 0.03 | 0.000 | 0.000 | 0.000 | 0.000 | 2 |
| PSS050 | 1.32 | 0.63 | 6.79 | 0.007 | 0.020 | 0.018 | 0.014 | 403 |
| PSS060 | 0.04 | 0.02 | 0.30 | 0.000 | 0.000 | 0.000 | 0.000 | 20 |
| PSS080 | 0.16 | 0.08 | 1.50 | 0.004 | 0.002 | 0.001 | 0.000 | 220 |
| BNSF SIG Yard | 0.17 | 0.03 | 0.38 | 0.001 | 0.003 | 0.003 | 0.002 | 50 |
| PSS020 | 0.01 | 0.01 | 0.13 | 0.000 | 0.000 | 0.000 | 0.000 | 5 |
| PSS010 | 1.12 | 0.23 | 3.62 | 0.007 | 0.013 | 0.012 | 0.003 | 405 |
| PST050 | 0.18 | 0.08 | 1.80 | 0.004 | 0.003 | 0.003 | 0.000 | 192 |
| PST080 | 0.03 | 0.00 | 0.07 | 0.000 | 0.000 | 0.000 | 0.000 | 16 |
| PST120 | 0.02 | 0.00 | 0.01 | 0.000 | 0.001 | 0.001 | 0.001 | 6 |
| PST055 | 0.01 | 0.00 | 0.03 | 0.000 | 0.000 | 0.000 | 0.000 | 2 |
| PST030 | 0.12 | 0.07 | 0.84 | 0.001 | 0.001 | 0.001 | 0.000 | 47 |
| PST130 | 0.12 | 0.02 | 0.20 | 0.001 | 0.001 | 0.001 | 0.000 | 56 |
| PST070 | 0.02 | 0.01 | 0.10 | 0.000 | 0.000 | 0.000 | 0.000 | 6 |
| PST020 | 0.07 | 0.03 | 0.52 | 0.001 | 0.001 | 0.001 | 0.000 | 39 |
| PST100 | 0.03 | 0.01 | 0.18 | 0.000 | 0.000 | 0.000 | 0.000 | 14 |
| PST040 | 0.14 | 0.04 | 0.25 | 0.000 | 0.007 | 0.006 | 0.007 | 12 |
| PST010 | 0.71 | 0.33 | 4.37 | 0.006 | 0.007 | 0.007 | 0.000 | 321 |
| PST060 | 1.34 | 0.35 | 5.56 | 0.012 | 0.022 | 0.020 | 0.014 | 719 |
| **Total** | **6.4** | **2.8** | **34.5** | **0.048** | **0.090** | **0.083** | **0.042** | **2,828** |

Table 8.7 presents the import/export vehicle emissions for the Port of Tacoma's Marshall Avenue Auto Terminal.

**Table 8.7: 2011 Import/Export Vehicle Emissions, tpy**

| Class | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Cars | 0.0076 | 0.0146 | 0.1784 | 0.0024 | 0.0013 | 0.0012 | 0.0000 | 131 |
| Light trucks | 0.0002 | 0.0002 | 0.0022 | 0.0000 | 0.0000 | 0.0000 | 0.0035 | 2 |
| **Total** | **0.0078** | **0.0148** | **0.1806** | **0.0024** | **0.0013** | **0.0012** | **0.0035** | **133** |

## 8.8 Emission Comparison, 2011 vs 2005

The 2011 and 2005 comparison for terminal fleet vehicles and cruise terminal vehicles are summarized in Table 8.8. In 2011, despite an increase in terminal fleet vehicle counts from 2005, there was a reduction for $NO_x$, VOC, CO, DPM and GHG emissions. PM and $SO_2$emissions increased. The varying emission changes could be due to different fleet mix of gasoline, propane and diesel powered vehicles as compared to 2005 based on a more complete data set in 2011. The reductions are due to a newer and cleaner fleet and use of hybrid vehicles and alternative fuel, such as biodiesel.

**Table 8.8: Terminal Fleet Vehicle 2011 vs 2005 Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 6.4 | 2.8 | 34.5 | 0.048 | 0.090 | 0.083 | 0.042 | 2,828 |
| 2005 | 9.8 | 5.4 | 49.8 | 0.039 | 0.083 | 0.080 | 0.079 | 3,237 |
| **Change, tpy** | **-3.4** | **-2.6** | **-15.3** | **0.009** | **0.007** | **0.003** | **-0.037** | **-409** |
| **Change, %** | **-34%** | **-48%** | **-31%** | **24%** | **8%** | **3%** | **-47%** | **-13%** |

Table 8.9 summarizes the terminal fleet vehicle count and there was a 31% increase in 2011 as compared to 2005. In particular, the vehicle fleet's count increased 16% for the Port of Seattle and 38% for the Port of Tacoma.

**Table 8.9: Terminal Fleet Vehicle 2011 vs 2005 Count Comparison**

| Year | Fleet Count |
|---|---|
| 2011 | 805 |
| 2005 | 614 |
| **Change** | **191** |
| **Change, %** | **31%** |

## SECTION 9 EMISSIONS COMPARISON BY PORT

This section summarizes maritime-related emissions associated with the Ports of Everett, Olympia, Seattle, and Tacoma. The Port of Anacortes elected not to provide information relating to cargo throughputs and other data needed for this section; therefore they are not included in Section 9. Comparisons are provided between the 2011 emission estimates and emissions previously estimated for 2005.

For the Port of Everett and Port of Olympia specific comparisons, the source category emissions are tabulated similar to the 2005 report, as follows:

- Port – emissions within port terminals, adjacent rail yards, and adjacent waterways
  - Ocean-going vessel emissions (hotelling and maneuvering activities)
  - Harbor vessel emissions (10% of total recreational vessel emissions related to port-owned marinas – Ports of Everett and Olympia)
  - Cargo handling equipment emissions
  - Locomotive emissions (on-terminal and adjacent rail yards switching activities)
  - Heavy-duty vehicle emissions (queuing and on-terminal activities)
  - Fleet vehicle emissions (on-terminal activities)

The following were not included in the Port of Everett, Port of Olympia, and petroleum facilities summaries:

- Ocean-going vessels transiting mode emissions and emissions from activities that are not directly associated with the operations at port terminals or petroleum facilities.
- Harbor vessel emissions from activities that are not directly associated with the operations at Ports of Everett or Olympia terminals or petroleum facilities.
- Line-haul locomotive emissions (line-haul activities were not identified at these ports).
- Heavy-duty vehicles on-road emissions outside the ports' terminals.

For 2011, the Port of Seattle and Port of Tacoma increased the resolution from the previous report to get a better understanding of port-related emissions allocating them into three geographical zones, compared to one zone in 2005. For comparison purposes the 2011 and 2005 emissions were allocated into the following three geographical zones:

- Port –emissions within port terminals, adjacent rail yards, and adjacent waterways
  - Ocean-going vessel emissions (hotelling and maneuvering activities)
  - Harbor vessel emissions (port-related commercial harbor and government vessel activities)
  - Harbor vessel emissions (10% of total recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions
  - Locomotive emissions (switching and line haul activities)

  - Heavy-duty vehicle emissions (queuing and on-terminal activities)
  - Fleet vehicle emissions (on-terminal activities)

- Air District – all port-related emissions within PSCAA four county boundary (Pierce, King, Kitsap, and Snohomish Counties)
  - Ocean-going vessel emissions (hotelling, maneuvering, and transit emissions)
  - Harbor vessel emissions (port-related commercial harbor and government vessel activities)
  - Harbor vessel emissions (50% of total recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions
  - Locomotive emissions
  - Heavy-duty vehicle emissions
  - Fleet vehicle emissions

- Airshed – all port-related emissions within the entire emissions inventory domain
  - Ocean-going vessel emissions (hotelling, maneuvering, and transit emissions)
  - Harbor vessel emissions (commercial harbor and government vessel activities)
  - Harbor vessel emissions (100% of the recreational vessel emissions related to port-owned marinas)
  - Cargo handling equipment emissions
  - Locomotive emissions
  - Heavy-duty vehicle emissions
  - Fleet vehicle emissions

The following were not included in the Port of Seattle and Port of Tacoma summaries:

- Ocean-going vessel emissions from activities that are not directly associated with the operations at either the Port of Tacoma or Port of Seattle terminals.
- Harbor vessel emissions from activities that are not directly associated with the operations at either the Port of Tacoma or Port of Seattle terminals

In some cases, the methods used to estimate emissions for a source category or part of a source category in the 2005 PSEI were changed or updated for the 2011 PSEI to reflect improvements in data, methodologies, or calculations. In such cases, the 2005 emissions were recalculated using the 2011 methodology, or otherwise appropriately adjusted to account for the changes, in order to provide a valid basis for comparison. The comparisons are presented as 2011 and 2005 emission estimates in tons per year, the difference between years in tons per year, and the difference as a percentage increase or decrease. The percentage differences are indicative of the trend and magnitude of the changes occurring between 2011 and 2005.

## 9.1 Emissions Calculation and Allocation Methodology Changes

Changes in emission calculation methodologies are discussed below for each source category:

*Ocean-Going Vessels*

The ocean-going vessel emission calculation methodology used in the 2011 inventory is similar to the methodology used in 2005. The maneuvering and hotelling allocations are slightly different in 2011 due to refinements in the resolution of vessel movements associated with modes of operation, thus the 2005 maneuvering and hotelling allocations were adjusted to match 2011 for comparison.

In 2005, port-related ocean-going vessel emissions were allocated to only to the port zone (in adjacent waters). As mentioned in Sections 2.2 and 9.1, in 2011, the Port of Tacoma and Seattle are reporting port-related emissions in the three geographical zones (port, air district, airshed), which resulted in a refinement of allocating 2005 emissions for each port. The 2005 total ocean-going vessel emissions for each port did not change, only refinements to the allocations based on the new zones.

*Harbor Vessels*

The commercial harbor vessel emissions for assist tugs, tank barges, and port-owned vessels were included for the respective Port of Seattle and Port of Tacoma comparisons only.

The emissions calculation methodology was similar to the methodology used in 2005, with the exception of updated load factors used in 2011. The load factors for harbor tug, ferry, excursion vessel and workboat were updated in 2011 based on updated information from Washington State Ferries for the ferry load factor, EPA NONROAD for excursion vessel load factor, and the latest POLA and POLB emissions inventories[61] for workboat load factor. For commercial harbor vessel emissions comparison, the 2005 emissions were adjusted for the updated load factor so that the emissions would be comparable.

A similar methodology was used for recreational vessels in 2011 and 2005. The same assumptions for percent of engine type (diesel, gasoline 2-stroke, gasoline 4-stroke) and engine size were used in both inventories. For recreational vessels, NONROAD2008a was used to estimate 2011 and 2005 emissions. This was done to allow for a direct comparison.

In 2005, port-related commercial harbor and government vessels were not included in the port specific breakouts. For 2011, the port-related commercial harbor and government vessel emissions are allocated within the applicable new geographical zones.

For recreational vessels, in 2005 all recreational vessel emissions from port-owned marinas were included with the specific port-related emissions. For 2011, recreational vessels from port owned marinas are broken out by the newly redefined geographical zones, as applicable and described above in Section 9.1, to make more direct comparisons within each zone.

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[61] POLA: *http://www.portoflosangeles.org/pdf/2011_Air_Emissions_Inventory.pdf*
POLB: *http://www.polb.com/civica/filebank/blobdload.asp?BlobID=10194*

### *Cargo Handling Equipment*

The cargo handling equipment emission calculation methodology used in the 2011 inventory is similar to the methodology used in 2005. The one exception is the load factor used for diesel yard tractors. The 0.59 EPA NONROAD load factor was used in the 2005 EI and 0.39 was used in the 2011 EI based on a 2008 study of yard tractors operating in a port environment.[62] Thus, the 2005 emissions were re-calculated using the 2011 load factor for diesel yard tractors in order for the 2011 and 2005 emissions to be comparable.

There were no allocation changes for cargo handling equipment as the equipment does not operate outside the terminals.

### *Locomotives*

The only change in the locomotive emission calculation methodology used in the 2011 inventory as compared to the 2005 methodology is the use of an updated value for brake-specific fuel consumption (BSFC) that affects the estimates of $CO_2$ emissions. The EPA published an updated emission factor document in April 2009[63]. That document includes a different value for BSFC from the value used for the 2005 PSEI, which was based on prior EPA guidance. The result of the change is higher estimates of $CO_2$ emissions from switching locomotives than that in the 2005 PSEI report.

Allocations for 2005 did not change and 2011 port-related locomotive emissions for Port of Tacoma and Port of Seattle we allocated into the three geographic zones.

### *Heavy-Duty Vehicles*

Two changes were made to the emission calculation methodology for HDVs used in the 2011 inventory as compared to the 2005 methodology. One was an adjustment to on-road emission estimates to account for differences in the current regional travel demand model used by the PSRC to estimate on-road activity and emissions. The other was emission factor adjustments made to account for differences in the size categories of HDVs included in the composite emission factors. The 2011 emission factors are specific to the heaviest size categories of HDVs that are typical of the trucks that call on port terminals, while the 2005 emission factors had included smaller size categories that are less common in the fleet.

Allocations for 2005 did not change and 2011 port-related heavy-duty vehicle emissions for Port of Tacoma and Port of Seattle we allocated into the three geographic zones.

### *Fleet Vehicles – Terminal Fleet Vehicles*

Terminal fleet vehicles are the only fleet vehicles evaluated in this section as the focus is to look at vehicles residing on the terminals. There is no change in the terminal fleet vehicle emission calculation methodology used in the 2011 inventory as compared to the 2005 methodology.

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[62] Ports of Los Angeles and Long Beach, *San Pedro Bay Ports Yard Tractor Load Factor Study*, December 2008.

[63] EPA, *Emission Factors for Locomotives*: EPA-420-F-09-025, Office of Transportation and Air Quality, April 2009

## 9.2 Port of Everett

In 2011, the TEU and tonnage in metric tons or tonnes of cargo increased compared to 2005 for the Port of Everett. In 2005, the Port added 3 new international shipping lines and in 2006, the Port recruited and signed an agreement with a cement company. These changes have brought increased activity to the Port and have resulted in TEU throughput doubling since 2005 and almost a 50% increase in cargo tonnage, as presented in Table 9.1.

**Table 9.1: Port of Everett 2011 vs 2005 TEU and Cargo Throughput Comparison**

| Year | Container Throughput (TEU) | Cargo Throughput (tonnes) |
|---|---:|---:|
| 2011 | 20,918 | 152,995 |
| 2005 | 9,561 | 103,757 |
| **Change, %** | **119%** | **47%** |

Metrics are used to track air emissions efficiencies of operations on emissions per unit of cargo throughput basis. Table 9.2 presents a simple metric of tons of emissions (excluding port-related recreational vessels) per 10,000 tonnes of cargo in 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005.

**Table 9.2: Port of Everett 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---:|---:|---:|---:|---:|---:|---:|---:|
| 2011 | 8.73 | 0.63 | 2.93 | 3.52 | 0.55 | 0.48 | 0.51 | 524 |
| 2005 | 12.17 | 0.79 | 3.47 | 3.88 | 0.65 | 0.58 | 0.57 | 642 |
| **Change (%)** | **-28%** | **-20%** | **-15%** | **-9%** | **-15%** | **-17%** | **-9%** | **-18%** |

The emissions-related efficiency improvements from 2011 vs 2005 range from 9% less DPM/CO emissions to 28% less $NO_x$, on a ton of emissions per 10,000 tonnes cargo moved through the port basis. The 2011 vs 2005 emissions-related efficiency changes are presented by pollutant in graphical form in Figure 9.1.

**Figure 9.1: Port of Everett 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Change**

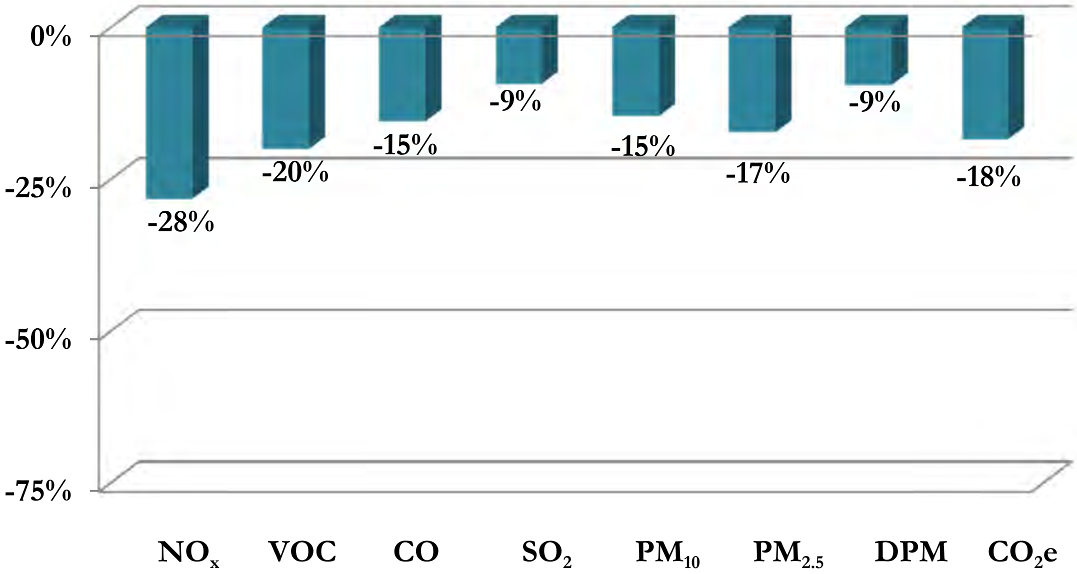

Table 9.3 presents a summary comparison of the 2011 and 2005 emissions by source category, with the 2005 emissions being recalculated or adjusted as discussed in Section 9.1. Each source category's emissions comparison for the Port of Everett is discussed in the following subsections.

**Table 9.3: Port of Everett 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 47.2 | 1.4 | 3.8 | 53.315 | 3.942 | 3.154 | 3.363 | 3,059 |
| Recreational vessels | 7.6 | 8.4 | 82.8 | 0.015 | 0.184 | 0.172 | 0.054 | 956 |
| Locomotives | 62.1 | 5.0 | 9.0 | 0.500 | 2.200 | 2.000 | 2.200 | 3,298 |
| Cargo handling equipment | 23.4 | 2.4 | 24.6 | 0.013 | 2.300 | 2.200 | 2.300 | 1,375 |
| Heavy-duty vehicles | 0.1 | 0.0 | 0.1 | 0.000 | 0.002 | 0.001 | 0.002 | 12 |
| Terminal fleet vehicles | 0.8 | 0.8 | 7.4 | 0.005 | 0.009 | 0.008 | 0.002 | 273 |
| **Total** | **141.2** | **18.0** | **127.7** | **53.848** | **8.636** | **7.534** | **7.920** | **8,972** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 21.7 | 0.7 | 1.7 | 33.635 | 2.201 | 1.761 | 1.385 | 1,983 |
| Recreational vessels | 7.9 | 17.2 | 115.6 | 0.186 | 0.350 | 0.325 | 0.060 | 929 |
| Locomotives | 79.8 | 4.6 | 8.4 | 4.914 | 2.028 | 1.866 | 2.028 | 3,057 |
| Cargo handling equipment | 23.0 | 2.4 | 22.1 | 1.663 | 2.456 | 2.383 | 2.450 | 1,406 |
| Heavy-duty vehicles | 1.0 | 0.1 | 0.7 | 0.018 | 0.020 | 0.019 | 0.020 | 90 |
| Terminal fleet vehicles | 0.7 | 0.4 | 3.1 | 0.005 | 0.010 | 0.010 | 0.009 | 126 |
| **Total** | **134.2** | **25.4** | **151.6** | **40.422** | **7.066** | **6.363** | **5.952** | **7,590** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | 117% | 114% | 121% | 59% | 79% | 79% | 143% | 54% |
| Recreational vessels | -4% | -51% | -28% | -92% | -48% | -47% | -10% | 3% |
| Locomotives | -22% | 8% | 7% | -90% | 8% | 7% | 8% | 8% |
| Cargo handling equipment | 2% | 1% | 11% | -99% | -6% | -8% | -6% | -2% |
| Heavy-duty vehicles | -88% | -88% | -91% | -100% | -90% | -95% | -90% | -87% |
| Terminal fleet vehicles | 8% | 96% | 138% | 0% | -10% | -20% | -78% | 116% |
| **Total** | **5%** | **-29%** | **-16%** | **33%** | **22%** | **18%** | **33%** | **18%** |

*Ocean-Going Vessels*

The hotelling and maneuvering ocean-going vessel emissions at the Port of Everett increased in 2011 as compared to 2005. Table 9.4 presents the OGV emissions comparison for 2011 and 2005. The increase in ocean-going vessel emissions is due to increases in the number of vessel activities and TEU throughput which doubled in 2011 as compared to 2005.

**Table 9.4: Port of Everett 2011 vs 2005 OGV Port Emissions Comparison, tpy**

| Emissions | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 47.2 | 1.4 | 3.8 | 53.3 | 3.9 | 3.2 | 3.4 | 3,059 |
| 2005 | 21.7 | 0.7 | 1.7 | 33.6 | 2.2 | 1.8 | 1.4 | 1,983 |
| **Change, tpy** | **25.5** | **0.8** | **2.1** | **19.7** | **1.7** | **1.4** | **2.0** | **1,076** |
| **Change, %** | **117%** | **114%** | **121%** | **59%** | **79%** | **79%** | **143%** | **54%** |

The increase in emissions is directly related to the increase in ocean-going vessel activity as presented in Table 9.5. Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

**Table 9.5: Port of Everett 2011 vs 2005 OGV Activity Comparison**

| Year | OGV Inbound Activity |
|---|---|
| 2011 | 103 |
| 2005 | 47 |
| **Change, %** | **119%** |

*Harbor Vessels - Recreational Vessels*

Table 9.6 presents the recreational vessel emissions comparison for 2011 vs 2005. Most of the recreational vessel emissions decreased in 2011 when compared to 2005. This change is most likely due to the combination of use of lower sulfur fuel by diesel and gasoline engines and the emissions model assuming a cleaner fleet in 2011 than in 2005. Since there is no detailed information for the recreational vessel engines, the emissions model makes assumptions regarding the fleet mix. EPA has cleaner engine standards for gasoline engines, which reduced VOC, CO and PM in 2011.

For the Port of Everett, recreational vessel count increased 11% in 2011 due to the marina expansion.

**Table 9.6: Port of Everett 2011 vs 2005 Port Recreational Vessels Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 7.6 | 8.4 | 82.8 | 0.02 | 0.18 | 0.17 | 0.05 | 955.7 |
| 2005 | 7.9 | 17.2 | 115.6 | 0.19 | 0.35 | 0.33 | 0.06 | 928.7 |
| **Change (tpy)** | **-0.3** | **-8.8** | **-32.8** | **-0.17** | **-0.17** | **-0.15** | **-0.01** | **27.1** |
| **Change (%)** | **-4%** | **-51%** | **-28%** | **-92%** | **-48%** | **-47%** | **-10%** | **3%** |

*Cargo Handling Equipment*

Table 9.7 presents the emissions estimate comparison for calendar year 2011 and 2005 for cargo handling equipment in tons per year and as a percent change. Cargo handling equipment emissions decreased significantly for $SO_2$ due to the mandated use of ULSD in all diesel equipment. PM emissions also decreased as a result of using ULSD in 2011. Table 9.8 presents the activity and equipment count comparison for calendar year 2011 and 2005 for cargo handling equipment. $NO_x$, VOC and CO each had a slight increase in emissions as the result of the activity increase shown in Table 9.8.

**Table 9.7: Port of Everett 2011 vs 2005 Port CHE Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 23.4 | 2.40 | 24.6 | 0.013 | 2.30 | 2.20 | 2.30 | 1,375 |
| 2005 | 23.0 | 2.38 | 22.1 | 1.663 | 2.46 | 2.38 | 2.45 | 1,406 |
| **Change, tpy** | **0.4** | **0.02** | **2.5** | **-1.650** | **-0.16** | **-0.18** | **-0.15** | **-31** |
| **Change, %** | **2%** | **1%** | **11%** | **-99%** | **-6%** | **-8%** | **-6%** | **-2%** |

**Table 9.8: Port of Everett 2011 vs 2005 CHE Activity and Equipment Count Comparison**

| Year | Activity (hp-hr) | Count |
|---|---|---|
| 2011 | 2,222,824 | 74 |
| 2005 | 2,163,785 | 62 |
| **Change, %** | **3%** | **19%** |

*Locomotives*

Table 9.9 presents the port emissions (on-terminal and adjacent rail yards) estimate comparison for calendar year 2011 and 2005 for switching locomotive emissions in tons per year and as a percent change. The port locomotive emissions are lower for most of the pollutants in 2011 than in 2005 due to a combination of improved fuel efficiency for the locomotives, and use of lower emissions locomotives. The lower emission locomotives are the result of the Class 1 railroads placing newer, lower emission locomotives into service throughout their fleets. CO and greenhouse gas emissions increased in 2011 as compared to 2005 due to increased throughput at the Port of Everett.

**Table 9.9: Port of Everett 2011 vs 2005 Port Locomotive Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 62 | 5 | 9 | 1 | 2 | 2 | 2 | 3,298 |
| 2005 | 80 | 5 | 8 | 5 | 2 | 2 | 2 | 3,057 |
| **Change, tpy** | **-18** | **0** | **1** | **-4** | **0** | **0** | **0** | **241** |
| **Change, %** | **-23%** | **0%** | **12%** | **-81%** | **0%** | **0%** | **0%** | **8%** |

*Heavy-Duty Vehicles*

Table 9.10 presents the emissions estimate comparison for calendar year 2011 and 2005 for on-terminal heavy-duty vehicles in tons per year and as a percent change. The on-terminal heavy-duty vehicle emissions were reduced by 87-100% for all pollutants in 2011. This is due to the a lower number of truck trips and idling time, the use of ULSD, as reported by the Port, and newer trucks in 2011 as compared to the 2005 fleet.

**Table 9.10: Port of Everett 2011 vs 2005 Port HDV Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 0.12 | 0.01 | 0.06 | 0.00 | 0.002 | 0.001 | 0.002 | 12 |
| 2005 | 0.98 | 0.08 | 0.68 | 0.02 | 0.020 | 0.019 | 0.020 | 90 |
| **Change, tpy** | **-0.86** | **-0.07** | **-0.62** | **-0.02** | **-0.02** | **-0.02** | **-0.02** | **-78** |
| **Change, %** | **-88%** | **-88%** | **-91%** | **-100%** | **-90%** | **-95%** | **-90%** | **-87%** |

*Fleet Vehicles – Terminal Fleet Vehicles*

Table 9.11 presents the emissions estimate comparison for calendar year 2011 and 2005 for terminal fleet vehicles in tons per year and as a percent change. In 2011, there were a total of 65 terminal fleet vehicles inventoried which was more than the 39 inventoried in 2005. The increase in 2011 emissions for some of the pollutants may be due to the increase in the number of vehicles. The increase in CO emissions and decrease in PM emissions may be due to different engine types (gasoline, diesel, alternative-fueled) for 2011 and 2005 vehicle inventories.

**Table 9.11: Port of Everett 2011 vs 2005 Port Terminal Fleet Vehicles Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 0.8 | 0.8 | 7.4 | 0.005 | 0.009 | 0.008 | 0.002 | 273 |
| 2005 | 0.7 | 0.4 | 3.1 | 0.005 | 0.010 | 0.010 | 0.009 | 126 |
| **Change, tpy** | **0.1** | **0.4** | **4.3** | **0.000** | **-0.001** | **-0.002** | **-0.007** | **146** |
| **Change, %** | **8%** | **95%** | **138%** | **0%** | **-10%** | **-20%** | **-78%** | **116%** |

## 9.3 Port of Olympia

In 2011, no containers were handled at the Port of Olympia, but general cargo throughput increased fivefold between 2011 and 2005, as presented in Table 9.12.

**Table 9.12: Port of Olympia 2011 vs 2005 TEU and Tonnage Comparison**

| Year | Container Throughput (TEU) | Cargo Throughput (tonnes) |
|---|---|---|
| 2011 | 0 | 711,536 |
| 2005 | 903 | 129,512 |
| **Change, %** | **-100%** | **449%** |

Table 9.13 presents a simple metric of total tons of emissions per 10,000 tonnes of cargo in 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005.

**Table 9.13: Port of Olympia 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 7.6 | 0.4 | 2.6 | 1.9 | 0.5 | 0.5 | 0.5 | 753 |
| 2005 | 40.7 | 3.1 | 16.0 | 14.5 | 2.8 | 2.6 | 2.6 | 2,558 |
| **Change (%)** | **-81%** | **-86%** | **-84%** | **-87%** | **-82%** | **-82%** | **-83%** | **-71%** |

The emissions-related efficiency improvements from 2011 vs 2005 range from 71% less $CO2_e$ emissions to 87% less $SO_2$, on a ton of emissions per 10,000 tonnes cargo moved through the port basis. The 2011 vs 2005 emissions-related efficiency changes are presented by pollutant in graphical form in Figure 9.1.

**Figure 9.2: Port of Olympia 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Change**

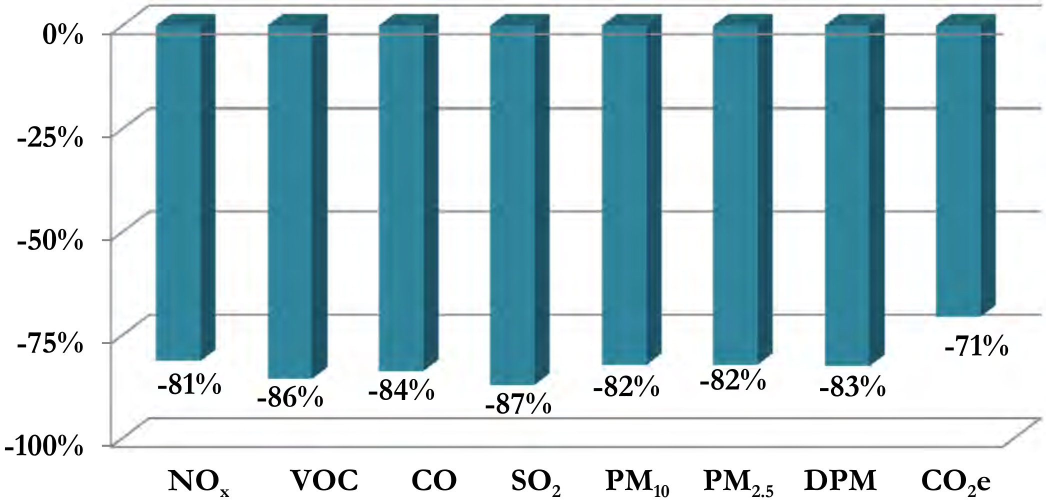

Table 9.14 presents a summary comparison of the 2011 and 2005 emissions by source category. Each source category emissions comparison for the Port of Olympia is discussed in the following subsections.

**Table 9.14: Port of Olympia 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 7.54 | 0.247 | 0.65 | 13.329 | 0.8525 | 0.682 | 0.511 | 779 |
| Recreational vessels | 2.35 | 2.583 | 25.48 | 0.005 | 0.0565 | 0.053 | 0.017 | 294 |
| Locomotives, near-port | 3.70 | 0.200 | 0.40 | 0.002 | 0.1000 | 0.100 | 0.100 | 164 |
| Cargo handling equipment | 42.90 | 2.700 | 17.40 | 0.039 | 2.6000 | 2.500 | 2.600 | 4,408 |
| Heavy-duty vehicles, on-terminal | 0.09 | 0.000 | 0.06 | 0.000 | 0.0010 | 0.001 | 0.001 | 8 |
| Terminal fleet vehicles | 0.01 | 0.004 | 0.03 | 0.000 | 0.0001 | 0.000 | 0.000 | 2 |
| **Total** | **56.58** | **5.734** | **44.02** | **13.374** | **3.6101** | **3.336** | **3.229** | **5,654** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 10.72 | 0.316 | 0.84 | 14.595 | 0.9900 | 0.792 | 0.700 | 846 |
| Recreational vessels | 2.71 | 5.884 | 39.48 | 0.064 | 0.1196 | 0.111 | 0.021 | 317 |
| Locomotives, near-port | 14.98 | 0.869 | 1.58 | 0.923 | 0.3808 | 0.350 | 0.381 | 574 |
| Cargo handling equipment | 25.79 | 2.706 | 17.46 | 3.233 | 2.2559 | 2.188 | 2.253 | 1,774 |
| Heavy-duty vehicles, on-terminal | 1.26 | 0.105 | 0.85 | 0.024 | 0.0267 | 0.025 | 0.027 | 119 |
| Terminal fleet vehicles | na | na | na | na | na | na | na | na |
| **Total** | **55.45** | **9.880** | **60.21** | **18.839** | **3.7730** | **3.466** | **3.381** | **3,630** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -30% | -22% | -23% | -9% | -14% | -14% | -27% | -8% |
| Recreational vessels | -13% | -56% | -35% | -93% | -53% | -52% | -19% | -7% |
| Locomotives, near-port | -75% | -77% | -75% | -100% | -74% | -71% | -74% | -71% |
| Cargo handling equipment | 66% | 0% | 0% | -99% | 15% | 14% | 15% | 148% |
| Heavy-duty vehicles, on-terminal | -93% | -100% | -93% | -100% | -96% | -96% | -96% | -93% |
| Terminal fleet vehicles | na | na | na | na | na | na | na | na |
| **Total** | **2%** | **-42%** | **-27%** | **-29%** | **-4%** | **-4%** | **-4%** | **56%** |

*Ocean-Going Vessels*

Table 9.15 presents the ocean-going vessel emissions comparison for 2011 and 2005. Hotelling and maneuvering ocean-going vessel emissions at the Port of Olympia decreased in 2011 as compared to 2005, while the ocean-going vessel activities increased (see Table 9.16). The difference may be due to different vessel types calling the Port in 2011 vs 2005, which has an effect on the engine size and load. Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

**Table 9.15: Port of Olympia 2011 vs 2005 Port OGV Emissions Comparison, tpy**

| Emissions | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 7.5 | 0.2 | 0.6 | 13.3 | 0.9 | 0.7 | 0.5 | 779 |
| 2005 | 10.7 | 0.3 | 0.8 | 14.6 | 1.0 | 0.8 | 0.7 | 846 |
| **Change, tpy** | **-3.2** | **-0.1** | **-0.2** | **-1.3** | **-0.1** | **-0.1** | **-0.2** | **-67** |
| **Change, %** | **-30%** | **-22%** | **-23%** | **-9%** | **-14%** | **-14%** | **-27%** | **-8%** |

**Table 9.16: Port of Olympia 2011 vs 2005 OGV Activity Comparison**

| Year | OGV Inbound Activity |
|---|---|
| 2011 | 26 |
| 2005 | 20 |
| **Change, %** | **30%** |

*Harbor Vessels - Recreational Vessels*

Table 9.17 presents the recreation vessel emissions comparison for 2011 vs 2005. Most of the recreational vessel emissions decreased in 2011 when compared to 2005. This change is most likely due to the combination of use of lower sulfur fuel by diesel engines and the emissions model assuming a cleaner fleet in 2011 than in 2005. Since there is no detailed information for the recreational vessel engines, the emissions model makes assumptions regarding the fleet mix. EPA has cleaner engine standards for gasoline engines, which reduced VOC, CO and PM emissions in 2011.

For Port of Olympia, the recreational vessel count stayed the same in both inventory years.

**Table 9.17: Port of Olympia 2011 vs 2005 Port Recreational Vessel Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 2.35 | 2.58 | 25.48 | 0.005 | 0.056 | 0.053 | 0.017 | 294 |
| 2005 | 2.71 | 5.88 | 39.48 | 0.064 | 0.120 | 0.111 | 0.021 | 317 |
| **Change (tpy)** | **-0.36** | **-3.30** | **-14.00** | **-0.059** | **-0.063** | **-0.058** | **-0.004** | **-23** |
| **Change (%)** | **-13%** | **-56%** | **-35%** | **-93%** | **-53%** | **-52%** | **-19%** | **-7%** |

*Cargo Handling Equipment*

Table 9.18 presents the cargo handling equipment emissions estimate comparison for calendar year 2011 and 2005 in tons per year and as a percent change. Cargo handling equipment emissions decreased significantly for $SO_2$ due to the use of ULSD by all diesel equipment. The cargo handling equipment emissions increase for $NO_x$, PM and $CO_2$is due to the increased activity in 2011.

**Table 9.18: Port of Olympia 2011 vs 2005 Port CHE Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 42.9 | 2.7 | 17.4 | 0.04 | 2.6 | 2.5 | 2.6 | 4,408 |
| 2005 | 25.8 | 2.7 | 17.5 | 3.23 | 2.3 | 2.2 | 2.3 | 1,774 |
| **Change, tpy** | **17.1** | **0.0** | **-0.1** | **-3.19** | **0.3** | **0.3** | **0.3** | **2,634** |
| **Change, %** | **66%** | **0%** | **0%** | **-99%** | **15%** | **14%** | **15%** | **148%** |

Table 9.19 presents the activity and equipment count comparison for calendar year 2011 and 2005 for cargo handling equipment. The increase in activity and equipment count is reflective of the increased cargo tonnage in 2011 as compared to 2005.

**Table 9.19: Port of Olympia 2011 vs 2005 CHE Activity and Equipment Count Comparison**

| Year | Activity (hp-hr) | Count |
|---|---|---|
| 2011 | 7,314,297 | 53 |
| 2005 | 2,605,002 | 33 |
| **Change, %** | **181%** | **61%** |

*Locomotives*

Table 9.20 presents the port emissions (on-terminal and adjacent port areas) estimate comparison for calendar year 2011 and 2005 for switching locomotive emissions in tons per year and as a percent change. The port locomotive emissions are lower for all pollutants in 2011 due to a combination of improved fuel efficiency for the locomotives, and lower emissions locomotives.

**Table 9.20: Port of Olympia 2011 vs 2005 Port Locomotive Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 4 | 0.2 | 0.4 | 0.0 | 0.1 | 0.1 | 0.1 | 164 |
| 2005 | 15 | 0.9 | 1.6 | 0.9 | 0.4 | 0.4 | 0.4 | 574 |
| **Change, tpy** | **-11** | **-0.7** | **-1.2** | **-0.9** | **-0.3** | **-0.3** | **-0.3** | **-410** |
| **Change, %** | **-75%** | **-77%** | **-75%** | **-100%** | **-74%** | **-71%** | **-74%** | **-71%** |

*Heavy-Duty Vehicles*

Table 9.21 presents the emissions estimate comparison for calendar year 2011 and 2005 for port heavy duty vehicles in tons per year and as a percent change. The on-terminal heavy-duty vehicle emissions are lower for all pollutants in 2011. This is due to a lower number of truck trips, idling time, the use of ULSD, as reported by the Port, and newer truck fleet in 2011 as compared to 2005.

**Table 9.21: Port of Olympia 2011 vs 2005 Port HDV Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 0.090 | 0.000 | 0.060 | 0.000 | 0.001 | 0.001 | 0.001 | 8 |
| 2005 | 1.260 | 0.105 | 0.855 | 0.024 | 0.027 | 0.025 | 0.027 | 119 |
| **Change, tpy** | **-1.170** | **-0.105** | **-0.795** | **-0.024** | **-0.026** | **-0.024** | **-0.026** | **-111** |
| **Change, %** | **-93%** | **-100%** | **-93%** | **-100%** | **-96%** | **-96%** | **-96%** | **-93%** |

## 9.4 Port of Seattle

As part of the 2011 inventory update for the Port of Seattle, port-related port emissions were quantified with the similar approach used in 2005 and in addition port-related emissions were quantified for the entire airshed. To achieve a direct comparison, the 2005 data was recalculated using the 2011 emissions estimate methodology (as described in the previous sections and Section 10). In 2011, the TEU throughput of containers at the Port of Seattle decreased, the throughput of metric tons of cargo increased, and cruise passenger counts increased 29% as compared to that of 2005 and as presented in Table 9.22.

**Table 9.22: Port of Seattle 2011 vs 2005 TEU and Cargo Throughput Comparison**

| Year | Container Throughput (TEU) | Cargo (tonnes) | Cruise Passengers |
|---|---|---|---|
| 2011 | 2,033,535 | 22,762,678 | 885,949 |
| 2005 | 2,087,929 | 20,564,860 | 686,978 |
| **Change, %** | **-3%** | **11%** | **29%** |

The 2011 vs 2005 emissions and efficiency comparisons for the Port of Seattle are presented in subsections 9.4.1 2011 vs 2005 Port Emissions Comparisons and 9.4.2 2011 vs 2005 Airshed Emissions Comparisons below.

### *9.4.1 2011 vs 2005 Port Emissions Comparisons*

Table 9.23 presents a simple metric of TEU emissions efficiency, expressed in port tons of emissions per 10,000 TEU, for 2011 and 2005. The port tons of emissions per 10,000 TEU decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo and that port-related cruise ship emissions are included in this simple metric.

**Table 9.23: Port of Seattle 2011 vs 2005 Port Tons of Emissions per 10,000 TEU Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 8.6 | 0.5 | 1.9 | 3.0 | 0.4 | 0.4 | 0.4 | 661 |
| 2005 | 10.3 | 0.7 | 4.3 | 5.3 | 0.6 | 0.5 | 0.6 | 707 |
| **Change (%)** | **-16%** | **-30%** | **-56%** | **-44%** | **-30%** | **-30%** | **-29%** | **-6%** |

The port emissions-related efficiency improvements from 2011 vs 2005 range from 6% less $CO_2e$ emissions to 54% less CO, on a ton of emissions per 10,000 TEU moved through the port basis. The 2011 vs 2005 emissions-related efficiency changes are presented by pollutant in graphical form in Figure 9.3.

**Figure 9.3: Port of Seattle 2011 vs 2005 Port Tons of Emissions per 10,000 TEU Change**

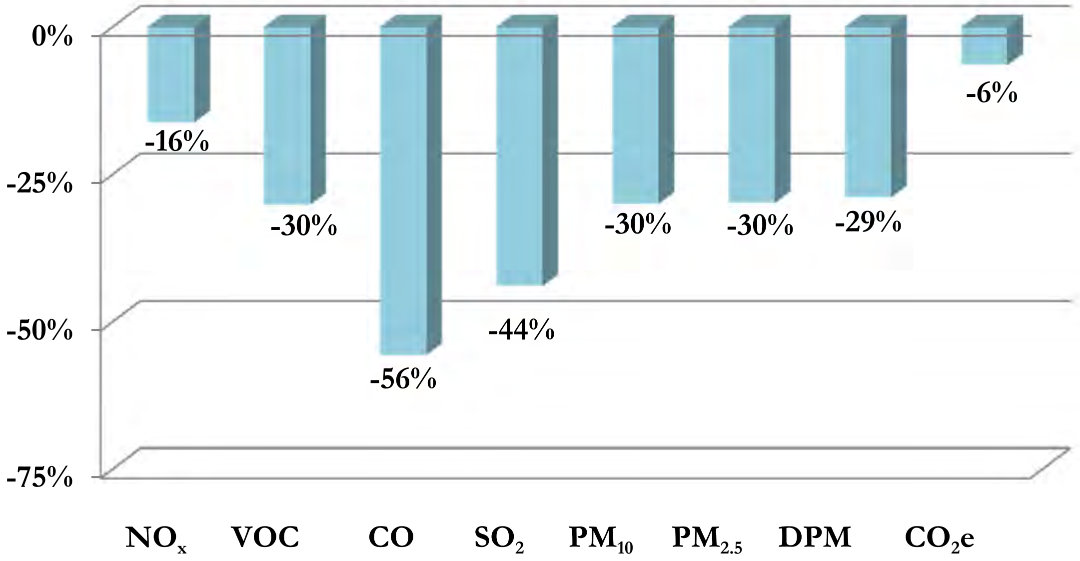

Table 9.24 presents a simple metric of cargo emissions efficiency, expressed in port tons of emissions per 10,000 tonnes of cargo, for 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo and that port-related cruise ship emissions are included in this simple metric.

**Table 9.24: Port of Seattle 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 0.77 | 0.04 | 0.17 | 0.27 | 0.04 | 0.03 | 0.04 | 59 |
| 2005 | 1.04 | 0.07 | 0.44 | 0.54 | 0.06 | 0.05 | 0.06 | 72 |
| **Change (%)** | **-26%** | **-39%** | **-61%** | **-51%** | **-38%** | **-38%** | **-37%** | **-18%** |

The port cargo emissions efficiencyimprovements2011 vs 2005 range from 17% less $CO_2e$ emissions to 60% less CO tons of emissions per 10,000 tonnes cargo moved through the port. The changes in the 2011 vs 2005 emissions normalized to cargo throughput for all pollutants are presented in graphical form in Figure 9.4.

**Figure 9.4: Port of Seattle 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Change**

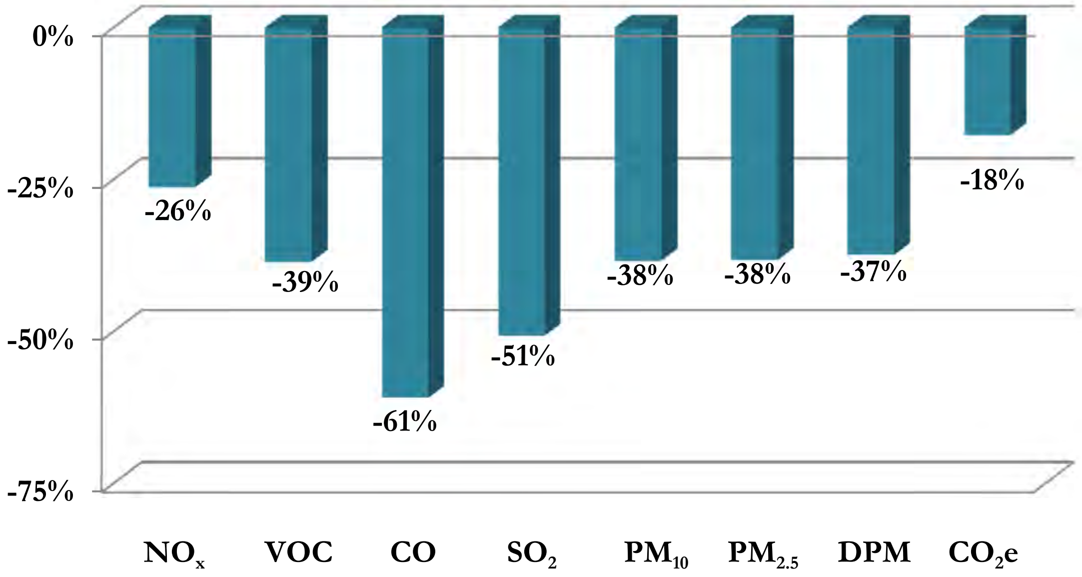

Table 9.25 presents a summary comparison of the 2011 vs 2005 Port Emissions by source category. Each source category emissions comparison for the Port of Seattle is discussed in the following subsections. For the Port of Seattle, harbor vessels below include port-owned and commercial harbor vessels.

**Table 9.25: Port of Seattle 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 748 | 26 | 66 | 600.51 | 47.69 | 38.15 | 38.62 | 54,479 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Harbor vessels | 334 | 22 | 72 | 0.21 | 13.24 | 12.21 | 13.04 | 20,415 |
| Recreational vessels | 6 | 6 | 61 | 0.05 | 0.14 | 0.14 | 0.04 | 708 |
| Locomotives | 290 | 20 | 45 | 2.54 | 10.50 | 9.60 | 10.50 | 16,828 |
| Cargo handling equipment | 306 | 18 | 158 | 0.30 | 16.70 | 16.20 | 16.70 | 34,561 |
| Heavy-duty vehicles | 68 | 6 | 38 | 0.07 | 0.82 | 0.76 | 0.82 | 7,038 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0.02 | 0.03 | 0.03 | 0.02 | 1,053 |
| **Total** | **1,754** | **99** | **454** | **603.69** | **89.12** | **77.09** | **79.75** | **135,083** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 861 | 28 | 72 | 978.73 | 73.84 | 59.08 | 58.86 | 60,474 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Harbor vessels | 316 | 22 | 66 | 33.74 | 13.79 | 12.71 | 13.58 | 18,073 |
| Recreational vessels | 7 | 15 | 104 | 0.17 | 0.31 | 0.29 | 0.05 | 832 |
| Locomotives | 448 | 25 | 55 | 40.22 | 13.27 | 12.21 | 13.27 | 20,561 |
| Cargo handling equipment | 418 | 51 | 616 | 52.27 | 27.62 | 26.80 | 27.40 | 38,135 |
| Heavy-duty vehicles | 96 | 8 | 67 | 1.82 | 1.99 | 1.83 | 1.99 | 8,884 |
| Terminal fleet vehicles | 5 | 3 | 31 | 0.02 | 0.02 | 0.02 | 0.02 | 1,403 |
| **Total** | **2,151** | **152** | **1,012** | **1,106.95** | **130.85** | **112.93** | **115.18** | **148,362** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -13% | -7% | -8% | -39% | -35% | -35% | -34% | -10% |
| OGV, transit | na | na | na | na | na | na | na | na |
| Harbor vessels | 6% | -1% | 9% | -99% | -4% | -4% | -4% | 13% |
| Recreational vessels | -20% | -60% | -41% | -71% | -55% | -52% | -14% | -15% |
| Locomotives | -35% | -19% | -18% | -94% | -21% | -21% | -21% | -18% |
| Cargo handling equipment | -27% | -64% | -74% | -99% | -40% | -40% | -39% | -9% |
| Heavy-duty vehicles | -29% | -28% | -43% | -96% | -59% | -59% | -59% | -21% |
| Terminal fleet vehicles | -43% | -70% | -60% | 20% | 67% | 60% | -19% | -25% |
| **Total** | **-18%** | **-35%** | **-55%** | **-45%** | **-32%** | **-32%** | **-31%** | **-9%** |

*Ocean-Going Vessels*

The ocean-going vessel hotelling and maneuvering port emissions at the Port of Seattle decreased for all pollutants in 2011 as compared to that in 2005. This is due to a combination of the decreased activity and emission reduction strategies used in 2011 to reduce vessel emissions while at berth. Some of the cruise vessels use shore power while at berth and other cruise and shipping lines participated in the At-Berth-Clean (ABC) Fuels Program and switched to low sulfur fuel use while at berth in 2011. Table 9.26 presents the ocean-going vessel emissions comparison for 2011 vs 2005, and Table 9.27 presents the change in vessel inbound activities. Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

**Table 9.26: Port of Seattle 2011 vs 2005 OGV Port Emissions Comparison, tpy**

| Emissions | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 748.3 | 26.2 | 66.2 | 600.5 | 47.7 | 38.2 | 38.6 | 54,479 |
| 2005 | 860.7 | 28.2 | 72.2 | 978.7 | 73.8 | 59.1 | 58.9 | 60,474 |
| **Change, tpy** | **-112.4** | **-2.0** | **-5.9** | **-378.2** | **-26.2** | **-20.9** | **-20.2** | **-5,995** |
| **Change, %** | **-13%** | **-7%** | **-8%** | **-39%** | **-35%** | **-35%** | **-34%** | **-10%** |

**Table 9.27: Port of Seattle 2011 vs 2005 OGV Activity Comparison**

| Year | OGV Inbound Activities |
|---|---|
| 2011 | 1,136 |
| 2005 | 1,197 |
| **Change, %** | **-5%** |

*Harbor Vessels - Commercial Harbor and Government Vessels*

Table 9.28 presents the comparison for 2011 vs 2005 of port commercial harbor and government vessel emissions related to the Port. The $NO_x$, CO and greenhouse emissions increased, while $SO_2$ emissions decreased and PM emission remained the same in 2011. The lower $SO_2$ emissions are due to the use of lower sulfur fuel in 2011. The increased $NO_x$ and CO emissions were due to increased assist tug and workboat activity for the Port of Seattle.

**Table 9.28: Port of Seattle 2011 vs 2005 Port Commercial Harbor and Government Vessel Emissions Comparison, tpy**

| Type | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 334 | 22 | 72 | 0 | 13 | 12 | 13 | 20,415 |
| 2005 | 316 | 22 | 66 | 34 | 14 | 13 | 14 | 18,073 |
| **Change (%)** | **6%** | **-1%** | **9%** | **-99%** | **-4%** | **-4%** | **-4%** | **13%** |

*Harbor Vessels - Recreational Vessels*

Table 9.29 presents the comparison for 2011 vs 2005 of port recreational vessel emissions related to port-owned marinas. Again, it should be noted that it is assumed that 10% of the total recreational vessel emissions occurs in the port zone.

**Table 9.29: Port of Seattle 2011 vs 2005 Port Recreational Vessel Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2E$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 5.7 | 6.2 | 61.4 | 0.01 | 0.14 | 0.13 | 0.04 | 708 |
| 2005 | 7.1 | 15.4 | 103.5 | 0.17 | 0.31 | 0.29 | 0.05 | 832 |
| **Change (tpy)** | **-1.5** | **-9.2** | **-42.2** | **-0.16** | **-0.17** | **-0.16** | **-0.01** | **-123** |
| **Change (%)** | **-20%** | **-60%** | **-41%** | **-94%** | **-55%** | **-55%** | **-20%** | **-15%** |

*Cargo Handling Equipment*

Table 9.30 presents the port emissions estimate comparison for calendar year 2011 and 2005 for cargo handling equipment in tons per year and as a percent change. Cargo handling equipment port emissions decreased significantly for $SO_2$ and this is due to the use of ULSD by all diesel equipment. PM emissions also decreased as a result of using ULSD in 2011. Note the port and airshed emissions for cargo handling equipment are the same, because equipment operations do not move beyond the port terminals. Cargo handling equipment emissions decreased for all pollutants as a result of the use of 164 DOCs, 5 DPFs, 7 on-road engines, and decreased activity. The equipment retrofits, DOCs and DPFs, lower VOC, CO, and PM emissions, while on-road engines lower $NO_x$, VOC and PM emissions.

**Table 9.30: Port of Seattle 2011 vs 2005 Port CHE Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 305.5 | 18.4 | 158.0 | 0.3 | 16.7 | 16.2 | 16.7 | 34,561 |
| 2005 | 418.1 | 50.7 | 616.3 | 52.3 | 27.6 | 26.8 | 27.4 | 38,135 |
| **Change, tpy** | **-112.6** | **-32.3** | **-458.3** | **-52.0** | **-10.9** | **-10.6** | **-10.7** | **-3,573** |
| **Change, %** | **-27%** | **-64%** | **-74%** | **-99%** | **-40%** | **-40%** | **-39%** | **-9%** |

Table 9.31 presents the activity and equipment count comparison for calendar year 2011 and 2005 for cargo handling equipment. The activity and equipment count decreased in 2011 and could be due to the slight decrease in TEU throughput.

**Table 9.31: Port of Seattle 2011 vs 2005 CHE Activity and Equipment Count Comparison**

| Year | Activity (hp-hr) | Count |
|---|---|---|
| 2011 | 56,822,638 | 504 |
| 2005 | 64,089,026 | 514 |
| **Change, %** | **-11%** | **-2%** |

*Locomotives*

Table 9.32 presents the port emissions (on-terminal and adjacent rail yards) estimate comparison for calendar year 2011 and 2005 for line-haul and switching locomotive emissions in tons per year and as a percent change. The port locomotive emissions are lower for all pollutants in 2011 due to a combination of lower throughput, improved fuel efficiency for the locomotives, and lower emissions locomotives. The lower locomotive emissions are the result of turnover of the line-haul locomotive fleet to newer and cleaner locomotives.

**Table 9.32: Port of Seattle 2011 vs 2005 Port Locomotive Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 290 | 20 | 45 | 3 | 11 | 10 | 11 | 16,828 |
| 2005 | 448 | 25 | 55 | 40 | 13 | 12 | 13 | 20,561 |
| **Change, tpy** | **-158** | **-5** | **-10** | **-38** | **-3** | **-3** | **-3** | **-3,733** |
| **Change, %** | **-35%** | **-19%** | **-18%** | **-94%** | **-21%** | **-21%** | **-21%** | **-18%** |

*Heavy-Duty Vehicles*

Table 9.33 shows the port emissions estimate comparison for calendar year 2011 and 2005 for on-terminal heavy duty vehicles in tons per year and as a percent change. The on-terminal HDV emissions are lower for all pollutants in 2011. This is due to newer trucks calling the terminals, the use of ULSD, less on-terminal idling as reported by the terminals, and fewer reported truck trips, in 2011 compared with 2005.

**Table 9.33: Port of Seattle 2011 vs 2005 Port HDV Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 68.3 | 5.8 | 38.1 | 0.1 | 0.8 | 0.8 | 0.8 | 7,038 |
| 2005 | 96.5 | 8.1 | 67.4 | 1.8 | 2.0 | 1.8 | 2.0 | 8,884 |
| **Change, tpy** | **-28.1** | **-2.3** | **-29.3** | **-1.8** | **-1.2** | **-1.1** | **-1.2** | **-1,845** |
| **Change, %** | **-29%** | **-28%** | **-43%** | **-96%** | **-59%** | **-59%** | **-59%** | **-21%** |

*Fleet Vehicles – Terminal Fleet Vehicles*

Table 9.34 presents the emissions estimate comparison for calendar year 2011 and 2005 for terminal fleet vehicles in tons per year and as a percent change. In 2011, there were a total of 404 terminal fleet vehicles inventoried which was more than the 347 inventoried in 2005. With the exception of $SO_2$ and PM emissions which increased, some pollutant emissions are lower in 2011 as compared to 2005. This may be due to the lower reported activity levels by the terminals. Emissions from cruise terminal cars/minivans vehicles are not included in the comparison, as the focus of this section is to evaluate vehicles residing on the terminals.

**Table 9.34: Port of Seattle 2011 vs 2005 Port Fleet Vehicle Emissions Comparison, tpy**

| **Year** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** | **$CO_2e$** |
|---|---|---|---|---|---|---|---|---|
| 2011 | 2.7 | 1.0 | 12.3 | 0.018 | 0.035 | 0.032 | 0.017 | 1,053 |
| 2005 | 4.7 | 3.2 | 30.9 | 0.015 | 0.021 | 0.020 | 0.021 | 1,403 |
| **Change, tpy** | **-2.0** | **-2.2** | **-18.5** | **0.003** | **0.014** | **0.012** | **-0.004** | **-350** |
| **Change, %** | **-43%** | **-70%** | **-60%** | **20%** | **67%** | **60%** | **-19%** | **-25%** |

*9.4.2 2011 vs 2005 Airshed Emissions Comparisons*

Quantifying the changes of Port of Seattle operations throughout the airshed (i.e. the entire emissions inventory geographical domain) is an improvement made during the 2011 update. Similar to the simple metric used for port emissions, this evaluation utilized data from the original 2005 inventory for comparison purposes to the 2011 activity and used 2011 methods for estimating emissions. Table 9.35 presents the Port of Seattle-related airshed TEU emissions efficiency, expressed in airshed tons of emissions per 10,000 TEU, changes from 2011 vs 2005. The airshed tons of emissions per 10,000 TEU decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo and that port-related cruise ship emissions are included in this simple metric.

**Table 9.35: Port of Seattle 2011 vs 2005 Airshed Tons of Emissions per 10,000 TEU Comparison**

| **Year** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** | **$CO_2e$** |
|---|---|---|---|---|---|---|---|---|
| 2011 | 37.0 | 1.7 | 5.8 | 18.5 | 1.9 | 1.6 | 1.9 | 2,783 |
| 2005 | 47.8 | 2.1 | 9.0 | 22.7 | 2.6 | 2.2 | 2.5 | 2,859 |
| **Change (%)** | **-23%** | **-17%** | **-35%** | **-18%** | **-25%** | **-26%** | **-25%** | **-3%** |

The Port of Seattle-related airshed TEU emissions efficiency changes from 2011 vs 2005 range from 3% less $CO_2e$ emissions to 34% less CO emissions per 10,000 TEU moved through the port. The changes in the 2011 vs 2005 airshed emissions normalized to TEU throughput for all pollutants are presented in graphical form in Figure 9.5.

**Figure 9.5: Port of Seattle 2011 vs 2005 Airshed Tons of Emissions per 10,000 TEU Change**

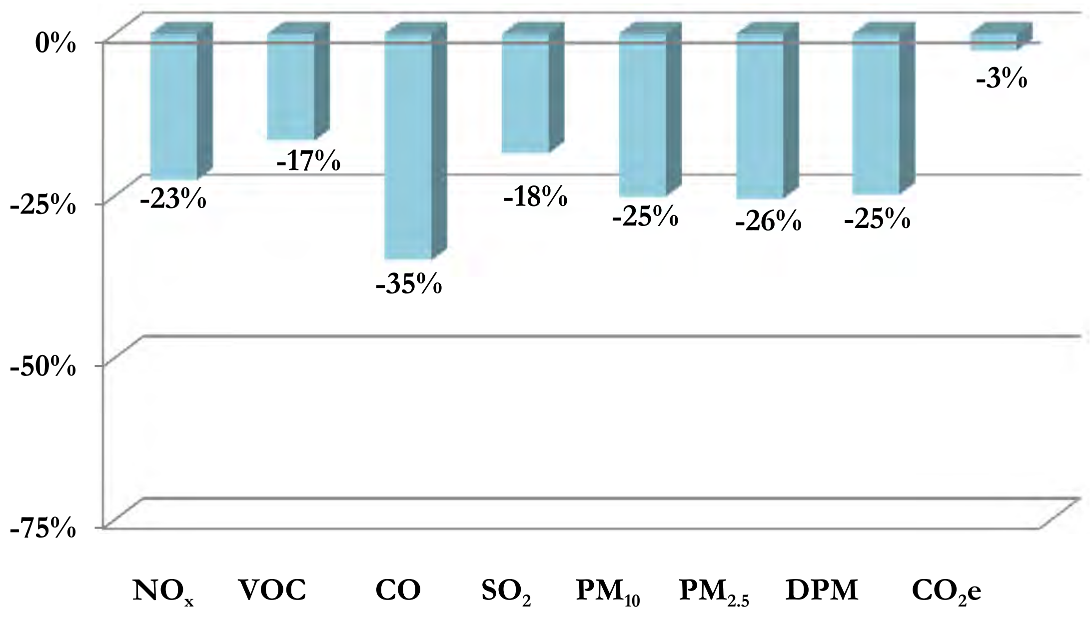

Table 9.36 presents the Port of Seattle-related airshed cargo emissions efficiency, expressed in airshed tons of emissions per 10,000 tonnes of cargo, for 2011 and 2005. The airshed tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo. Port-related cruise ship emissions are included in this simple metric because they are part of port operations.

**Table 9.36: Port of Seattle 2011 vs 2005 Airshed Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 3.3 | 0.2 | 0.5 | 1.7 | 0.2 | 0.1 | 0.2 | 249 |
| 2005 | 4.9 | 0.2 | 0.9 | 2.3 | 0.3 | 0.2 | 0.3 | 290 |
| **Change (%)** | **-32%** | **-27%** | **-43%** | **-28%** | **-34%** | **-34%** | **-34%** | **-14%** |

The Port of Seattle-related airshed cargo emissions efficiency improvements from 2011 vs 2005 range from 14% less $CO_2e$ emissions to 42% less CO emissions per 10,000 tonnes cargo moved through the port. The changes in the 2011 vs 2005 emissions normalized to cargo throughput for all pollutants are presented in graphical form in Figure 9.6.

**Figure 9.6: Port of Seattle 2011 vs 2005 Airshed Tons of Emissions per 10,000 Tonnes of Cargo Change**

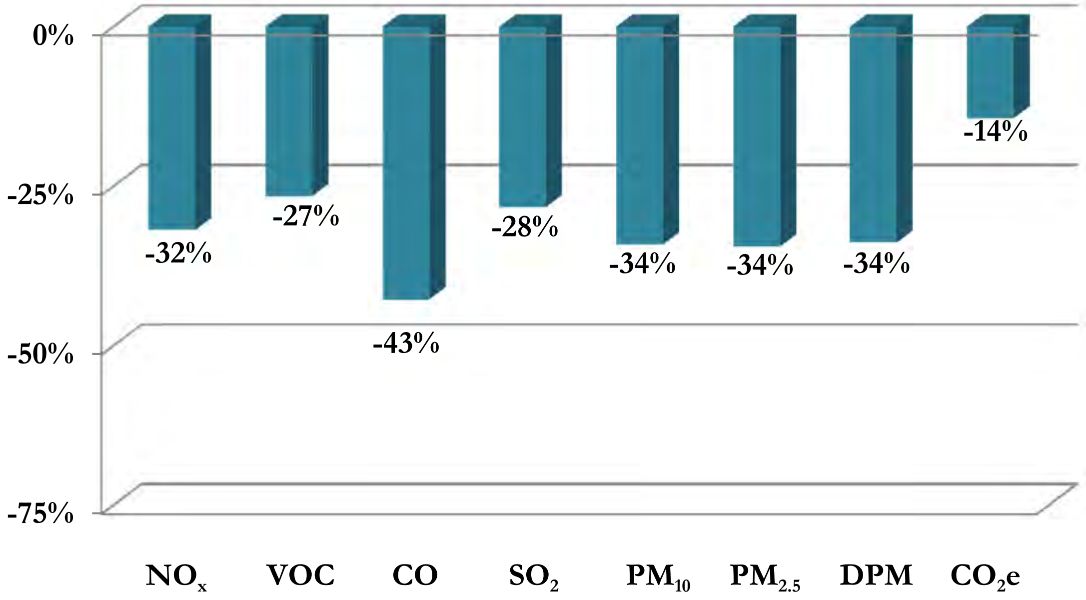

Table 9.37 presents a summary comparison of the Port of Seattle-related 2011 and 2005 airshed emissions by source category. The reasons behind the 2011 vs 2005 emissions changes for the airshed zone are generally the same as in the port comparisons in the previous subsection 9.4.1. For the Port of Seattle, harbor vessels below include port-owned and commercial harbor vessels.

**Table 9.37: Port of Seattle 2011 vs 2005 Airshed Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 748 | 26 | 66 | 600.51 | 47.69 | 38.15 | 38.62 | 54,479 |
| OGV, transit | 4,106 | 158 | 366 | 3,150.77 | 264.57 | 211.66 | 257.71 | 202,078 |
| Harbor vessels | 418 | 24 | 82 | 0.25 | 16.43 | 15.15 | 16.23 | 25,048 |
| Recreational vessels | 57 | 62 | 614 | 0.11 | 1.36 | 1.27 | 0.40 | 7083 |
| Locomotives | 680 | 42 | 111 | 6.15 | 24.85 | 22.85 | 24.85 | 41,870 |
| Cargo handling equipment | 306 | 18 | 158 | 0.30 | 16.70 | 16.20 | 16.70 | 34,561 |
| Heavy-duty vehicles | 1,270 | 83 | 390 | 1.81 | 25.27 | 22.55 | 25.27 | 206,887 |
| Terminal fleet vehicles | 3 | 1 | 12 | 0.02 | 0.03 | 0.03 | 0.02 | 1,053 |
| **Total** | **7,588** | **414** | **1,799** | **3,759.93** | **396.90** | **327.86** | **379.80** | **573,059** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 861 | 28 | 72 | 978.73 | 73.84 | 59.08 | 58.86 | 60,474 |
| OGV, transit | 5,639 | 198 | 461 | 3,521.17 | 336.38 | 269.11 | 327.21 | 226,887 |
| Harbor vessels | 534 | 26 | 96 | 55.46 | 22.36 | 20.59 | 22.14 | 29,737 |
| Recreational vessels | 71 | 154 | 1,035 | 1.67 | 3.14 | 2.91 | 0.54 | 8317 |
| Locomotives | 1,026 | 52 | 131 | 84.31 | 28.90 | 26.59 | 28.90 | 47,898 |
| Cargo handling equipment | 418 | 51 | 616 | 52.27 | 27.62 | 26.80 | 27.40 | 38,135 |
| Heavy-duty vehicles | 1,506 | 75 | 465 | 42.94 | 53.60 | 48.25 | 53.60 | 192,389 |
| Terminal fleet vehicles | 5 | 3 | 31 | 0.02 | 0.02 | 0.02 | 0.02 | 1,403 |
| **Total** | **10,060** | **587** | **2,907** | **4,736.54** | **545.87** | **453.34** | **518.69** | **605,240** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -13% | -7% | -8% | -39% | -35% | -35% | -34% | -10% |
| OGV, transit | -27% | -20% | -21% | -11% | -21% | -21% | -21% | -11% |
| Harbor vessels | -22% | -8% | -14% | -100% | -27% | -26% | -27% | -16% |
| Recreational vessels | -20% | -60% | -41% | -93% | -57% | -56% | -26% | -15% |
| Locomotives | -34% | -19% | -15% | -93% | -14% | -14% | -14% | -13% |
| Cargo handling equipment | -27% | -64% | -74% | -99% | -40% | -40% | -39% | -9% |
| Heavy-duty vehicles | -16% | 10% | -16% | -96% | -53% | -53% | -53% | 8% |
| Terminal fleet vehicles | -43% | -70% | -60% | 20% | 67% | 60% | -19% | -25% |
| **Total** | **-25%** | **-29%** | **-38%** | **-21%** | **-27%** | **-28%** | **-27%** | **-5%** |

## 9.5 Port of Tacoma

As part of the 2011 inventory update for the Port of Tacoma port-related emissions were quantified with the similar at-port methodology used in 2005. In addition, port-related emissions were quantified for the entire airshed zone. This was done for the 2005 data and recalculated using the 2011 emissions estimate methodology (as described in the previous sections and Section 10). In 2011, the cargo throughput in TEU and in metric tonnes for the Port of Tacoma decreased as compared to 2005, as presented in Table 9.38.

**Table 9.38: Port of Tacoma 2011 vs 2005 TEU and Cargo Throughput Comparison**

| Year | Container Throughput (TEU) | Cargo Throughput (tonnes) |
|---|---:|---:|
| 2011 | 1,488,795 | 17,270,252 |
| 2005 | 2,070,000 | 20,400,000 |
| **Change, %** | **-28%** | **-15%** |

The 2011 vs 2005 emissions and efficiency comparisons for the Port of Tacoma are presented in subsections 9.4.1 2011 vs 2005 port emissions comparisons and 9.4.2 2011 vs 2005 airshed emissions comparisons below.

### *9.5.1 2011 vs 2005 Port Emissions Comparisons*

Table 9.39 presents a simple metric of TEU emissions efficiency, expressed in tons of emissions per 10,000 TEU, for 2011 and 2005. The port tons of emissions per 10,000 TEU decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo.

**Table 9.39: Port of Tacoma 2011 vs 2005 Port Tons of Emissions per 10,000 TEU Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---:|---:|---:|---:|---:|---:|---:|---:|
| 2011 | 8.48 | 0.42 | 1.65 | 2.77 | 0.43 | 0.37 | 0.37 | 633 |
| 2005 | 9.21 | 0.43 | 1.70 | 3.66 | 0.48 | 0.42 | 0.42 | 634 |
| **Change (%)** | **-8%** | **-2%** | **-3%** | **-24%** | **-12%** | **-12%** | **-10%** | **0%** |

The port TEU emissions efficiency changes in 2011 vs 2005 range from 2% less VOC emissions to 24% less $SO_2$, expressed in port tons of emissions per 10,000 TEU moved through the port. The changes in the 2011 vs 2005 emissions normalized to TEU throughput for all pollutants are presented in graphical form in Figure 9.7. Note there was no significant change in $CO_2e$ emissions from 2011 vs 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo.

**Figure 9.7: Port of Tacoma 2011 vs 2005 Port Tons of Emissions per 10,000 TEU Change**

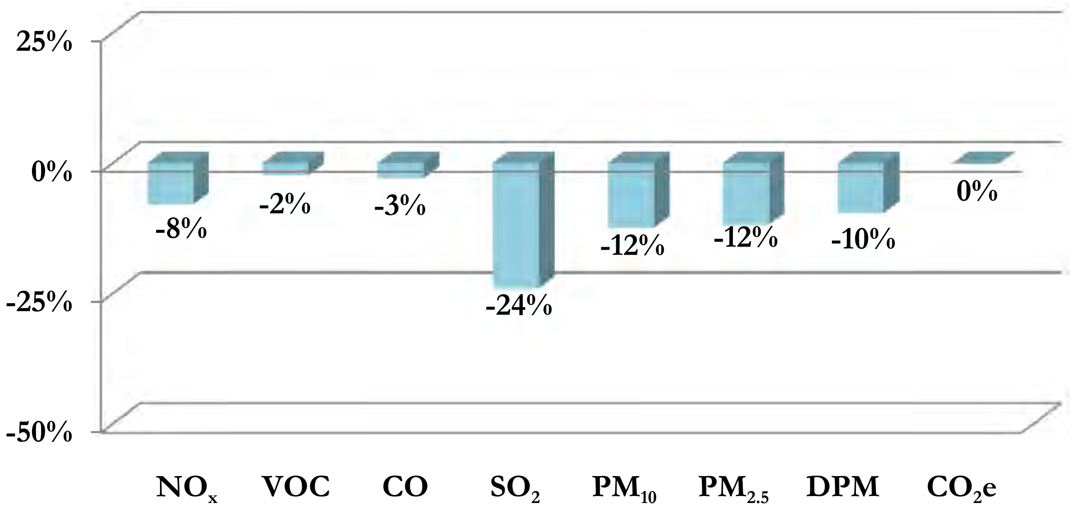

Table 9.40 presents a simple metric of port tons of emissions per 10,000 tonnes of cargo in 2011 and 2005. The port tons of emissions per 10,000 tonnes of cargo decreased in 2011, representing an improvement in air emissions-related efficiencies from 2005. It should be noted that port-related recreational vessel emissions are not included because they are not associated with the movement of cargo.

**Table 9.40: Port of Tacoma 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 0.73 | 0.036 | 0.14 | 0.24 | 0.04 | 0.03 | 0.03 | 54 |
| 2005 | 0.93 | 0.043 | 0.17 | 0.37 | 0.05 | 0.04 | 0.04 | 64 |
| **Change (%)** | **-22%** | **-17%** | **-18%** | **-36%** | **-25%** | **-25%** | **-24%** | **-15%** |

The port cargo emissions efficiency improvements 2011 vs 2005 range from 15% less $CO_2e$ emissions to 36% less $SO_2$ tons of emissions per 10,000 tonnes cargo moved through the port. The changes in the 2011 vs 2005 emissions normalized to cargo throughput for all pollutants are presented in graphical form in Figure 9.8.

**Figure 9.8: Port of Tacoma 2011 vs 2005 Port Tons of Emissions per 10,000 Tonnes of Cargo Change**

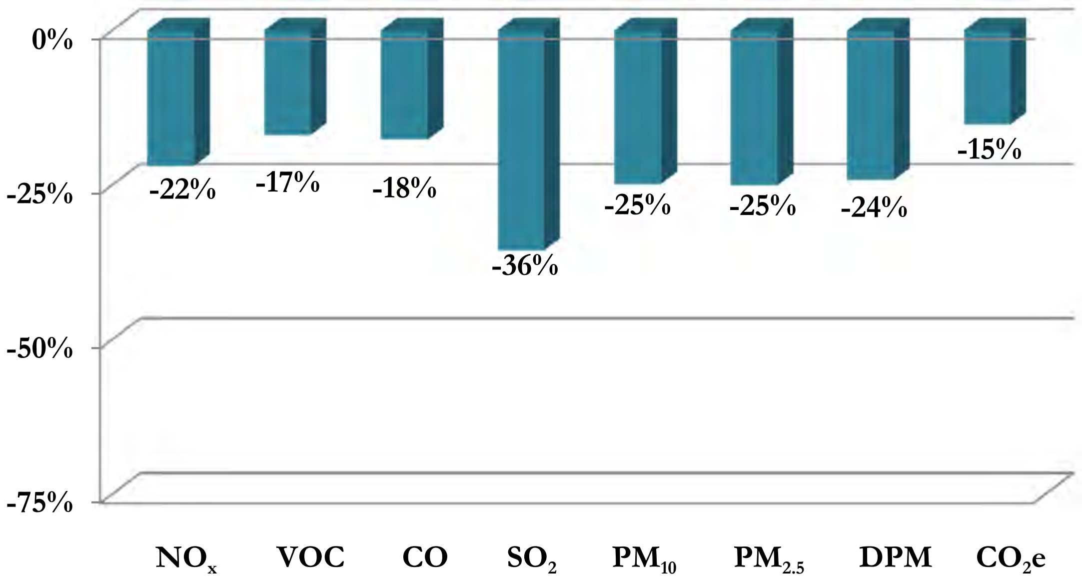

Table 9.41 provides a summary comparison of the 2011 and 2005 emissions by source category. Each source category emissions comparison for the Port of Tacoma is discussed in the following subsections. For the Port of Tacoma, there were no associated recreational or government (port-owned) harbor vessels.

**Table 9.41: Port of Tacoma 2011 vs 2005 Port Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 375 | 12 | 32 | 410.18 | 29.00 | 23.20 | 21.12 | 30,273 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 291 | 10 | 44 | 0.16 | 11.82 | 10.88 | 11.82 | 17,485 |
| Locomotives | 364 | 25 | 54 | 2.37 | 12.35 | 11.35 | 12.35 | 20,015 |
| Cargo handling equipment | 206 | 13 | 88 | 0.20 | 10.00 | 9.70 | 10.00 | 22,486 |
| Heavy-duty vehicles | 24 | 2 | 13 | 0.02 | 0.29 | 0.27 | 0.29 | 2,505 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0.02 | 0.04 | 0.04 | 0.02 | 1,429 |
| **Total** | **1,263** | **62** | **245** | **412.96** | **63.50** | **55.44** | **55.60** | **94,192** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 645 | 21 | 54 | 676.17 | 47.05 | 37.64 | 33.79 | 47,465 |
| OGV, transit | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| Commercial harbor vessels | 278 | 6 | 38 | 29.45 | 12.20 | 11.23 | 12.20 | 15,815 |
| Locomotives | 589 | 33 | 71 | 45.66 | 17.09 | 15.72 | 17.09 | 25,500 |
| Cargo handling equipment | 370 | 26 | 160 | 5.40 | 22.92 | 22.26 | 23.01 | 38,646 |
| Heavy-duty vehicles | 21 | 2 | 13 | 0.42 | 0.46 | 0.42 | 0.46 | 2,049 |
| Terminal fleet vehicles | 4 | 2 | 15 | 0.02 | 0.04 | 0.04 | 0.04 | 1,689 |
| **Total** | **1,907** | **88** | **352** | **757.13** | **99.76** | **87.31** | **86.59** | **131,163** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -42% | -41% | -41% | -39% | -38% | -38% | -38% | -36% |
| OGV, transit | na | na | na | na | na | na | na | na |
| Commercial harbor vessels | 4% | 64% | 17% | -99% | -3% | -3% | -3% | 11% |
| Locomotives | -38% | -25% | -24% | -95% | -28% | -28% | -28% | -22% |
| Cargo handling equipment | -44% | -51% | -45% | -96% | -56% | -56% | -57% | -42% |
| Heavy-duty vehicles | 16% | 21% | -1% | -95% | -37% | -36% | -37% | 22% |
| Terminal fleet vehicles | -36% | -45% | -9% | 33% | 0% | -5% | -50% | -15% |
| **Total** | **-34%** | **-30%** | **-30%** | **-45%** | **-36%** | **-37%** | **-36%** | **-28%** |

*Ocean-Going Vessels*

The ocean-going vessel hotelling and maneuvering port emissions at the Port of Tacoma decreased for all pollutants in 2011 as compared to that in 2005. This is partly due to decreased activity and partly due to the emission reduction strategies used in 2011 to reduce vessel emissions while at berth. Totem Ocean Trailer Express (TOTE) vessels used shore power while at berth –while two shipping lines, K-Line and Evergreen Marine, switched all of their vessels to low sulfur fuel while at berth in 2011. Table 9.42 presents the ocean-going vessel emissions comparison for 2011 vs 2005, and Table 9.43 presents the change in vessel inbound activities. Inbound activity counts are based on MarEx data and only include ocean-going vessel counts arriving directly from sea and shifts from other ports in the inventory domain to the designated port. Barge calls are not included in the ocean-going vessel inbound activity.

**Table 9.42: Port of Tacoma 2011 vs 2005 Port OGV Emissions Comparison, tpy**

| Emissions | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 375.2 | 12.1 | 31.7 | 410.2 | 29.0 | 23.2 | 21.1 | 30,273 |
| 2005 | 644.8 | 20.5 | 53.8 | 676.2 | 47.0 | 37.6 | 33.8 | 47,465 |
| **Change, tpy** | **-269.6** | **-8.4** | **-22.1** | **-266.0** | **-18.1** | **-14.4** | **-12.7** | **-17,192** |
| **Change, %** | **-42%** | **-41%** | **-41%** | **-39%** | **-38%** | **-38%** | **-38%** | **-36%** |

**Table 9.43: Port of Tacoma 2011 vs 2005 OGV Activity Comparison**

| Year | OGV Inbound Activity |
|---|---|
| 2011 | 875 |
| 2005 | 1,093 |
| **Change, %** | **-20%** |

*Harbor Vessels - Commercial Harbor Vessels*

Table 9.44 presents the comparison for 2011 vs 2005 of port commercial harbor vessel emissions related to the Port. The lower $SO_2$ and particulate emissions are due to the use of lower sulfur fuel in 2011. The increases NOx, VOC, and $CO_2e$ are due to increased activity in 2011.

**Table 9.44: Port of Tacoma 2011 vs 2005 Port Commercial Harbor Vessel Emissions Comparison, tpy**

| Type | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 291 | 10 | 44 | 0.2 | 11.8 | 10.9 | 11.8 | 17,485 |
| 2005 | 278 | 6 | 38 | 29.5 | 12.2 | 11.2 | 12.2 | 15,815 |
| **Change (%)** | **4%** | **64%** | **17%** | **-99%** | **-3%** | **-3%** | **-3%** | **11%** |

*Cargo Handling Equipment*

Table 9.45 presents the emissions estimate comparison for calendar year 2011 and 2005 for cargo handling equipment in tons per year and as a percent change. Cargo handling equipment emissions decreased for all pollutants as a result of decreased activity and the implementation of emission control strategies that included retrofits of 117 DOCs, 48 DPFs, and use of 42 on-road engines in non-road applications. The equipment retrofits with DOCs and DPFs lowered VOC, CO, and PM emissions, while the use on-road engines lowered $NO_x$, VOC, and PM emissions.

**Table 9.45: Port of Tacoma 2011 vs 2005 Port CHE Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 205.9 | 12.6 | 88.0 | 0.2 | 10.0 | 9.7 | 10.0 | 22,486 |
| 2005 | 370.3 | 25.6 | 160.2 | 5.4 | 22.9 | 22.3 | 23.0 | 38,646 |
| **Change, tpy** | **-164.4** | **-13.0** | **-72.2** | **-5.2** | **-12.9** | **-12.6** | **-13.0** | **-16,160** |
| **Change, %** | **-44%** | **-51%** | **-45%** | **-96%** | **-56%** | **-56%** | **-57%** | **-42%** |

Table 9.46 presents the activity and equipment count comparison for calendar year 2011 and 2005 for cargo handling equipment. The activity decreased in 2011 as a result of the decreased TEU and tonnage throughput. The equipment count increased due to some equipment being added in 2011 that was not included in 2005 and the fact that some equipment was kept in the inventory, even though it was not used.

**Table 9.46: Port of Tacoma 2011 vs 2005 CHE Activity and Equipment Count Comparison**

| Year | Activity (hp-hr) | Count |
|---|---|---|
| 2011 | 35,233,383 | 546 |
| 2005 | 68,330,199 | 518 |
| **Change, %** | **-48%** | **5%** |

*Locomotives*

Table 9.47 presents the port emissions (on-terminal and adjacent rail yards) estimate comparison for calendar year 2011 and 2005 for line-haul and switching locomotive emissions in tons per year and as a percent change. The port locomotive emissions are lower for all pollutants in 2011 due to a combination of lower throughput, improved fuel efficiency for the locomotives, and lower emissions locomotives. The lower emission locomotives are the result of turnover of the line-haul locomotive fleet to newer, cleaner locomotives and three lower emission locomotives that Tacoma Rail put into service during 2011.

**Table 9.47: Port of Tacoma 2011 vs 2005 Port Locomotive Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 364 | 25 | 54 | 2 | 12 | 11 | 12 | 20,015 |
| 2005 | 589 | 33 | 71 | 46 | 17 | 16 | 17 | 25,500 |
| **Change, tpy** | **-225** | **-8** | **-17** | **-43** | **-5** | **-4** | **-5** | **-5,485** |
| **Change, %** | **-38%** | **-25%** | **-24%** | **-95%** | **-28%** | **-28%** | **-28%** | **-22%** |

*Heavy-Duty Vehicles*
Table 9.48 presents the emissions estimate comparison for calendar year 2011 and 2005 for on-terminal heavy-duty vehicles in tons per year and as a percent change. The on-terminal heavy-duty vehicle emissions are lower for all pollutants in 2011 except for NOx and VOC, which are somewhat higher. The reductions are due to the use of ULSD and newer trucks calling the terminals in 2011 compared with 2005. The increases in emissions of NOx and VOC occurred because terminals reported overall higher numbers of truck trips (despite an overall drop in port throughput) and longer idling times. These increases in trips and idling also affected the reductions of the other pollutants, which would have decreased more had trips and idling remained the same. Driving and idling emissions of all pollutants were lower on a gram-per-mile and gram-per-hour basis in 2011 than in 2005, due to the fuel and truck fleet changes noted above.

The 2011 includes small number of port facilities that were placed in service after 2005 therefore not included in the 2005 EI. Estimated emissions from these facilities are not included in the 2011 emissions shown below, however they are included in the heavy-duty vehicle source category and overall emission estimates.

**Table 9.48: Port of Tacoma 2011 vs 2005 Port HDV Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 21.8 | 1.9 | 12.2 | 0.0 | 0.3 | 0.2 | 0.3 | 2,237 |
| 2005 | 20.8 | 1.7 | 13.5 | 0.4 | 0.5 | 0.4 | 0.5 | 2,049 |
| **Change, tpy** | **1.0** | **0.2** | **-1.3** | **-0.4** | **-0.2** | **-0.2** | **-0.2** | **188** |
| **Change, %** | **5%** | **10%** | **-10%** | **-95%** | **-43%** | **-43%** | **-43%** | **9%** |

*Fleet Vehicles – Terminal Fleet Vehicles*
Table 9.49 presents the emissions estimate comparison for calendar year 2011 and 2005 for terminal fleet vehicles in tons per year and as a percent change. In 2011, there were a total of 297 terminal fleet vehicles inventoried which was more than the 216 inventoried in 2005. All emissions, except for $SO_2$ emissions, are lower or the same in 2011 as compared to 2005. This may be due to lower activity by the vehicles inventoried. Emissions from import/export vehicles are not included in the comparison, as the focus of this section is to evaluate vehicles residing on the terminals.

**Table 9.49: Port of Tacoma 2011 vs 2005 Port Terminal Fleet Vehicles Emissions Comparison, tpy**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 2.8 | 0.9 | 13.9 | 0.024 | 0.043 | 0.040 | 0.022 | 1,429 |
| 2005 | 4.3 | 1.7 | 15.3 | 0.018 | 0.043 | 0.042 | 0.042 | 1,689 |
| **Change, tpy** | **-1.5** | **-0.8** | **-1.4** | **0.006** | **0.000** | **-0.002** | **-0.021** | **-260** |
| **Change, %** | **-36%** | **-45%** | **-9%** | **33%** | **0%** | **-5%** | **-50%** | **-15%** |

### *9.5.2 2011 vs 2005 Airshed Emissions Comparisons*

Quantifying the changes of Port of Tacoma operations throughout the airshed zone (i.e. the entire emissions inventory geographical domain) is an improvement made during the 2011 update. This evaluation utilized data from the original 2005 inventory for comparison purposes to the 2011 activity and used 2011 methods for estimating emissions. Table 9.50 presents tons of emissions per 10,000 TEU in 2011 and 2005. While other non-containerized cargo activities increased at the Port of Tacoma, the containers throughput decreased significantly in 2011 as compared to that in 2005. As a result, the port-wide tons of emissions per 10,000 TEU increased in 2011 for most of the pollutants, with the exception of $NO_x$ which remained the same and CO which decreased.

**Table 9.50: Port of Tacoma 2011 vs 2005 Airshed Emissions, tons emissions per 10,000 TEU**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 37.2 | 1.6 | 5.2 | 20.0 | 2.0 | 1.7 | 1.9 | 2,665 |
| 2005 | 37.2 | 1.5 | 5.3 | 17.2 | 1.9 | 1.6 | 1.8 | 2,345 |
| **Change (%)** | **0%** | **7%** | **-3%** | **16%** | **5%** | **3%** | **3%** | **14%** |

The Port of Tacoma-related airshed TEU emissions efficiency changes from 2011 vs 2005 range from 3% less CO emissions to 16% more $SO_2$ emissions per 10,000 TEU moved through the port. The changes in the 2011 vs 2005 airshed emissions normalized to TEU throughput for all pollutants are presented in graphical form in Figure 9.9. The 2011 increases are due to the relationship between the number and types of ships calling the Port and the reduction in container throughput compared with 2005 conditions.

**Figure 9.9: Port of Tacoma 2011 vs 2005 Airshed Tons of Emissions per 10,000 TEU Change**

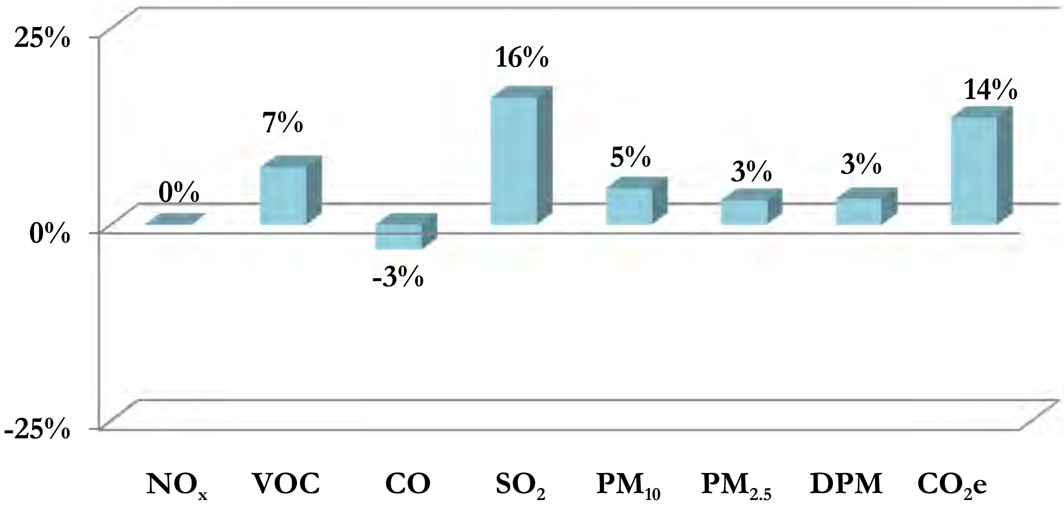

Table 9.51 presents the Port of Tacoma-related airshed cargo emissions efficiency, expressed in airshed tons of emissions per 10,000 tonnes of cargo (including both container and non-container cargo throughput), for 2011 and 2005. The efficiency improvements represent a meaningful improvement over this time and cargo is being handled and transported in a more effective manner, which resulted in reduced emissions per cargo tonnes handled by the port.

**Table 9.51: Port of Tacoma 2011 vs 2005 Airshed Tons of Emissions per 10,000 Tonnes of Cargo Comparison**

| Year | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| 2011 | 3.2 | 0.1 | 0.4 | 1.7 | 0.2 | 0.1 | 0.2 | 230 |
| 2005 | 3.8 | 0.2 | 0.5 | 1.7 | 0.2 | 0.2 | 0.2 | 238 |
| **Change (%)** | **-15%** | **-9%** | **-18%** | **-1%** | **-11%** | **-12%** | **-12%** | **-3%** |

The Port of Tacoma-related airshed cargo emissions efficiency improvements from 2011 vs 2005 range from 1% less $SO_2$ emissions to 18% less CO, on an airshed emissions per 10,000 tonnes cargo moved through the port basis. The changes in the 2011 vs 2005 emissions normalized to cargo throughput for all pollutants are presented in graphical form in Figure 9.10.

**Figure 9.10: Port of Tacoma 2011 vs 2005 Airshed Tons of Emissions per 10,000 Tonnes of Cargo Change**

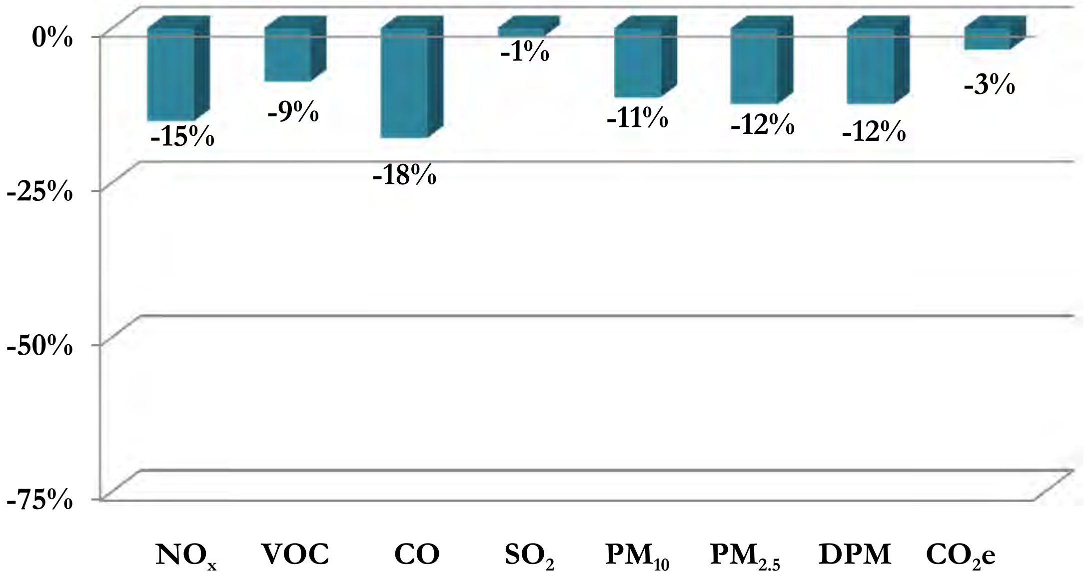

Table 9.52 provides a summary comparison of the 2011 and 2005 airshed emissions by source category. The reasons behind the 2011 vs 2005 emissions changes for the airshed zone are generally the same as outlined in the port comparisons in the previous subsection. For the Port of Tacoma, there were no associated recreational or government (port-owned) harbor vessels.

**Table 9.52: Port of Tacoma 2011 vs 2005 Airshed Emissions Comparison, tpy**

| | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2011** | | | | | | | | |
| OGV, hotelling & maneuvering | 375 | 12 | 32 | 410.18 | 29.00 | 23.20 | 21.12 | 30,273 |
| OGV, transit | 3,257 | 122 | 280 | 2,561.76 | 216.39 | 173.12 | 202.75 | 153,472 |
| Commercial harbor vessels | 291 | 10 | 44 | 0.16 | 11.82 | 10.88 | 11.82 | 17,485 |
| Locomotives | 520 | 33 | 80 | 3.87 | 18.05 | 16.45 | 18.05 | 30,030 |
| Cargo handling equipment | 206 | 13 | 88 | 0.20 | 10.00 | 9.70 | 10.00 | 22,486 |
| Heavy-duty vehicles | 895 | 51 | 229 | 1.24 | 17.37 | 15.48 | 17.37 | 141,618 |
| Terminal fleet vehicles | 3 | 1 | 14 | 0.02 | 0.04 | 0.04 | 0.02 | 1,429 |
| **Total** | **5,546** | **241** | **768** | **2,977.43** | **302.68** | **248.86** | **281.13** | **396,792** |
| **2005** | | | | | | | | |
| OGV, hotelling & maneuvering | 645 | 21 | 54 | 676.17 | 47.05 | 37.64 | 33.79 | 47,465 |
| OGV, transit | 4,069 | 143 | 332 | 2,736.89 | 245.01 | 196.01 | 234.39 | 166,921 |
| Commercial harbor vessels | 278 | 6 | 38 | 29.45 | 12.20 | 11.23 | 12.20 | 15,815 |
| Locomotives | 1,035 | 52 | 128 | 78.45 | 27.80 | 25.58 | 27.80 | 46,082 |
| Cargo handling equipment | 370 | 26 | 160 | 5.40 | 22.92 | 22.26 | 23.01 | 38,646 |
| Heavy-duty vehicles | 1,307 | 63 | 376 | 37.79 | 47.49 | 42.58 | 47.49 | 168,846 |
| Terminal fleet vehicles | 4 | 2 | 15 | 0.02 | 0.04 | 0.04 | 0.04 | 1,689 |
| **Total** | **7,709** | **312** | **1,103** | **3,564.18** | **402.52** | **335.33** | **378.72** | **485,463** |
| **% Change** | | | | | | | | |
| OGV, hotelling & maneuvering | -42% | -41% | -41% | -39% | -38% | -38% | -38% | -36% |
| OGV, transit | -20% | -15% | -15% | -6% | -12% | -12% | -13% | -8% |
| Commercial harbor vessels | 4% | 64% | 17% | -99% | -3% | -3% | -3% | 11% |
| Locomotives | -50% | -36% | -37% | -95% | -35% | -36% | -35% | -35% |
| Cargo handling equipment | -44% | -51% | -45% | -96% | -56% | -56% | -57% | -42% |
| Heavy-duty vehicles | -32% | -20% | -39% | -97% | -63% | -64% | -63% | -16% |
| Terminal fleet vehicles | -36% | -45% | -9% | 33% | 0% | -5% | -50% | -15% |
| **Total** | **-28%** | **-23%** | **-30%** | **-16%** | **-25%** | **-26%** | **-26%** | **-18%** |

# SECTION 10 CLEAN AIR STRATEGY EMISSION REDUCTIONS

In 2007, the Ports of Seattle and Tacoma, along with the Port Metro Vancouver, British Columbia, developed the CAS in collaboration with regulatory air agencies, including Environment Canada, the PSCAA, the WDOE, and the United States Environmental Protection Agency. The CAS defines performance measures for reducing port-related air emissions.

As an addition to the 2011 Puget Sound Maritime Air Emissions Inventory, estimates have been developed of the emission reductions achieved in 2011 calendar year by the Port of Seattle and the Port of Tacoma through the implementation of CAS measures. This section provides the CAS emission reductions by port, by source category, and by Strategy measure. It should be noted that some emission reduction initiatives were implemented before 2011, but this section only provides emission reductions in calendar year 2011.

Emission reductions achieved during 2011 were estimated for the following CAS measures:

- Ocean-going vessels: shore power and fuel switching by vessels at berth in 2011.
- Harbor vessels: early use of ULSD fuel in 2011 by commercial harbor vessels linked to port operations, such as assist tugs and port-owned vessels.
- Cargo handling equipment: engine retrofits and fleet turnover either due to newer equipment or engine repowers.
- Heavy duty vehicles: Scrappage programs, retrofits, and ban of 1994 and older trucks calling at the port terminals.
- Locomotives: early use of ULSD in switching locomotives, idle reduction, and repowering of switching locomotives.

## 10.1 Port of Seattle

Table 10.1 summarizes the 2011 emission reductions for the Port of Seattle for ocean-going vessels, harbor vessels, cargo handling equipment, switching locomotives, and heavy-duty vehicles.

**Table 10.1: Port of Seattle 2011 Emission Reductions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Ocean-going vessels | 38.51 | 0.84 | 2.29 | 371.00 | 23.51 | 18.81 | 19.10 | 1,778 |
| Harbor craft | 4.78 | 0.00 | 0.00 | 56.10 | 3.30 | 3.04 | 3.30 | 0 |
| Cargo handling equipment | 91.79 | 7.78 | 15.37 | 0.00 | 2.67 | 2.59 | 2.67 | 0 |
| Locomotives | 2.60 | 0.00 | 0.00 | 20.00 | 0.10 | 0.10 | 0.10 | 137 |
| Heavy duty vehicles | 135.94 | 1.32 | 0.00 | 0.00 | 8.16 | 7.28 | 8.16 | 0 |
| **Total** | **273.61** | **9.94** | **17.66** | **447.10** | **37.74** | **31.82** | **33.33** | **1,915** |

### *10.1.1 Ocean-Going Vessels*

In 2009, the Port of Seattle launched the At-Berth Clean Fuels Incentive Program (ABC Fuels) which provides incentive for frequent callers to use less than 0.5% sulfur diesel fuel in auxiliary engines while at berth. In addition, some vessels voluntarily use shore power while at berth. The ocean-going vessels' emission reductions are due to approximately 375 vessel calls that switched fuel and 36 vessel calls for three cruise ships that used shore power while at berth in 2011. Table 10.2 presents the Port of Seattle OGV emission reductions.

**Table 10.2: Port of Seattle 2011 OGV Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Shore Power | 20.90 | 0.84 | 2.29 | 29.46 | 2.25 | 1.80 | 2.03 | 1,756 |
| Fuel Switch | 17.61 | 0.00 | 0.00 | 341.54 | 21.26 | 17.01 | 17.07 | 22 |
| **Total** | **38.51** | **0.84** | **2.29** | **371.00** | **23.51** | **18.81** | **19.10** | **1,778** |

### *10.1.2 Commercial Harbor Vessels*

Emission reductions from assist tugs, Victoria Clipper, tank barges, and port-owned workboats are included in the reductions attributed to commercial harbor vessel associated with the Port of Seattle. In 2011, emission reduction measures included the use of ULSD for the full year by all 39 vessels associated with the Port, along with use of Tier 2 engines by three vessels that have been repowered. Table 10.3 presents the Port of Seattle 2011 commercial harbor vessel emission reductions.

**Table 10.3: Port of Seattle 2011 Commercial Harbor Vessel Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Lower sulfur fuel | 0.00 | 0.00 | 0.00 | 56.10 | 3.26 | 3.00 | 3.26 | 0.00 |
| Tier 2 engines | 4.78 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.00 |
| **Total** | **4.78** | **0.00** | **0.00** | **56.10** | **3.30** | **3.04** | **3.30** | **0.00** |

### *10.1.3 Cargo Handling Equipment*

The Port of Seattle and its tenants have installed DOCs and DPFs retrofits on their equipment and have purchased cargo handling equipment with on-road engines that have resulted in emission reductions. The 2011 emission reductions are due to 167 retrofits, 67 pieces of equipment with on-road engines, and fleet modernization (the purchase of newer equipment with lower-emitting engines or engine repowers). There is no PM or DPM emissions reduction due to fleet modernization because the emissions factors for PM in EPA's NONROAD model do not vary for Tier 1 to Tier 3 engines. EPA's Tier I PM standards are equivalent to pre Tier 1 emission rates and even though Tier 2 PM standards are lower than Tier 1, due to uncertainties in PM emissions, there is no change in PM emission rates between Tier 1, 2, and 3 engines. Table 10.4 presents the Port of Seattle 2011 CHE emission reductions.

**Table 10.4: Port of Seattle 2011 CHE Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Retrofit | 0.00 | 4.80 | 15.37 | 0.00 | 1.86 | 1.80 | 1.86 | 0 |
| On-road Engines | 15.77 | 1.46 | 0.00 | 0.00 | 0.81 | 0.79 | 0.81 | 0 |
| Fleet Turnover | 76.01 | 1.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0 |
| **Total** | **91.79** | **7.78** | **15.37** | **0.00** | **2.67** | **2.59** | **2.67** | **0** |

### *10.1.4 Locomotives*

The CAS includes numerous measures related to locomotive emissions, most of which are difficult to quantify in terms of emission reductions. The use of ULSD in switching locomotives produced a reduction of $SO_2$ emissions of approximately 94%, or 20 tons in 2011. Installation of idle reduction technologies in switching locomotives also resulted in emission reductions through the reduction of locomotive idling times. The Port's Louis Dreyfus terminal saw a 36% reduction in fuel consumption per ton of freight moved between 2010 and 2011 after installing such devices. Table 10.5 presents the Port of Seattle locomotive emission reductions.

**Table 10.5: Port of Seattle 2011 Locomotive Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Idling reduction | 2.60 | 0.00 | 0.00 | 0.00 | 0.10 | 0.10 | 0.10 | 137 |
| Lower sulfur fuel | 0.00 | 0.00 | 0.00 | 20.00 | 0.00 | 0.00 | 0.00 | 0 |
| **Total** | **2.60** | **0.00** | **0.00** | **20.00** | **0.10** | **0.10** | **0.10** | **137** |

### *10.1.5 Heavy-Duty Vehicles*

The Port of Seattle implemented the "Scrappage and Retrofits for Air in Puget Sound" or ScRAPS program which provided a financial incentive to scrap pre-1994 MY drayage trucks. Since the beginning of 2011, all drayage trucks that entered the Port of Seattle container terminals have been required to be 1994 or newer in order to be allowed access to the container terminals. This combination of factors resulted in a newer overall truck fleet than would have called in the absence of these measures. Table 10.6 presents the Port of Seattle heavy-duty vehicle emission reductions which are due primarily to the Port's Clean Truck Program entry requirements which prohibits trucks, pre-1994 model year, from entering port terminals.

**Table 10.6: Port of Seattle 2011 HDV Emissions Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Fleet Change | 135.94 | 1.32 | 0.00 | 0.00 | 8.16 | 7.28 | 8.16 | 0 |

## 10.2 Port of Tacoma

Table 10.7 summarizes the 2011 emission reductions for the Port of Tacoma for ocean-going vessels, harbor vessels, cargo handling equipment, switching locomotives, and heavy-duty vehicles.

**Table 10.7: Port of Tacoma 2011 Port Emission Reductions, tpy**

| Source Category | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Ocean-going vessels | 21.41 | 0.50 | 1.34 | 132.69 | 8.46 | 6.77 | 6.10 | 1,159 |
| Harbor craft | 4.78 | 0.00 | 0.00 | 34.10 | 2.07 | 1.90 | 2.07 | 0 |
| Cargo handling equipment | 15.66 | 5.20 | 17.34 | 0.00 | 2.43 | 2.36 | 2.43 | 0 |
| Locomotives | 3.09 | 0.17 | 0.00 | 16.90 | 0.12 | 0.12 | 0.12 | 59 |
| Heavy duty vehicles | 58.18 | 0.76 | 0.00 | 0.00 | 3.56 | 3.17 | 3.56 | 0 |
| **Total** | **103.11** | **6.63** | **18.68** | **183.70** | **16.65** | **14.32** | **14.29** | **1,218** |

### *10.2.1 Ocean-Going Vessels*

In 2010, the Port of Tacoma completed a project to retrofit two TOTE RoRo ships and one port terminal for shore power. These two vessels, which call twice weekly, used shore power while at berth for every call they made to the Totem Ocean Trail Express terminal. In addition, two shipping lines, K-Line and Evergreen Marine, used distillate fuel with 0.5% sulfur for hotelling operations while at berth in 2011. Table 10.8 presents the Port of Tacoma OGV emission reductions.

**Table 10.8: Port of Tacoma 2011 OGV Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Shore Power | 15.73 | 0.50 | 1.34 | 20.01 | 1.43 | 1.15 | 1.15 | 1,150 |
| Fuel Switch | 5.68 | 0.00 | 0.00 | 112.69 | 7.03 | 5.62 | 4.95 | 9 |
| **Total** | **21.41** | **0.50** | **1.34** | **132.69** | **8.46** | **6.77** | **6.10** | **1,159** |

### *10.2.2 Harbor Vessels*

Emission reductions from assist tugs and tank barges are included in the emission reductions achieved by Port of Tacoma related commercial harbor vessels. In 2011, the emission reduction measures included the use of ULSD for the full year by all 27 vessels associated with the Port along with the use of Tier 2 engines by three vessels that have been retrofit. Table 10.9 presents the Port of Tacoma 2011 commercial harbor vessel emission reductions.

**Table 10.9: Port of Tacoma 2011 Commercial Harbor Vessel Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Lower sulfur fuel | 0.00 | 0.00 | 0.00 | 34.10 | 2.03 | 1.86 | 2.03 | 0.00 |
| Tier 2 engines | 4.78 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 0.00 |
| **Total** | **4.78** | **0.00** | **0.00** | **34.10** | **2.07** | **1.90** | **2.07** | **0.00** |

### *10.2.3 Cargo Handling Equipment*

The Port of Tacoma and its tenants have installed DOCs and DPFs retrofits on their equipment, repower CHE, and have purchased CHE with on-road engines that have resulted in emission reductions. The 2011 emission reductions are based on 165 retrofits, 20 pieces of equipment with on-road engines, 20 pieces of equipment with a combination of on-road engine and DOC retrofit, and fleet modernization (the purchase of newer equipment with lower-emitting engines or engine repowers). Table 10.10 presents the Port of Tacoma 2011 CHE emission reductions.

**Table 10.10: Port of Tacoma 2011 CHE Emission Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Retrofit | 0.00 | 4.19 | 16.84 | 0.00 | 2.07 | 2.01 | 2.07 | 0.00 |
| On-road Engines | 3.61 | 0.29 | 0.00 | 0.00 | 0.23 | 0.22 | 0.23 | 0.00 |
| Combination | 3.79 | 0.39 | 0.51 | 0.00 | 0.13 | 0.13 | 0.13 | 0.00 |
| Fleet Turnover | 8.26 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **15.66** | **5.20** | **17.34** | **0.00** | **2.43** | **2.36** | **2.43** | **0.00** |

### *10.2.4 Locomotives*

The CAS includes numerous measures related to locomotive emissions, most of which are difficult to quantify in terms of emission reductions. The use of ULSD in switching locomotives produced a reduction of $SO_2$ emissions of approximately 94%, or 17 tons in 2011.

Since 2007, Tacoma Rail has partnered with local, state and federal agencies to install idle reduction equipment and retire older less efficient locomotives to improve efficiency and reduce emissions. Tacoma Rail currently has Automatic Engine Start Stop devices on 85% of their fleet. In 2011 Tacoma Rail replaced three non-tier locomotives manufactured between 1956 and 1960 with newer repowered locomotives that meet EPA Tier 2 emission standards. Combined with an anti-idle function, the project significantly reduced air pollutant emissions and fuel consumption. The project reduced emissions by 75% and fuel use by 40% for each locomotive replaced. An additional component of this project was installation of onboard wheel flange lubrication technology on the three locomotives which were replaced, as well as five additional switcher locomotives owned and operated by Tacoma Rail. The wheel flange lubricator systems are designed to reduce wheel/rail friction thereby improving fuel efficiency.

In 2011, three switching locomotives at TEMCO, the Port of Tacoma grain terminal, were equipped with Automatic Engine Start Stop devices to limit excess idling. In addition to reducing GHG emissions the project significantly reduced diesel particulate emissions.

It should be noted that since the repowers occurred during 2011, the reductions shown are not for a full year, but are actual emission reductions in 2011; reductions should be greater in future years. Table 10.11 also includes the $SO_2$ reduction due to the use of ULSD in 2011 and TEMCO's estimated reductions due to the idle reduction devices. TEMCO's reductions were estimated by the WDOE for the period from July 2011 when they were installed until July 2012. The figures presented below are prorated to represent 2011 reductions only. The reductions achieved by Tacoma Rail have not been quantified because specific fuel savings information is not available, but would be significantly higher than those achieved by TEMCO, based on their relative levels of activity.

**Table 10.11: Port of Tacoma 2011 Locomotives Emissions Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Repower | 1.86 | 0.17 | 0.00 | 0.00 | 0.08 | 0.08 | 0.08 | 0 |
| Lower sulfur fuel | 0.00 | 0.00 | 0.00 | 16.90 | 0.00 | 0.00 | 0.00 | 0 |
| Idling reduction | 1.23 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.04 | 59 |
| **Total** | **3.09** | **0.17** | **0.00** | **16.90** | **0.12** | **0.12** | **0.12** | **59** |

### *10.2.5 Heavy-Duty Vehicles*

The Port of Tacoma implemented a Drayage Truck Emission Improvement Program to reduce heavy-duty vehicle emissions. As part of the program, the Port of Tacoma implemented a clean truck sticker registry identifying trucks compliant with program standards, which include a requirement that trucks be of model year 1994 or newer. This resulted in a newer overall truck fleet than would have called in the absence of this program. Table 10.12 presents the 2011 Port of Tacoma emission reductions for heavy-duty vehicles.

**Table 10.12: Port of Tacoma 2011 HDV Emissions Reductions, tpy**

| Measure | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| Fleet Change | 58.18 | 0.76 | 0.00 | 0.00 | 3.56 | 3.17 | 3.56 | 0 |

# APPENDIX A – GLOSSARY

***Air toxics*** – Toxic air pollutants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause cancer or other serious, chronic health effects, such as reproductive effects or birth defects, or adverse environmental effects.

***Alternative fuel*** – Also known as "non-conventional fuels", is any material or substance that can be used as a fuel, other than fossil fuels, or conventional fuels of petroleum (oil), coal, propane, and natural gas. The term "alternative fuels" usually refers to a source of which energy is renewable (See "renewable fuel").

***Area source*** – A general term for a source that is an aggregate of all emission sources within a defined spatial boundary. Though emissions from individual sources in an area are relatively small, collectively their emissions can be of concern - particularly where large numbers of sources are located in heavily populated areas.

***Auxiliary engine*** – A small engine often used when a ship is in-transit, maneuvering, or hotelling.

***Baseline Air Emissions Inventory*** – For a given air emission source category, a baseline inventory establishes a reference point with more detailed emission data than previously existed. An established baseline allows comparison with future inventories of similar precision to describe changes to the characteristics of the source category and intensity of the emissions.

***Brake-Specific Fuel Consumption*** – A way to measure the efficiency of an engine by dividing rate of fuel consumption by the rate of power production.

***Bunker Fuel*** – See *"Fuel Oil"*

***Cargo handling equipment (CHE)*** – Equipment used to move cargo to and from marine vessels, railcars and trucks. This includes equipment such as cranes, rubber tired gantry cranes, terminal trucks, container handlers, bulk loaders, and forklifts.

***Cold Ironing*** – Also called "Alternative Maritime Power" in application at the Port of Los Angeles and more generally referred to as "Shore Power." This specifically refers to an electrical connection made between the vessel and the terminal to provide full or partial operational power during hotelling periods. The primary motivation for cold ironing has been as a method to reduce emissions from the exhausts of auxiliary engines that would normally operate during hotelling. "Cold iron" is a reference to when ships mainly used boilers to produce steam for propulsion, heat, and power. When the steam production was shut down, the iron in the boiler housing would go cold.

***Commercial vessel*** – Any vessel involved in commercial trade or business.

***Criteria pollutants*** – A regulatory term that refers specifically to six outdoor air pollutants for which EPA is required to develop National Ambient Air Quality Standards (NAAQS), as codified in the federal Clean Air Act. These six are carbon monoxide (CO), lead, nitrogen dioxide ($NO_2$), particulate matter (PM), ozone, and sulfur oxides.

***Deadweight tonnage*** – Refers to the total amount of weight that a vessel is carrying, minus the actual weight of the vessel.

***Deterioration factor*** – For use in emission or performance calculation, this number accounts for the effect of gradual wear in the internal engine components in the course of normal operation.

***Diesel***– In standard use, this refers to a specific fractional distillate of fuel oil that is used as fuel in a combustion-ignition (CI) engine. Practically, diesel can refer generally to any hydrocarbon-dense oil with relatively low volatility that can be used as a combustion fuel. In common maritime use, diesel can refer to several varieties of distillate fuels including "Marine Diesel Oil" (MDO, aka DMB or DMC) and "Marine Gas Oil" (MGO, aka DMA or DMX) as specified by ISO 8217. Diesel can also be referred to by its sulfur content, such as the case of LSD (low sulfur diesel with less than 500ppm sulfur) or ULSD.

***Diesel electric –*** Refers to equipment that uses electric motive systems that rely on electricity from diesel generators.

***Diesel Oxidation Catalyst (DOC)*** – A flow-through canister, fit to an engine exhaust pipe, containing a honeycomb-like structure or substrate. The substrate has a large surface area that is coated with an active catalyst layer. This layer contains a small, well dispersed amount of precious metals such as platinum or palladium. As exhaust gases pass over the catalyst, carbon monoxide, gaseous hydrocarbons and liquid hydrocarbon particles (unburned fuel and oil) are oxidized, thereby reducing harmful emissions.

***Diesel Particulate Matter (DPM)*** – Refers to particulate components of combustion products that are directly emitted from diesel engines. These include soot ("elemental" or "black" carbon) and other aerosols that are complex aggregates of hydrocarbons, metals, silicates, and other chemicals. In recent years, DPM has been singled out as posing a carcinogenic risk to people who regularly work in proximity to diesel equipment over the course of many years.

***Diesel Particulate Filter (DPF)*** – A filter installed on the exhaust pipe of diesel engine to physically separate particulate matter from the exhaust stream. Some filters are single use (disposable), while others are designed to burn off the accumulated particulate, either through the use of a catalyst (passive), or through an active technology, such as a fuel burner which heats the filter to soot combustion temperatures

***Economizer*** – A heat exchanger that transfers heat from the exhaust stream to a water circulation system to produce steam. Often used when a vessel is in transit, an economizer can allow the regular diesel powered boiler to be shut off.

***Emission factor*** – A number specific to an engine or system that describes the amount of a pollutant that is generated per unit of activity, e.g. mg/mile or g/hr

***Emulsified fuel*** – A homogenized blend of water into diesel fuel that changes the fuel combustion characteristics and resulting emissions. This strategy is mainly employed to reduce $NO_x$ emissions but may also reduce PM and improve fuel economy.

***EPA NONROAD model*** – NONROAD is a computer modeling program created and regularly updated by EPA that calculates past, present, and future emission inventories (i.e., tons of pollutant) for all non-road equipment categories except commercial marine, locomotives, and aircraft. For a specified geographic area, time period, and fuel type, the model estimates exhaust and evaporative hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen ($NO_x$), particulate matter (PM), sulfur dioxide ($SO_2$), and carbon dioxide ($CO_2$).

***Exhaust gas recirculation (EGR)*** – A technique used in most gasoline and diesel powered engines to control emissions. Engine exhaust is mixed with engine intake air and recirculated through the combustion process. The result is a reduction in $NO_x$ emissions due to lower combustion temperatures and reduction of excess oxygen.

***Fine particulate matter*** – See *Particulate Matter*

***Four-stroke engines*** – The most common type of engine for cars and trucks. This engine uses the 'Otto cycle' and consists of four strokes. 1. intake stroke, 2. compression stroke, 3. power (ignition) stroke, and 4. exhaust stroke.

***Fuel correction factor(FCF)*** – A number used in emission inventory models to reflect the impact on emissions of commercially dispensed fuel compared to fuel used during the certification process. These factors are derived as the ratio of the impact of the dispensed fuel to the impact of the certification fuel.

***Fuel Oil*** **–** A general term for viscous liquid fuels used for powering engines. In the maritime industry the following classifications are used.

- ***Marine gas oil (MGO)*** **–** A purely distillate fuel (see "diesel")
- ***Marine diesel oil (MDO)*** **–** A blend of gas oil and heavy fuel oil
- ***Intermediate fuel oil (IFO)*** **–** A blend of gas oil and heavy fuel oil, with less gas oil than marine diesel oil
- ***Medium fuel oil (MDO)*** **–** A blend of gas oil and heavy fuel oil, with less gas oil than intermediate fuel oil
- ***Heavy fuel oil (HFO)*** – Pure or nearly pure residual oil (bunker fuel)

***Fugitive emissions*** – Emissions not created through a defined process or controlled by a dedicated system. These can be due to equipment leaks, evaporative processes, materials processing, and windblown disturbances

***GHG equivalent*** – Similar to "carbon equivalent" this refers to a method by which air emissions are standardized for comparison based on their "global warming potential" (GWP) as greenhouse gases. Each greenhouse gas differs in its ability to absorb heat in the atmosphere so will be presented in units of carbon equivalents, which weighs each gas by its GWP relative to carbon dioxide. For example, methane traps over 21 times more heat per molecule than carbon dioxide, and nitrous oxide absorbs 310 times more heat per molecule than carbon dioxide.

***Greenhouse Gas*** – Substances in the atmosphere that absorb radiated heat form the earth's surface and also radiate heat back to the surface, causing a net retention of heat energy. Carbon dioxide, methane, and nitrous oxide are common examples.

***Gross vehicle weight rating*** – The estimated total weight of a road vehicle that is loaded to capacity, including the weight of the vehicle, the passengers, fuel, cargo, and miscellaneous items. The rating allows the vehicle driver to know what routes are acceptable, depending on whether the roadways can accommodate a vehicle of the estimated weight.

***Harbor vessel*** – A term that generally refers to vessels that do not make regular ocean passage. These include commercial fishing boats, tug boats, ferries, workboats, etc.; governmental (non-military) vessels such as ferries and other vessels; tank barges; and recreational vessels. For the purpose of this report, any vessel that is not an ocean-going vessel, recreational vessel, or tank barge, has been categorized as a commercial harbor vessel, government (non-military) vessels, tank barges, or recreational vessels.

***Heavy-duty vehicle*** – A class 8 truck fueled by diesel and has a gross vehicle weight of 33,001 lbs or higher.

***Hotelling*** **–** The period during which a vessel is secured at berth

***Hydrocarbon*** – A chemical term referring to compounds that consists of carbon and hydrogen in various structures. Most common liquid fuels are primarily comprised of some form of hydrocarbon.

***Integrated tug/barge*** – Any tug and barge combination with a specially designed connection system joining the two together. The combination allows the vessel to have increased sea keeping capabilities when compared to a separated tug and barge.

***Intermediate fuel oil (IFO)*** – See *Fuel Oil*

***Intermodal Container Transfer Facility*** – A rail yard that is located close to a port facility and is where a cargo transition between two different transportation modes (e.g. trucks, trains, or ships) occurs.

***Light-duty vehicle (LDV)*** – Class 1 and 2 vehicles that can use gas or diesel fuel and have a gross vehicle weight of 6,000 lbs or less (class 1) or between 6,001 and 10,000 lbs (class 2).

***Liquefied Natural Gas (LNG)*** – Natural gas that has been processed to remove impurities and heavy hydrocarbons and is then condensed into a liquid using extremely low temperature or high pressure.

***Liquefied Petroleum Gas (LPG)*** – A mixture of hydrocarbon gases that are commonly used to fuel heating appliances and vehicles. The two most common forms of liquefied petroleum gas are propane and butane.

***Load Factor (LF)*** – A ratio of an engine's average actual power used to its maximum power rating.

***Low Sulfur Diesel (LSD) –*** See "Diesel"

***Main line locomotives*** – Also called "line-haul," these are the largest class of locomotives and are designed for the heaviest loads, longest distances, and steepest grades.

***Main propulsion engine –*** The engines on a vessel that are dedicated to movement of a ship over long distances.

***Marine Diesel Oil (MDO) –*** See "Fuel Oil"

***Maximum continuous rating*** – A value assigned to a piece of equipment by its manufacturer that sets a guideline for which the equipment can be operated for an unlimited period of time without damage.

***National Ambient Air Quality Standards (NAAQS)*** – A term referring to a specific legal instrument under the federal Clean Air Act that creates enforceable limits to airborne concentrations of "criteria pollutants." NAAQS are currently required for six substances (See "criteria pollutants"). NAAQS can be of two types: "Primary NAAQS" are designed to protect human health, including sensitive populations such as children, the elderly, and individuals suffering from respiratory disease. "Secondary" NAAQS are designed to protect public welfare (e.g., building facades, visibility, crops, and domestic animals).

***Non-Methane Organic Gas (NMOG)*** – Organic gases that exclude methane but account for all other organic pollutants that form a foundation for the formation of ozone.

***Ocean-going vessel (OGV)*** – Vessels that operate in open oceanic waters.

***Particulate Matter (PM)*** – A general term for any substance, except pure water, that exists as a liquid or solid in the atmosphere under normal conditions and is of microscopic or sub-microscopic size but larger than molecular dimensions. Airborne PM can result from direct emissions of particles (primary PM) or from condensation of certain gases that have themselves been directly emitted or chemically transformed in the atmosphere (secondary PM). PM is often classified by size:

- ***$PM_{2.5}$***– Also known as “fine” particulate matter, $PM_{2.5}$ refers to the fraction of PM in a sample that is 2.5 microns in diameter or less. This size of PM is commonly associated with combustion and secondary PM.
- ***$PM_{10}$***– Also known as “coarse” particulate matter, $PM_{10}$ refers to the fraction of PM in a sample that is 10 microns in diameter or less.

***Polycyclic Aromatic Hydrocarbon (PAH)*** – One of the first atmospheric species to be identified as carcinogenic. PAHs are formed during the incomplete combustion of organic matter, e.g. coal, oil, wood, and petroleum. PAH’s consist of two or more fused benzene rings in various configurations that, by definition, contain only carbon and hydrogen.

***Polycyclic organic material*** – Compounds containing polycyclic aromatic hydrocarbons and derivatives.

***Renewable Fuels*** – Fuels derived from sources that are regenerative or for all practical purposes cannot be depleted.

***Residual oil –***“Residual Fuel Oil” or “Bunker Fuel” – See ‘Fuel Oil”***.***

***Roll-on/Roll-off (RoRo)*** – A vessel featuring a built-in ramp for wheeled cargo to be ‘rolled-on’ and ‘rolled-off’ of the vessel.

***Rubber Tired Gantry (RTG) Crane*** – A common piece of cargo handling equipment at marine terminals used to transfer containers from stacked storage to a vehicle.

***Selective Catalytic Reduction (SCR) –*** A process where a gaseous or liquid reductant (most commonly ammonia or urea) is added to the flue or exhaust gas stream and absorbed onto a catalyst. The reductant reacts with $NO_x$ in the exhaust gas to form $H_2O$ (water vapor) and $N_2$ (nitrogen gas).

***Sea water scrubbing*** – An exhaust treatment technique used on ships to reduce emissions by through physical and chemical interaction with sea water. When the exhaust comes in contact with the seawater, the $SO_2$ reacts with calcium carbonate to form a solid calcium sulfate and $CO_2$. Scrubbers also function by physically scavenging particles and gases from the air.

***Shaft generators*** – Provides electric power to a moving vessel by generating current from the rotation of the vessel's drive shaft.

***Shore power –*** See "Cold Ironing"

***Point source*** – A single, stationary point source of emissions that is immoveable for all practical purposes.

***Switching locomotive –*** A locomotive that is used exclusively in a facility where rail cars are organized and assembled into trains.

***Total organic gases –*** The sum of reactive and non-reactive organic gases in the air.

***Twenty-foot Equivalent Unit (TEU) –*** A measure used for containerized cargo. One TEU is equivalent to one standard cargo container measured 20' x 8' x 8'6".

***Two-stroke engines*** – A type of internal combustion engine that completes the same four processes as a four-stroke engine (intake, compression, power, and exhaust) in only two strokes of the piston rather than four. This is accomplished by using the space below the piston for air intake and compression, thus allowing the chamber above the piston to be used for just the power and exhaust strokes. This results in a power stroke with every revolution of the crank, instead of every second revolution as in a four-stroke engine. For this reason, two-stroke engines provide high specific power, so they are valued for use in portable, lightweight applications. Two stoke diesel engines are common in large marine vessels.

***Ultra Low Sulfur Diesel (ULSD) –*** See "diesel."

***Volatile Organic Compound (VOC) –*** A very board term used to describe the entire set of vapor-phase atmospheric organic chemicals except CO and $CO_2$.

# APPENDIX B - SUPPORTING DATA

# APPENDIX B - SUPPORTING DATA

## OCEAN-GOING VESSEL DATA

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 7825435 | 1980 | 14837 | 18.5 | Auto Carrier | 12356 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7917551 | 1981 | 28223 | 19.5 | Auto Carrier | 13496 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7917563 | 1981 | 28210 | 20 | Auto Carrier | 13500 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8016548 | 1982 | 28100 | 18.25 | Auto Carrier | 13500 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8018168 | 1982 | 17863 | 19.5 | Auto Carrier | 13542 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8107103 | 1982 | 41666 | 14.5 | Auto Carrier | 11180 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8204951 | 1984 | 44013 | 21 | Auto Carrier | 26921 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8204963 | 1984 | 44080 | 21 | Auto Carrier | 26921 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8204975 | 1984 | 43986 | 20.5 | Auto Carrier | 26919 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8320767 | 1985 | 28070 | 19.5 | Auto Carrier | 16980 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8321333 | 1985 | 28070 | 20 | Auto Carrier | 15190 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8415809 | 1985 | 13920 | 17.75 | Auto Carrier | 9179 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8517944 | 1986 | 12893 | 18.25 | Auto Carrier | 10591 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8602579 | 1987 | 15528 | 18 | Auto Carrier | 9000 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8607749 | 1987 | 14104 | 18.25 | Auto Carrier | 9650 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8608078 | 1988 | 23096 | 18 | Auto Carrier | 9445 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8608133 | 1987 | 9783 | 18 | Auto Carrier | 8870 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8608145 | 1987 | 9675 | 18.5 | Auto Carrier | 8870 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8608157 | 1987 | 12848 | 18 | Auto Carrier | 10597 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8608169 | 1987 | 12939 | 19.5 | Auto Carrier | 10591 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8612251 | 1987 | 14487 | 20.9 | Auto Carrier | 10298 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8612263 | 1987 | 14034 | 20.8 | Auto Carrier | 10298 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8616958 | 1987 | 15576 | 18.7 | Auto Carrier | 11511 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8709119 | 1987 | 9694 | 18 | Auto Carrier | 8871 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8709157 | 1987 | 12706 | 19.7 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8712324 | 1988 | 18777 | 19 | Auto Carrier | 11694 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8718706 | 1988 | 12763 | 18 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8912663 | 1988 | 12763 | 18.58 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9053505 | 1994 | 17183 | 18.8 | Auto Carrier | 10813 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9056296 | 1994 | 14930 | 19 | Auto Carrier | 11916 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9070462 | 1994 | 13308 | 18 | Auto Carrier | 10371 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9077836 | 1995 | 14696 | 18.5 | Auto Carrier | 12269 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9082934 | 1995 | 15199 | 20.2 | Auto Carrier | 16358 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9088237 | 1996 | 13778 | 19.9 | Auto Carrier | 13899 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9088249 | 1997 | 12490 | 19.9 | Auto Carrier | 13899 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9103180 | 1994 | 18938 | 18.6 | Auto Carrier | 11695 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9110107 | 1995 | 15181 | 18.5 | Auto Carrier | 11475 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9121273 | 1996 | 48988 | 19.5 | Auto Carrier | 25000 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9122655 | 1997 | 28142 | 20.5 | Auto Carrier | 16358 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9122966 | 1997 | 21421 | 20.1 | Auto Carrier | 14314 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9138525 | 1998 | 28142 | 20.5 | Auto Carrier | 16358 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9150339 | 1998 | 14353 | 18.9 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9150341 | 1998 | 14348 | 18.9 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9153551 | 1998 | 15483 | 18 | Auto Carrier | 11416 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9158288 | 1998 | 22799 | 19 | Auto Carrier | 14123 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9158604 | 1997 | 21505 | 20.1 | Auto Carrier | 14314 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9166895 | 1998 | 13418 | 19 | Auto Carrier | 11916 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9169316 | 1999 | 16669 | 19.2 | Auto Carrier | 12357 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9174490 | 1998 | 22734 | 19.3 | Auto Carrier | 14121 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9175925 | 1998 | 14101 | 19 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9177026 | 1999 | 12780 | 19.5 | Auto Carrier | 11060 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9177038 | 2000 | 12778 | 19.5 | Auto Carrier | 11060 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9177428 | 1998 | 21523 | 18.53 | Auto Carrier | 14123 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9181376 | 1999 | 15894 | 19 | Auto Carrier | 11622 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9182289 | 1999 | 21526 | 19.3 | Auto Carrier | 14121 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9185047 | 2000 | 14067 | 18.9 | Auto Carrier | 10592 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9185463 | 2000 | 16886 | 20 | Auto Carrier | 14123 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9188805 | 1999 | 10817 | 18.5 | Auto Carrier | 9989 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9189251 | 1999 | 28126 | 20.5 | Auto Carrier | 14710 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9191307 | 2000 | 39516 | 20 | Auto Carrier | 20940 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9191321 | 2000 | 39516 | 20 | Auto Carrier | 20940 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9203291 | 1998 | 21511 | 19 | Auto Carrier | 14314 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9209271 | 2000 | 17693 | 20 | Auto Carrier | 14638 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9209518 | 2000 | 20144 | 19 | Auto Carrier | 14123 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9210438 | 2000 | 21400 | 20.5 | Auto Carrier | 15520 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9213454 | 2000 | 20202 | 20 | Auto Carrier | 14121 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9231688 | 2001 | 10454 | 18.5 | Auto Carrier | 9989 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9238519 | 2001 | 17201 | 20 | Auto Carrier | 13940 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9238521 | 2001 | 17232 | 20 | Auto Carrier | 13940 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9240160 | 2003 | 28388 | 20.5 | Auto Carrier | 16358 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9252204 | 2003 | 19879 | 20 | Auto Carrier | 14160 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9252228 | 2003 | 19893 | 20 | Auto Carrier | 14160 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9267687 | 2003 | 19512 | 20 | Auto Carrier | 14160 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9273894 | 2004 | 20111 | 20 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9283875 | 2004 | 20146 | 20 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9289908 | 2006 | 12600 | 20 | Auto Carrier | 14220 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9289910 | 2006 | 12249 | 20 | Auto Carrier | 14220 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293571 | 2005 | 18947 | 20 | Auto Carrier | 15130 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293612 | 2004 | 19628 | 19.5 | Auto Carrier | 13895 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293624 | 2005 | 19628 | 19.5 | Auto Carrier | 13895 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293636 | 2004 | 19086 | 20.65 | Auto Carrier | 14315 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293648 | 2004 | 19080 | 20.65 | Auto Carrier | 12170 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293662 | 2005 | 19093 | 20.65 | Auto Carrier | 10360 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293894 | 2006 | 17713 | 20.7 | Auto Carrier | 15090 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293911 | 2005 | 17738 | 20.7 | Auto Carrier | 15090 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302205 | 2005 | 19628 | 19.5 | Auto Carrier | 13240 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9303194 | 2006 | 18312 | 19.8 | Auto Carrier | 14280 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9303211 | 2006 | 18318 | 20.6 | Auto Carrier | 14280 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9310109 | 2006 | 19628 | 19.5 | Auto Carrier | 14315 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9319753 | 2006 | 19628 | 19.5 | Auto Carrier | 14315 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9325233 | 2007 | 18099 | 19.8 | Auto Carrier | 14280 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9332925 | 2007 | 18700 | 19 | Auto Carrier | 15820 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9334246 | 2008 | 15068 | 19.4 | Auto Carrier | 11440 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338620 | 2007 | 18864 | 20 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338632 | 2008 | 12892 | 20 | Auto Carrier | 10999 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338709 | 2007 | 22755 | 19.5 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338840 | 2008 | 18864 | 20 | Auto Carrier | 15130 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338890 | 2009 | 14342 | 19.5 | Auto Carrier | 11334 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9339818 | 2007 | 18090 | 19.8 | Auto Carrier | 14280 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9339832 | 2008 | 17673 | 20 | Auto Carrier | 12640 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9358888 | 2008 | 12303 | 19.7 | Auto Carrier | 11060 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9361811 | 2008 | 12300 | 20 | Auto Carrier | 12640 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9361823 | 2008 | 12300 | 20 | Auto Carrier | 12640 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9362267 | 2006 | 17765 | 20 | Auto Carrier | 16360 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9367607 | 2009 | 17382 | 19.3 | Auto Carrier | 14120 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9372327 | 2007 | 15261 | 19.9 | Auto Carrier | 11560 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9372810 | 2009 | 17406 | 19.3 | Auto Carrier | 14120 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9375264 | 2008 | 22144 | 19.5 | Auto Carrier | 14315 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377494 | 2008 | 30089 | 20.8 | Auto Carrier | 18080 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377511 | 2008 | 30089 | 20.8 | Auto Carrier | 18080 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9381677 | 2008 | 17289 | 19.8 | Auto Carrier | 15090 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9384942 | 2007 | 22602 | 20.1 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9391581 | 2009 | 21037 | 20 | Auto Carrier | 15820 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9392341 | 2010 | 15031 | 19.4 | Auto Carrier | 11441 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9395630 | 2011 | 13363 | 19.8 | Auto Carrier | 13560 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9397987 | 2008 | 18772 | 20.65 | Auto Carrier | 14315 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398333 | 2009 | 22250 | 19.5 | Auto Carrier | 13240 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9402756 | 2008 | 12889 | 20 | Auto Carrier | 11620 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9403279 | 2010 | 14381 | 19.5 | Auto Carrier | 11336 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9403281 | 2010 | 14996 | 20 | Auto Carrier | 11440 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426350 | 2009 | 21438 | 20 | Auto Carrier | 15544 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426386 | 2009 | 17237 | 19.8 | Auto Carrier | 15092 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9432880 | 2008 | 12296 | 20 | Auto Carrier | 14220 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9432907 | 2008 | 12352 | 20 | Auto Carrier | 14220 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9442122 | 2010 | 11215 | 19.6 | Auto Carrier | 11620 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9442873 | 2008 | 18930 | 20 | Auto Carrier | 13260 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9477921 | 2009 | 20019 | 20 | Auto Carrier | 16360 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9481051 | 2011 | 12588 | 18 | Auto Carrier | 11060 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9481075 | 2011 | 10600 | 18 | Auto Carrier | 11060 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9494905 | 2009 | 17245 | 20.5 | Auto Carrier | 15090 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9515383 | 2011 | 41820 | 20.25 | Auto Carrier | 20100 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9519121 | 2009 | 22723 | 19.5 | Auto Carrier | 16360 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9531739 | 2010 | 21323 | 20.6 | Auto Carrier | 15544 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9544920 | 2011 | 17300 | 19.8 | Auto Carrier | 16360 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9553103 | 2010 | 22657 | 19.5 | Auto Carrier | 15540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9554200 | 2010 | 19045 | 20 | Auto Carrier | 15100 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9584059 | 2010 | 18436 | 20 | Auto Carrier | 15130 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9610391 | 2011 | 18900 | 20 | Auto Carrier | 15820 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8307179 | 1984 | 38309 | 14 | Bulk | 5884 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8308991 | 1985 | 38888 | 14.5 | Bulk | 5884 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8319641 | 1984 | 38033 | 14 | Bulk | 6660 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8413473 | 1986 | 34142 | 14.1 | Bulk | 9540 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8517578 | 1987 | 68283 | 14 | Bulk | 8018 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8800327 | 1990 | 68789 | 14.5 | Bulk | 8994 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8801022 | 1990 | 68788 | 14 | Bulk | 9017 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8801785 | 1989 | 68676 | 14 | Bulk | 7205 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8901107 | 1990 | 69637 | 14 | Bulk | 8905 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8903234 | 1992 | 69451 | 14 | Bulk | 8910 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8905828 | 1991 | 65434 | 14.4 | Bulk | 9451 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9011923 | 1992 | 73505 | 13.7 | Bulk | 8005 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9013268 | 1991 | 69337 | 14.5 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9040376 | 1993 | 43415 | 13.7 | Bulk | 7025 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9041019 | 1994 | 70046 | 14.5 | Bulk | 9015 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9046916 | 1993 | 69555 | 13.5 | Bulk | 7414 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9047099 | 1994 | 69271 | 14 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9047104 | 1994 | 69283 | 14.5 | Bulk | 8798 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9055993 | 1994 | 69930 | 14 | Bulk | 8458 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9074016 | 1993 | 69153 | 14.8 | Bulk | 10246 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9074470 | 1994 | 69286 | 14 | Bulk | 11254 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9075735 | 1995 | 73034 | 14.5 | Bulk | 8676 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9077226 | 1995 | 68371 | 14 | Bulk | 7635 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9077903 | 1994 | 64214 | 13.5 | Bulk | 8555 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9086954 | 1996 | 69091 | 14.5 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9087192 | 1995 | 70677 | 14 | Bulk | 8312 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9103178 | 1994 | 45228 | 14.3 | Bulk | 7943 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9104081 | 1995 | 45712 | 14 | Bulk | 7171 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9104457 | 1994 | 68591 | 14.1 | Bulk | 7635 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9105396 | 1995 | 27308 | 14.1 | Bulk | 5370 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9107667 | 1995 | 45483 | 14.6 | Bulk | 8561 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9111943 | 1995 | 45320 | 14.3 | Bulk | 7392 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9112325 | 1996 | 73080 | 13.5 | Bulk | 8680 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9115523 | 1996 | 70165 | 14.8 | Bulk | 7723 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9118329 | 1996 | 45190 | 14.5 | Bulk | 7723 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9119971 | 1996 | 46664 | 14 | Bulk | 8165 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9120059 | 1996 | 70189 | 15.8 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9122849 | 1996 | 71662 | 14.5 | Bulk | 8701 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9123128 | 1996 | 70164 | 14.5 | Bulk | 8900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9126302 | 1997 | 45584 | 14 | Bulk | 6958 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9128221 | 1997 | 73049 | 14.76 | Bulk | 8682 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9128582 | 1995 | 69058 | 14.75 | Bulk | 9930 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9128922 | 1996 | 70252 | 14 | Bulk | 10916 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9131838 | 1997 | 72940 | 14.5 | Bulk | 8680 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9135523 | 1996 | 24800 | 14.3 | Bulk | 6179 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9138501 | 1997 | 74009 | 14.5 | Bulk | 8900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9138903 | 1997 | 32115 | 14.4 | Bulk | 7061 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9139256 | 1997 | 71572 | 14.3 | Bulk | 8701 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9139270 | 1996 | 70296 | 14 | Bulk | 9526 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9140009 | 1996 | 45681 | 14.5 | Bulk | 8562 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9147423 | 1998 | 73937 | 14.5 | Bulk | 8900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9149392 | 1998 | 47180 | 14.5 | Bulk | 7451 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9156278 | 1998 | 73018 | 14.5 | Bulk | 8673 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9156838 | 1997 | 73763 | 15 | Bulk | 8385 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9159438 | 1997 | 45363 | 14.3 | Bulk | 6333 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9159567 | 1997 | 73786 | 14.5 | Bulk | 8878 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9162045 | 1997 | 71369 | 14.5 | Bulk | 8532 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9163295 | 1998 | 74522 | 14.5 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9163465 | 1998 | 45766 | 14 | Bulk | 7172 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168491 | 1998 | 45713 | 14 | Bulk | 7172 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9170274 | 1998 | 72493 | 14.5 | Bulk | 10224 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9170298 | 1998 | 70529 | 14.5 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9176670 | 2000 | 45710 | 14 | Bulk | 7172 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9180906 | 2000 | 75100 | 14.5 | Bulk | 10750 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9181039 | 1999 | 50327 | 14 | Bulk | 8090 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9185736 | 1999 | 73744 | 14.5 | Bulk | 8878 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9185748 | 1998 | 72465 | 14.2 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9186376 | 1998 | 27140 | 14 | Bulk | 6074 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9186778 | 1999 | 48221 | 14.5 | Bulk | 7282 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9189768 | 1999 | 74356 | 14.5 | Bulk | 9209 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9190640 | 2002 | 72863 | 14.5 | Bulk | 12269 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9207417 | 1999 | 73807 | 14 | Bulk | 8900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9207730 | 2000 | 74020 | 13.6 | Bulk | 8900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9207766 | 2001 | 75971 | 14 | Bulk | 9010 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9208502 | 2000 | 72917 | 15 | Bulk | 10412 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9211559 | 2000 | 28355 | 14 | Bulk | 5392 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9213753 | 2000 | 31824 | 14 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9214161 | 1999 | 74242 | 15 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9216248 | 2001 | 74401 | 14.5 | Bulk | 10952 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9216432 | 2001 | 74119 | 14.4 | Bulk | 8668 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9216444 | 2001 | 74119 | 14.4 | Bulk | 8668 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9216640 | 2001 | 75563 | 14 | Bulk | 9342 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9217216 | 2001 | 74297 | 14.7 | Bulk | 10224 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9217228 | 2001 | 74297 | 14.7 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9218167 | 2000 | 74269 | 14.5 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9218284 | 2001 | 73311 | 14.5 | Bulk | 8880 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9218301 | 2000 | 31877 | 13.5 | Bulk | 7060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9218313 | 2000 | 31879 | 13.5 | Bulk | 7060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9218791 | 2001 | 74540 | 14.5 | Bulk | 10952 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9219032 | 2001 | 74297 | 14.5 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9219044 | 2002 | 75000 | 14.5 | Bulk | 10224 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9219458 | 2000 | 46644 | 14.5 | Bulk | 7428 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9221190 | 2001 | 76099 | 14.5 | Bulk | 12269 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9221437 | 2001 | 73910 | 14.9 | Bulk | 10371 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9222625 | 2001 | 52224 | 14.5 | Bulk | 9467 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9224790 | 2002 | 74141 | 14.5 | Bulk | 10952 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9224984 | 2001 | 75121 | 14.8 | Bulk | 11160 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9224996 | 2001 | 75169 | 14.8 | Bulk | 11160 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9227649 | 2001 | 75121 | 14.5 | Bulk | 9800 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9227687 | 2001 | 73996 | 14.5 | Bulk | 9989 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9228069 | 2002 | 74204 | 14.5 | Bulk | 9974 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229623 | 2002 | 74133 | 14.9 | Bulk | 11044 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229635 | 2002 | 74133 | 14.9 | Bulk | 11044 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9230359 | 2002 | 73937 | 14.7 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9231303 | 2001 | 76623 | 15 | Bulk | 10320 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9231987 | 2003 | 50457 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9233351 | 2001 | 74272 | 14.1 | Bulk | 8827 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9235232 | 2001 | 74750 | 14 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9237280 | 2001 | 28287 | 14 | Bulk | 5390 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9245196 | 2002 | 52382 | 14.5 | Bulk | 8561 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9246619 | 2002 | 53094 | 15 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9249271 | 2003 | 53098 | 14 | Bulk | 7686 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9250701 | 2002 | 32474 | 14.3 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9251078 | 2002 | 32537 | 14.3 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9252058 | 2001 | 28492 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9252412 | 2003 | 75932 | 14.5 | Bulk | 8550 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9255593 | 2002 | 75162 | 14.5 | Bulk | 9260 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9256353 | 2001 | 28470 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9256872 | 2004 | 76015 | 14.5 | Bulk | 8550 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260859 | 2002 | 28379 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9261798 | 2002 | 75007 | 14.5 | Bulk | 11290 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9262998 | 2003 | 32751 | 14.5 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9263069 | 2004 | 45181 | 14 | Bulk | 8313 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9263760 | 2002 | 28473 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9264441 | 2002 | 50508 | 14.5 | Bulk | 7900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9267077 | 2004 | 31893 | 14.3 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9267089 | 2004 | 31894 | 14.5 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9267405 | 2002 | 53553 | 15 | Bulk | 9481 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9268083 | 2003 | 31646 | 14.7 | Bulk | 7061 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9268916 | 2004 | 33745 | 14 | Bulk | 6230 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9272785 | 2003 | 52428 | 14.8 | Bulk | 7290 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9274551 | 2004 | 32754 | 13.5 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9274915 | 2004 | 52571 | 14.3 | Bulk | 7800 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9276171 | 2004 | 76878 | 14 | Bulk | 9318 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9276200 | 2004 | 28446 | 13.8 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9277644 | 2004 | 52810 | 14.5 | Bulk | 8580 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9277668 | 2004 | 52808 | 13.5 | Bulk | 8580 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9278648 | 2003 | 35552 | 14.6 | Bulk | 7081 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9279549 | 2004 | 75772 | 14.5 | Bulk | 8973 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281437 | 2004 | 73880 | 14.5 | Bulk | 11111 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281449 | 2004 | 73592 | 15 | Bulk | 11111 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9282613 | 2004 | 35313 | 14.2 | Bulk | 6656 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9284001 | 2004 | 32773 | 13.5 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9284245 | 2005 | 56056 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9284300 | 2004 | 56042 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9284879 | 2004 | 76466 | 14.5 | Bulk | 9350 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285407 | 2003 | 34790 | 14 | Bulk | 7955 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9286956 | 2005 | 76286 | 14 | Bulk | 10500 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9287168 | 2005 | 76469 | 14.5 | Bulk | 8830 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9287170 | 2005 | 76440 | 14 | Bulk | 8830 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9287455 | 2004 | 74823 | 13.8 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9287778 | 2004 | 77684 | 14.6 | Bulk | 7356 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290141 | 2005 | 75349 | 14.5 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9291092 | 2005 | 75744 | 14.5 | Bulk | 8973 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9291119 | 2005 | 75804 | 14.5 | Bulk | 8973 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9291121 | 2005 | 75409 | 14.5 | Bulk | 8973 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293105 | 2003 | 53125 | 14.5 | Bulk | 9477 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9293868 | 2005 | 29678 | 14.3 | Bulk | 6150 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9294501 | 2004 | 76704 | 14 | Bulk | 9230 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9296274 | 2005 | 33733 | 14.3 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9297929 | 2005 | 73691 | 14.4 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9298521 | 2005 | 52498 | 14.5 | Bulk | 7800 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300178 | 2004 | 32573 | 14 | Bulk | 7080 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300207 | 2004 | 32564 | 14.3 | Bulk | 5627 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301055 | 2006 | 82790 | 14.5 | Bulk | 11000 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301720 | 2005 | 55257 | 14.5 | Bulk | 8200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302750 | 2004 | 76606 | 15 | Bulk | 10320 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302786 | 2005 | 76619 | 14.5 | Bulk | 10320 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9303144 | 2006 | 75637 | 14 | Bulk | 8973 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9303376 | 2005 | 32642 | 14.3 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9304576 | 2006 | 76801 | 14 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9310616 | 2007 | 28709 | 14.5 | Bulk | 5900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9310757 | 2006 | 32588 | 14.3 | Bulk | 7780 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9311189 | 2008 | 75886 | 14 | Bulk | 9010 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9311402 | 2005 | 31871 | 14.5 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9311414 | 2006 | 31886 | 14.5 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9312339 | 2004 | 28433 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9313292 | 2011 | 82499 | 14.5 | Bulk | 10150 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9314624 | 2008 | 77061 | 14.5 | Bulk | 9319 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9314636 | 2008 | 77061 | 14.5 | Bulk | 9319 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9314648 | 2007 | 82282 | 14.5 | Bulk | 10959 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9316062 | 2006 | 76863 | 14.5 | Bulk | 9230 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9316218 | 2004 | 49400 | 14.5 | Bulk | 6880 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9316220 | 2004 | 55317 | 14.6 | Bulk | 8200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317365 | 2007 | 54881 | 14.5 | Bulk | 8208 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317482 | 2005 | 46619 | 14.3 | Bulk | 7024 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317494 | 2007 | 55728 | 14.5 | Bulk | 8208 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317523 | 2008 | 82338 | 14.5 | Bulk | 9377 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317690 | 2006 | 37504 | 14.5 | Bulk | 7061 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317781 | 2006 | 31896 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317793 | 2007 | 31883 | 14.5 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9321914 | 2007 | 75511 | 14.5 | Bulk | 11077 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9326158 | 2008 | 77376 | 14.5 | Bulk | 8789 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9331543 | 2006 | 75375 | 14.5 | Bulk | 10220 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9331696 | 2009 | 53000 | 14.7 | Bulk | 9479 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9335886 | 2008 | 32114 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9336775 | 2007 | 32576 | 14 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9336799 | 2005 | 32816 | 13.5 | Bulk | 6620 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9338541 | 2007 | 32142 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9340063 | 2008 | 55624 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9342918 | 2006 | 76585 | 15.3 | Bulk | 10320 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9358838 | 2006 | 74483 | 14 | Bulk | 8990 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9362231 | 2006 | 76629 | 14 | Bulk | 10320 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9363065 | 2008 | 75228 | 14 | Bulk | 8992 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9364758 | 2008 | 76432 | 14.5 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9364813 | 2006 | 53452 | 15 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9367621 | 2007 | 28448 | 14 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9367633 | 2006 | 28442 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9370329 | 2008 | 29664 | 14.25 | Bulk | 6150 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9370393 | 2008 | 16383 | 13.8 | Bulk | 4635 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377975 | 2008 | 33171 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377987 | 2008 | 33171 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377999 | 2008 | 33171 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9378008 | 2009 | 33098 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9379662 | 2008 | 31890 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9379674 | 2009 | 31922 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9379935 | 2009 | 33157 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9381172 | 2006 | 76629 | 14 | Bulk | 12240 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9384863 | 2007 | 28416 | 14 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9387633 | 2008 | 75093 | 14 | Bulk | 11299 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9391610 | 2010 | 56548 | 14.5 | Bulk | 8890 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9397236 | 2009 | 31887 | 14.4 | Bulk | 7470 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9403097 | 2009 | 58803 | 14.5 | Bulk | 8400 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9403102 | 2009 | 58792 | 14.5 | Bulk | 8400 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9404455 | 2010 | 37852 | 14 | Bulk | 8730 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9404998 | 2010 | 55073 | 14.5 | Bulk | 8202 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9413690 | 2009 | 75123 | 14 | Bulk | 8990 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9414149 | 2009 | 83611 | 14 | Bulk | 13560 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9420291 | 2009 | 55444 | 14.6 | Bulk | 8201 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9422794 | 2011 | 37221 | 14.5 | Bulk | 7458 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9423530 | 2009 | 58701 | 14 | Bulk | 8400 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424089 | 2010 | 31881 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424091 | 2010 | 31887 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424106 | 2010 | 31889 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424118 | 2011 | 31888 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424120 | 2011 | 31872 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9424132 | 2011 | 31858 | 14.4 | Bulk | 6840 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9425904 | 2010 | 58117 | 14.5 | Bulk | 8400 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426116 | 2010 | 93337 | 14.1 | Bulk | 13560 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426776 | 2010 | 61611 | 14.5 | Bulk | 8208 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9430856 | 2009 | 55582 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9433547 | 2009 | 57000 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9436721 | 2010 | 57573 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9441312 | 2010 | 57809 | 14.3 | Bulk | 8700 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9443396 | 2010 | 32875 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9444924 | 2008 | 28333 | 14 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9445148 | 2008 | 28429 | 14 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9445203 | 2008 | 28342 | 13.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9452593 | 2010 | 79649 | 14 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9452622 | 2011 | 79602 | 14 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9454084 | 2010 | 58831 | 14.5 | Bulk | 8630 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9456238 | 2011 | 56770 | 14.7 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9456458 | 2010 | 56925 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9460318 | 2008 | 53450 | 13.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9465801 | 2009 | 75206 | 14 | Bulk | 8990 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9473341 | 2011 | 75200 | 14.5 | Bulk | 8833 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9473406 | 2009 | 33345 | 13.7 | Bulk | 6480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9473573 | 2010 | 35000 | 14 | Bulk | 7900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9475739 | 2010 | 33000 | 14.5 | Bulk | 7900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9479010 | 2010 | 55640 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9481441 | 2010 | 79471 | 14.5 | Bulk | 11900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9482483 | 2009 | 53390 | 14 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9483188 | 2009 | 55783 | 14.5 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9483827 | 2010 | 81000 | 14.4 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9486570 | 2010 | 37302 | 14 | Bulk | 7368 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9490777 | 2010 | 57970 | 14.3 | Bulk | 8700 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9492074 | 2011 | 79500 | 14 | Bulk | 11060 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9493638 | 2011 | 75618 | 14.5 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9494242 | 2010 | 56726 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9498901 | 2010 | 93282 | 14.1 | Bulk | 12240 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9512898 | 2011 | 82012 | 14.5 | Bulk | 14280 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9515682 | 2009 | 28291 | 14 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9515759 | 2010 | 56722 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9523146 | 2010 | 75566 | 14.5 | Bulk | 11900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9523251 | 2009 | 82123 | 14.5 | Bulk | 9710 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9530955 | 2011 | 36903 | 14.8 | Bulk | 7860 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9533347 | 2010 | 57000 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9533359 | 2010 | 56604 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

## Puget Sound Emissions Inventory

### Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9537733 | 2011 | 75491 | 14.5 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9542465 | 2010 | 74951 | 14.5 | Bulk | 9230 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9545508 | 2010 | 33663 | 14 | Bulk | 7900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9545510 | 2011 | 33723 | 14 | Bulk | 7900 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9548548 | 2009 | 76381 | 14.5 | Bulk | 10200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9550199 | 2010 | 28349 | 14 | Bulk | 6150 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9557056 | 2011 | 61654 | 14.5 | Bulk | 8208 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9563380 | 2010 | 35052 | 14 | Bulk | 9960 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9567427 | 2011 | 56745 | 14.2 | Bulk | 9960 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9573842 | 2011 | 61508 | 14.5 | Bulk | 8450 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9583598 | 2010 | 75500 | 14.5 | Bulk | 8833 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9584140 | 2011 | 57000 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9584592 | 2011 | 81582 | 14.5 | Bulk | 11200 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9589671 | 2011 | 81340 | 14.5 | Bulk | 11400 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9592886 | 2010 | 57000 | 14.2 | Bulk | 9480 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9604732 | 2011 | 28240 | 14.5 | Bulk | 5850 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8021971 | 1982 | 33748 | 15 | Bulk - Heavy Load | 10001 | 610 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9382841 | 2007 | 4579 | 13 | Bulk - Heavy Load | 4920 | 610 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7117278 | 1971 | 31364 | 16 | Bulk - Self Discharging | 9782 | 1163 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7925613 | 1981 | 37448 | 13 | Bulk - Self Discharging | 6620 | 1163 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8009571 | 1982 | 67208 | 14.5 | Bulk - Self Discharging | 11339 | 1163 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8105492 | 1983 | 74973 | 14.5 | Bulk - Self Discharging | 11327 | 1163 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9370783 | 2008 | 49549 | 14 | Bulk - Wood Chips | 8360 | 705 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7224306 | 1973 | 25651 | 22 | Container1000 | 23538 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7602338 | 1978 | 24683 | 20 | Container1000 | 23538 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7802718 | 1980 | 26350 | 20 | Container1000 | 23538 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7908005 | 1983 | 30652 | 23.25 | Container1000 | 31774 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8419142 | 1987 | 21282 | 20 | Container1000 | 16814 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8419154 | 1987 | 20668 | 20 | Container1000 | 16814 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8419166 | 1987 | 20668 | 20 | Container1000 | 16814 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9117662 | 1995 | 14700 | 20 | Container1000 | 10920 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9155377 | 2000 | 23992 | 18.3 | Container1000 | 14325 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9202481 | 2000 | 21331 | 20 | Container1000 | 15785 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9221059 | 2001 | 20631 | 19.5 | Container1000 | 13530 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9256377 | 2003 | 23454 | 19.5 | Container1000 | 15806 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9337597 | 2006 | 23690 | 19.5 | Container1000 | 16660 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9344643 | 2007 | 28187 | 21.3 | Container1000 | 19619 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9344679 | 2007 | 28219 | 21.3 | Container1000 | 19619 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9344681 | 2007 | 28123 | 21.3 | Container1000 | 19619 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9344693 | 2008 | 28186 | 21.3 | Container1000 | 19619 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9348986 | 2007 | 23780 | 19.5 | Container1000 | 12510 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9357846 | 2007 | 23745 | 19.5 | Container1000 | 16663 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9362712 | 2008 | 25884 | 20.5 | Container1000 | 16663 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9406960 | 2008 | 23711 | 19.5 | Container1000 | 16660 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9435258 | 2008 | 23357 | 19.5 | Container1000 | 16672 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9470961 | 2010 | 28632 | 21 | Container1000 | 18080 | 1556 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398436 | 2009 | 116440 | 24.8 | Container10000 | 68639 | 2617 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7617890 | 1979 | 31213 | 21 | Container2000 | 20963 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7617905 | 1980 | 31423 | 21 | Container2000 | 20963 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9080998 | 1996 | 32355 | 19.8 | Container2000 | 16860 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9110951 | 1995 | 34625 | 21.5 | Container2000 | 22478 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9122394 | 1996 | 34671 | 22 | Container2000 | 22795 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9162253 | 1998 | 30007 | 20 | Container2000 | 12240 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9162265 | 1998 | 30007 | 20 | Container2000 | 12240 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9173135 | 1999 | 30135 | 20 | Container2000 | 12240 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9225407 | 2000 | 39128 | 22.5 | Container2000 | 21735 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9240873 | 2002 | 34638 | 22.1 | Container2000 | 24814 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241451 | 2003 | 33825 | 22 | Container2000 | 21560 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9243590 | 2003 | 35925 | 22.2 | Container2000 | 21727 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9294549 | 2006 | 34704 | 22.1 | Container2000 | 24830 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9305881 | 2005 | 33651 | 22.3 | Container2000 | 20637 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307841 | 2005 | 33082 | 22.6 | Container2000 | 24533 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9311763 | 2006 | 37800 | 22 | Container2000 | 21769 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9311787 | 2006 | 37800 | 22 | Container2000 | 21769 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320001 | 2005 | 33813 | 21.9 | Container2000 | 21769 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320037 | 2006 | 37929 | 21 | Container2000 | 21769 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9336191 | 2007 | 34241 | 22 | Container2000 | 21660 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9377133 | 2007 | 38070 | 21.85 | Container2000 | 21769 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9400825 | 2008 | 33613 | 22.2 | Container2000 | 21735 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9402639 | 2009 | 34194 | 22 | Container2000 | 21660 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9440306 | 2010 | 41253 | 22.3 | Container2000 | 25039 | 1916 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7907984 | 1982 | 30825 | 23.25 | Container3000 | 31774 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8718110 | 1989 | 49262 | 22 | Container3000 | 30967 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9001215 | 1995 | 45995 | 22.5 | Container3000 | 30967 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9071521 | 1994 | 45455 | 20.5 | Container3000 | 20500 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9110561 | 1995 | 45470 | 21 | Container3000 | 20509 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9118317 | 1996 | 45995 | 22.5 | Container3000 | 30967 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9253296 | 2003 | 48874 | 23.4 | Container3000 | 31919 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9334351 | 2007 | 41850 | 22.3 | Container3000 | 26270 | 2382 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8613310 | 1988 | 60639 | 23 | Container4000 | 42424 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8902539 | 1991 | 67686 | 23 | Container4000 | 36499 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8902553 | 1991 | 67618 | 23 | Container4000 | 36629 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8902565 | 1991 | 67684 | 23 | Container4000 | 36629 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8902577 | 1992 | 65815 | 23 | Container4000 | 36629 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9036909 | 1993 | 67680 | 23 | Container4000 | 36509 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9038907 | 1993 | 67680 | 23.8 | Container4000 | 36509 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9038919 | 1994 | 65815 | 23 | Container4000 | 36499 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9077460 | 1995 | 66618 | 24.5 | Container4000 | 43176 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9102148 | 1995 | 62905 | 24.5 | Container4000 | 43839 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9102150 | 1995 | 62905 | 24.5 | Container4000 | 43843 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9134244 | 1997 | 55604 | 25 | Container4000 | 48634 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9143166 | 1998 | 50059 | 24 | Container4000 | 36479 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9143544 | 1997 | 66771 | 24 | Container4000 | 41129 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9143568 | 1998 | 66577 | 24 | Container4000 | 41129 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9144756 | 1997 | 62693 | 24.5 | Container4000 | 48630 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9144768 | 1998 | 62693 | 24.5 | Container4000 | 48630 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9193288 | 2000 | 67145 | 24 | Container4000 | 40039 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9193290 | 2000 | 67145 | 24 | Container4000 | 40039 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9193317 | 2000 | 66975 | 24 | Container4000 | 40039 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9200811 | 2000 | 66781 | 24 | Container4000 | 40058 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9200823 | 2000 | 66818 | 24 | Container4000 | 40058 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9232084 | 2002 | 58724 | 24 | Container4000 | 41109 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9232101 | 2002 | 58724 | 24 | Container4000 | 41106 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9236535 | 2003 | 58254 | 25 | Container4000 | 43920 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9252230 | 2002 | 53554 | 24.5 | Container4000 | 36774 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9262118 | 2003 | 50188 | 24.2 | Container4000 | 36543 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9279965 | 2004 | 66694 | 24 | Container4000 | 41106 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9279977 | 2004 | 66786 | 24 | Container4000 | 41106 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301847 | 2007 | 50500 | 23.3 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9310056 | 2005 | 52191 | 24.2 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9312561 | 2005 | 52191 | 24.2 | Container4000 | 36479 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9312597 | 2006 | 52210 | 24.2 | Container4000 | 36479 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320398 | 2005 | 63638 | 24.2 | Container4000 | 39969 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320439 | 2006 | 63411 | 24 | Container4000 | 39952 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9326768 | 2006 | 53682 | 24.25 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9351581 | 2008 | 50547 | 23.5 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9375496 | 2008 | 51752 | 23.5 | Container4000 | 36526 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9387102 | 2006 | 65123 | 23.8 | Container4000 | 45759 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9389382 | 2008 | 51733 | 24 | Container4000 | 40039 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9389409 | 2009 | 51733 | 24.5 | Container4000 | 40039 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9404194 | 2009 | 50574 | 24.5 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9431707 | 2010 | 50497 | 24.5 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450571 | 2009 | 50500 | 23.3 | Container4000 | 36559 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9492701 | 2011 | 58200 | 24.3 | Container4000 | 43609 | 2973 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9110377 | 1996 | 68363 | 25.6 | Container5000 | 55569 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9111383 | 1996 | 67298 | 25.6 | Container5000 | 54794 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9111395 | 1996 | 67272 | 25.6 | Container5000 | 54814 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116577 | 1996 | 63388 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116589 | 1996 | 62386 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116591 | 1996 | 63388 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116606 | 1997 | 63388 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116618 | 1997 | 63388 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9120750 | 1997 | 69285 | 24.5 | Container5000 | 43100 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9161778 | 1998 | 68955 | 25.6 | Container5000 | 54899 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168831 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168843 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168855 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168867 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168879 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9169158 | 1999 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9169160 | 2000 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9188154 | 2000 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9196955 | 2000 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9196967 | 2000 | 63400 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9196979 | 2000 | 63388 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9196981 | 2001 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9196993 | 2001 | 63216 | 25 | Container5000 | 48634 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9198264 | 2000 | 68413 | 25.9 | Container5000 | 54945 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9198276 | 2000 | 68303 | 25.9 | Container5000 | 54945 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9198288 | 2001 | 68413 | 25.9 | Container5000 | 54925 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9200689 | 1999 | 68996 | 26.3 | Container5000 | 54945 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215646 | 2000 | 68263 | 26.3 | Container5000 | 54945 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9222986 | 2001 | 68196 | 26.1 | Container5000 | 54897 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9224532 | 2001 | 71366 | 25.1 | Container5000 | 58839 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9246396 | 2001 | 68910 | 24.5 | Container5000 | 43100 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9246401 | 2002 | 69107 | 24.5 | Container5000 | 43100 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

**Ocean-Going Vessel Data**

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9247546 | 2001 | 67170 | 25 | Container5000 | 57204 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9247558 | 2001 | 67170 | 25 | Container5000 | 57200 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9247560 | 2001 | 67170 | 25.7 | Container5000 | 57204 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9248150 | 2003 | 67979 | 26.3 | Container5000 | 54899 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260902 | 2002 | 67009 | 24.75 | Container5000 | 57199 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260914 | 2003 | 67009 | 24.7 | Container5000 | 57199 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9267651 | 2002 | 67197 | 25 | Container5000 | 57221 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9278088 | 2004 | 68280 | 26 | Container5000 | 54899 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281267 | 2004 | 68372 | 24.3 | Container5000 | 41106 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9287900 | 2004 | 68150 | 23.8 | Container5000 | 41106 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9288409 | 2004 | 67009 | 24.75 | Container5000 | 57199 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290440 | 2005 | 66478 | 25 | Container5000 | 45777 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290452 | 2005 | 66501 | 25 | Container5000 | 45777 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9294800 | 2004 | 68280 | 26.5 | Container5000 | 54899 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9295359 | 2005 | 67025 | 24.2 | Container5000 | 45779 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300312 | 2005 | 67209 | 25.6 | Container5000 | 57203 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302073 | 2006 | 71309 | 25 | Container5000 | 62943 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302102 | 2006 | 71283 | 25 | Container5000 | 62943 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302566 | 2006 | 68126 | 24 | Container5000 | 41129 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9302580 | 2006 | 68135 | 24.3 | Container5000 | 41106 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9305697 | 2006 | 71326 | 25 | Container5000 | 58840 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9322475 | 2007 | 67986 | 24.3 | Container5000 | 41129 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9322487 | 2007 | 68138 | 24.3 | Container5000 | 36996 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9322499 | 2007 | 68009 | 24.3 | Container5000 | 41129 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9437050 | 2010 | 65741 | 25 | Container5000 | 40039 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9437062 | 2010 | 65710 | 25 | Container5000 | 40039 | 4356 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9085522 | 1996 | 84900 | 25 | Container6000 | 54839 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9085534 | 1996 | 84900 | 24.6 | Container6000 | 54859 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9085546 | 1996 | 84900 | 24.6 | Container6000 | 54839 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9085558 | 1996 | 84900 | 25 | Container6000 | 54839 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9085560 | 1997 | 84900 | 25 | Container6000 | 54839 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9107887 | 1997 | 90456 | 25 | Container6000 | 54839 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215828 | 2001 | 80551 | 26.4 | Container6000 | 65929 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215830 | 2001 | 80596 | 26.4 | Container6000 | 65929 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215842 | 2001 | 80494 | 26.4 | Container6000 | 65929 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215854 | 2001 | 80550 | 26.4 | Container6000 | 65929 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9215866 | 2001 | 80551 | 26.4 | Container6000 | 65929 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241281 | 2002 | 75898 | 24.5 | Container6000 | 48630 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241293 | 2003 | 75898 | 24.5 | Container6000 | 48634 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241308 | 2002 | 75898 | 25 | Container6000 | 48634 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241310 | 2001 | 75898 | 25 | Container6000 | 48634 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241322 | 2002 | 75898 | 24.5 | Container6000 | 48600 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244922 | 2003 | 81577 | 26 | Container6000 | 57074 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244934 | 2003 | 81183 | 26 | Container6000 | 57074 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244946 | 2003 | 81094 | 26 | Container6000 | 57074 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9247742 | 2003 | 81171 | 25 | Container6000 | 61349 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9305647 | 2006 | 80262 | 25 | Container6000 | 68519 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307047 | 2005 | 72968 | 25 | Container6000 | 62919 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9321017 | 2006 | 72968 | 26 | Container6000 | 62919 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9323522 | 2007 | 80108 | 25 | Container6000 | 68519 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9332884 | 2009 | 72982 | 25 | Container6000 | 64198 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9385001 | 2009 | 72982 | 25 | Container6000 | 62919 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

**Ocean-Going Vessel Data**

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9385013 | 2009 | 72982 | 25 | Container6000 | 62919 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9385025 | 2009 | 72982 | 25 | Container6000 | 62919 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9406647 | 2010 | 83217 | 25.6 | Container6000 | 57198 | 4815 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229829 | 2001 | 100006 | 25.3 | Container7000 | 68639 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229831 | 2002 | 100003 | 25.3 | Container7000 | 68639 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229843 | 2002 | 100016 | 25.3 | Container7000 | 68639 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9229855 | 2003 | 100019 | 25.3 | Container7000 | 68639 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285653 | 2004 | 93643 | 25.2 | Container7000 | 69619 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285665 | 2004 | 93659 | 25.2 | Container7000 | 68665 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285677 | 2004 | 93572 | 25.2 | Container7000 | 69619 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285689 | 2004 | 93728 | 25.2 | Container7000 | 69619 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9285691 | 2004 | 93638 | 25.2 | Container7000 | 69619 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290464 | 2005 | 93542 | 25.2 | Container7000 | 68489 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290476 | 2005 | 93545 | 25.2 | Container7000 | 68489 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290488 | 2005 | 93570 | 25.2 | Container7000 | 68489 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9295218 | 2005 | 93594 | 25.2 | Container7000 | 68489 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9295220 | 2005 | 93558 | 25.2 | Container7000 | 68489 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300403 | 2006 | 78716 | 25.3 | Container7000 | 54941 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300415 | 2006 | 78796 | 25.3 | Container7000 | 54941 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300453 | 2007 | 78612 | 25.3 | Container7000 | 54941 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9300477 | 2008 | 78733 | 25.3 | Container7000 | 54941 | 4360 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9198587 | 2000 | 104750 | 25 | Container8000 | 54839 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9214903 | 2000 | 104750 | 25 | Container8000 | 54839 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260433 | 2003 | 109000 | 25 | Container8000 | 63030 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260445 | 2003 | 109000 | 25 | Container8000 | 63035 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9260457 | 2004 | 109000 | 25 | Container8000 | 63035 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9294989 | 2005 | 108180 | 25.3 | Container8000 | 68489 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9294991 | 2005 | 108106 | 25.3 | Container8000 | 68489 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9295244 | 2005 | 103800 | 25.21 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9295256 | 2005 | 103800 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9299783 | 2005 | 101818 | 24.5 | Container8000 | 68655 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9305491 | 2006 | 101496 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9318046 | 2006 | 100680 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9318060 | 2006 | 101505 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9318101 | 2007 | 101477 | 24.5 | Container8000 | 68646 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320697 | 2007 | 103681 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9320702 | 2007 | 103631 | 24.5 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9337925 | 2008 | 102453 | 25 | Container8000 | 68519 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9337949 | 2009 | 102418 | 25 | Container8000 | 68519 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9343716 | 2007 | 103800 | 25.2 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9343728 | 2008 | 103567 | 25 | Container8000 | 68529 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9343730 | 2008 | 103538 | 25.2 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398395 | 2009 | 108574 | 25.6 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398400 | 2009 | 108427 | 25.6 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398424 | 2010 | 108574 | 25.6 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9433793 | 2011 | 101474 | 25.3 | Container8000 | 68519 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9436355 | 2011 | 101386 | 25.3 | Container8000 | 68519 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9448803 | 2011 | 102742 | 25.6 | Container8000 | 68529 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450375 | 2009 | 103845 | 25.6 | Container8000 | 72239 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450387 | 2009 | 103773 | 25.6 | Container8000 | 72239 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450399 | 2010 | 104015 | 25 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450404 | 2010 | 104007 | 25 | Container8000 | 57199 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9450428 | 2010 | 103646 | 25 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450430 | 2010 | 103662 | 25 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450442 | 2010 | 103995 | 25 | Container8000 | 57199 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450600 | 2010 | 107000 | 25.2 | Container8000 | 72239 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9450612 | 2010 | 109021 | 25.2 | Container8000 | 68519 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9461465 | 2010 | 102518 | 25.2 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9461491 | 2011 | 102455 | 25.2 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9461506 | 2011 | 102518 | 25.2 | Container8000 | 68639 | 4769 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9146455 | 1998 | 104700 | 25 | Container9000 | 54839 | 4551 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9342516 | 2008 | 110401 | 25.5 | Container9000 | 68639 | 4551 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8708672 | 1990 | 2420 | 15 | Cruise | 5038 | 3500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9066667 | 1995 | 4500 | 21 | Cruise | 36328 | 3500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9072446 | 1995 | 7260 | 21.5 | Cruise | 29249 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9116864 | 1997 | 8439 | 22.3 | Cruise | 50399 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9156527 | 2000 | 6150 | 22 | Cruise | 10400 | 3500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9188037 | 2000 | 7327 | 21 | Cruise | 5600 | 7000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9188647 | 2001 | 7200 | 22 | Cruise | 62369 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9189419 | 2000 | 11928 | 24 | Cruise | 71246 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9189421 | 2001 | 11778 | 24 | Cruise | 71246 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9192351 | 2001 | 8418 | 22 | Cruise | 63360 | 11000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9195157 | 2001 | 7500 | 24.6 | Cruise | 58799 | 11000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9221281 | 2003 | 10965 | 22 | Cruise | 10400 | 7000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226891 | 2004 | 10965 | 22 | Cruise | 10400 | 10000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226906 | 2005 | 10939 | 22 | Cruise | 63360 | 10500 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9228186 | 2004 | 14601 | 23 | Cruise | 60702 | 11000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9342281 | 2006 | 10000 | 25 | Cruise | 72079 | 11000 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 5057931 | 1962 | 14579 | 20 | General Cargo | 14160 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7119678 | 1971 | 1383 | 13 | General Cargo | 1232 | 1339 | 134 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8013027 | 1983 | 23024 | 17 | General Cargo | 15445 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8406717 | 1986 | 19763 | 17 | General Cargo | 15445 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8711318 | 1994 | 7346 | 14.6 | General Cargo | 5119 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8908088 | 1990 | 17175 | 16.2 | General Cargo | 7949 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9141211 | 1996 | 11285 | 14.7 | General Cargo | 5296 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9148116 | 1998 | 12950 | 15.6 | General Cargo | 8775 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9150731 | 1999 | 20427 | 14.2 | General Cargo | 6650 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9161168 | 1997 | 20406 | 16 | General Cargo | 8253 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9187033 | 1999 | 17539 | 15 | General Cargo | 7800 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9187045 | 1999 | 17539 | 15 | General Cargo | 7800 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9202041 | 1999 | 20144 | 16 | General Cargo | 8250 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226035 | 2002 | 48000 | 17 | General Cargo | 13548 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226047 | 2002 | 45000 | 17 | General Cargo | 13548 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226059 | 2003 | 45851 | 17 | General Cargo | 13548 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9226061 | 2004 | 45000 | 17 | General Cargo | 13548 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9238818 | 2002 | 29980 | 18 | General Cargo | 15785 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9243758 | 2002 | 9122 | 14.7 | General Cargo | 4350 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9243825 | 2003 | 19465 | 14.25 | General Cargo | 7860 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9290050 | 2004 | 10385 | 14.8 | General Cargo | 4320 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9312157 | 2004 | 12711 | 15 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9317042 | 2005 | 10650 | 13.2 | General Cargo | 3906 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9331593 | 2005 | 7492 | 16.5 | General Cargo | 6300 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9347035 | 2006 | 17349 | 15 | General Cargo | 7074 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9357212 | 2007 | 12782 | 15 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

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| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9358046 | 2006 | 12812 | 14 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9370135 | 2008 | 32221 | 14.3 | General Cargo | 6620 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9385087 | 2008 | 32271 | 14.3 | General Cargo | 6620 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9385491 | 2009 | 54204 | 14.5 | General Cargo | 8208 | 1339 | 134 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9402043 | 2007 | 12705 | 14 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9432153 | 2011 | 30000 | 19.2 | General Cargo | 16520 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9435856 | 2009 | 17354 | 15 | General Cargo | 7074 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9449493 | 2009 | 33392 | 13.7 | General Cargo | 6480 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9449508 | 2009 | 32949 | 13.7 | General Cargo | 6480 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9453793 | 2010 | 12696 | 15 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9501277 | 2010 | 12657 | 15 | General Cargo | 5400 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9504267 | 2008 | 7966 | 12.2 | General Cargo | 2970 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9511636 | 2010 | 10500 | 14.2 | General Cargo | 4320 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9530307 | 2010 | 33324 | 13.8 | General Cargo | 8730 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9530319 | 2010 | 33324 | 13.8 | General Cargo | 8726 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9569528 | 2010 | 6264 | 13 | General Cargo | 3000 | 1339 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9271119 | 2002 | 0 | 15 | ITB | 6767 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9275438 | 2002 | 0 | 15 | ITB | 6767 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9275878 | 2002 | 0 | 15 | ITB | 6825 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9277369 | 2002 | 945 | 15 | ITB | 6767 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9369411 | 2009 | 786 | 15 | ITB | 7999 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9398474 | 2006 | 835 | 15 | ITB | 6825 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9503160 | 2008 | 1282 | 13.5 | ITB | 9054 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9503847 | 2008 | 428 | 12 | ITB | 2985 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9542609 | 2011 | 600 | 15 | ITB | 8160 | 234 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8225711 | 1982 | 13879 | 17 | Reefer | 6620 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8906963 | 1992 | 10588 | 21 | Reefer | 11400 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8917596 | 1993 | 11733 | 20 | Reefer | 12500 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9019119 | 1993 | 10629 | 21 | Reefer | 11400 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9019121 | 1993 | 10629 | 20.91 | Reefer | 11400 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9038933 | 1994 | 11822 | 19.2 | Reefer | 12500 | 1402 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7390117 | 1976 | 19480 | 21.5 | RoRo | 27216 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7420493 | 1975 | 16138 | 21 | RoRo | 22067 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8508369 | 1994 | 10517 | 13.8 | RoRo | 6540 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9157430 | 1997 | 13046 | 15 | RoRo | 5296 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9162394 | 1997 | 9518 | 14 | RoRo | 4193 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9232278 | 2003 | 22437 | 24 | RoRo | 52198 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9232280 | 2003 | 22437 | 24 | RoRo | 52198 | 1541 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9165530 | 1998 | 106553 | 15.1 | Tanker - Aframax | 12000 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9192260 | 2000 | 105856 | 15.1 | Tanker - Aframax | 14314 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9242120 | 2003 | 113033 | 15 | Tanker - Aframax | 14313 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9247792 | 2003 | 106500 | 15.15 | Tanker - Aframax | 12240 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9251810 | 2002 | 106500 | 15.15 | Tanker - Aframax | 12240 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9265641 | 2003 | 107081 | 14.6 | Tanker - Aframax | 13530 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9271327 | 2003 | 105845 | 14.3 | Tanker - Aframax | 11547 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281009 | 2004 | 115048 | 14.7 | Tanker - Aframax | 14303 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9282479 | 2005 | 114809 | 15.7 | Tanker - Aframax | 15801 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9292503 | 2005 | 115515 | 15.3 | Tanker - Aframax | 14313 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9292515 | 2005 | 115525 | 15.3 | Tanker - Aframax | 14313 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9292993 | 2005 | 104499 | 15 | Tanker - Aframax | 13548 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9299721 | 2006 | 106004 | 14.8 | Tanker - Aframax | 13548 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9304825 | 2006 | 109266 | 14.5 | Tanker - Aframax | 13570 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

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| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9307152 | 2005 | 105712 | 15.25 | Tanker - Aframax | 12000 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9308857 | 2006 | 104955 | 15 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9330599 | 2006 | 104866 | 14.2 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9354301 | 2008 | 104535 | 15 | Tanker - Aframax | 15820 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9354313 | 2008 | 104542 | 15 | Tanker - Aframax | 15820 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9397808 | 2009 | 111402 | 15.45 | Tanker - Aframax | 14280 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9402316 | 2010 | 115123 | 15 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9408530 | 2008 | 115462 | 15 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9434890 | 2010 | 108835 | 14.5 | Tanker - Aframax | 13570 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9439539 | 2009 | 108760 | 15 | Tanker - Aframax | 13570 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9453999 | 2011 | 113968 | 15.5 | Tanker - Aframax | 14280 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9457593 | 2011 | 114542 | 15 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9592238 | 2011 | 115669 | 15.5 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9592252 | 2011 | 115674 | 15.7 | Tanker - Aframax | 13560 | 990 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 8800511 | 1990 | 40538 | 14 | Tanker - Chemical | 7830 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9145841 | 1996 | 45217 | 15.1 | Tanker - Chemical | 9989 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9157519 | 1997 | 16026 | 14.2 | Tanker - Chemical | 4891 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9161895 | 1998 | 19365 | 14.7 | Tanker - Chemical | 6179 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9168477 | 1998 | 19386 | 14.7 | Tanker - Chemical | 6179 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9230012 | 2001 | 16225 | 14 | Tanker - Chemical | 6300 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9241073 | 2004 | 46678 | 14 | Tanker - Chemical | 8310 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9248461 | 2002 | 24426 | 14.5 | Tanker - Chemical | 7980 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9263095 | 2003 | 19997 | 14.7 | Tanker - Chemical | 6230 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9278727 | 2004 | 25451 | 15.5 | Tanker - Chemical | 7080 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281932 | 2005 | 51383 | 14.2 | Tanker - Chemical | 8561 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9299422 | 2005 | 29057 | 14 | Tanker - Chemical | 7150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301005 | 2005 | 51303 | 14.5 | Tanker - Chemical | 13560 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9304320 | 2005 | 19991 | 14.7 | Tanker - Chemical | 6150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9304332 | 2005 | 19992 | 14.6 | Tanker - Chemical | 6150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307815 | 2005 | 50921 | 14.5 | Tanker - Chemical | 13560 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307994 | 2007 | 46784 | 14.5 | Tanker - Chemical | 8555 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9308235 | 2006 | 19995 | 15 | Tanker - Chemical | 6230 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9331256 | 2006 | 19996 | 15 | Tanker - Chemical | 6230 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9333280 | 2006 | 47931 | 15.4 | Tanker - Chemical | 11060 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9340441 | 2007 | 19998 | 14.7 | Tanker - Chemical | 6150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9343778 | 2006 | 19998 | 14.7 | Tanker - Chemical | 5296 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9345893 | 2006 | 19975 | 14.7 | Tanker - Chemical | 6230 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9349655 | 2007 | 20896 | 15.1 | Tanker - Chemical | 6150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353527 | 2007 | 46911 | 14.6 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353539 | 2007 | 46817 | 14.6 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353565 | 2009 | 46802 | 14.6 | Tanker - Chemical | 8700 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353577 | 2009 | 46666 | 14.6 | Tanker - Chemical | 8700 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353589 | 2010 | 46653 | 14.6 | Tanker - Chemical | 8700 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353591 | 2010 | 46666 | 14.6 | Tanker - Chemical | 8700 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9353606 | 2011 | 46666 | 14.6 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9360336 | 2007 | 47128 | 14.5 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9388003 | 2008 | 46606 | 14 | Tanker - Chemical | 9960 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9391165 | 2009 | 19997 | 14.7 | Tanker - Chemical | 6480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9392781 | 2009 | 47128 | 14.5 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9393008 | 2008 | 19928 | 14.8 | Tanker - Chemical | 6230 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9396737 | 2008 | 50927 | 14.9 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9407263 | 2008 | 73720 | 14.5 | Tanker - Chemical | 11299 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

# Puget Sound Emissions Inventory

## Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9407562 | 2009 | 48632 | 15 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9408126 | 2010 | 48635 | 15 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9408138 | 2010 | 48641 | 15 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9411135 | 2009 | 37836 | 14.5 | Tanker - Chemical | 7860 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9422237 | 2010 | 46625 | 14.8 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9425540 | 2010 | 50120 | 14.8 | Tanker - Chemical | 8580 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426300 | 2009 | 26015 | 15.1 | Tanker - Chemical | 7080 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9426910 | 2009 | 19993 | 14.7 | Tanker - Chemical | 6480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9430284 | 2010 | 46151 | 14.8 | Tanker - Chemical | 8598 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9436666 | 2008 | 40416 | 14 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9439802 | 2009 | 50261 | 14.9 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9478717 | 2010 | 50238 | 14.9 | Tanker - Chemical | 9480 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9490301 | 2010 | 26198 | 15.5 | Tanker - Chemical | 7470 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9490325 | 2011 | 26197 | 15.5 | Tanker - Chemical | 7450 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9494682 | 2011 | 47203 | 14.5 | Tanker - Chemical | 8598 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9499943 | 2008 | 12601 | 14.4 | Tanker - Chemical | 4200 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9597721 | 2011 | 21280 | 14.5 | Tanker - Chemical | 6150 | 937 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9118628 | 1997 | 46103 | 14.5 | Tanker - Handysize | 7944 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9149237 | 1998 | 47363 | 15 | Tanker - Handysize | 8310 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9149249 | 1998 | 47363 | 15 | Tanker - Handysize | 8310 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9183611 | 1999 | 46144 | 14.15 | Tanker - Handysize | 7679 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9183623 | 1999 | 46152 | 14.15 | Tanker - Handysize | 7679 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9221683 | 2000 | 47037 | 14.5 | Tanker - Handysize | 8683 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9354519 | 2007 | 45998 | 14.6 | Tanker - Handysize | 9267 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9363467 | 2009 | 45967 | 15.1 | Tanker - Handysize | 9267 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9367695 | 2008 | 47451 | 15.3 | Tanker - Handysize | 8580 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9367736 | 2008 | 47165 | 15 | Tanker - Handysize | 8580 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9402794 | 2010 | 47366 | 15.3 | Tanker - Handysize | 8580 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9451460 | 2010 | 46549 | 15.7 | Tanker - Handysize | 9480 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9459266 | 2011 | 45931 | 14.6 | Tanker - Handysize | 9480 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9555292 | 2010 | 47981 | 15 | Tanker - Handysize | 9480 | 693 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9031961 | 1993 | 66895 | 14.7 | Tanker - Panamax | 7963 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9035137 | 1993 | 66895 | 14.7 | Tanker - Panamax | 7963 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9252943 | 2003 | 71522 | 14.9 | Tanker - Panamax | 12440 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9254862 | 2003 | 70146 | 14.7 | Tanker - Panamax | 11444 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9256016 | 2003 | 68467 | 14.5 | Tanker - Panamax | 10002 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9281425 | 2005 | 74999 | 16 | Tanker - Panamax | 13539 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9288356 | 2005 | 70681 | 14.9 | Tanker - Panamax | 13548 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301952 | 2006 | 74933 | 14.9 | Tanker - Panamax | 13548 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9301964 | 2007 | 74875 | 14.9 | Tanker - Panamax | 13548 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307748 | 2006 | 54533 | 16.7 | Tanker - Panamax | 13700 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9307762 | 2007 | 54450 | 16.7 | Tanker - Panamax | 13700 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9342217 | 2008 | 76578 | 15.4 | Tanker - Panamax | 12268 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9351464 | 2007 | 73784 | 14.7 | Tanker - Panamax | 11299 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9382982 | 2009 | 74329 | 15.3 | Tanker - Panamax | 12240 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9407251 | 2007 | 73634 | 14.5 | Tanker - Panamax | 11299 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9425552 | 2010 | 50090 | 14.8 | Tanker - Panamax | 8580 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9433808 | 2011 | 50077 | 14.8 | Tanker - Panamax | 8580 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9433810 | 2011 | 50079 | 14.8 | Tanker - Panamax | 8580 | 830 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7408081 | 1978 | 124644 | 17 | Tanker - Suezmax | 22067 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 7408093 | 1979 | 125133 | 17 | Tanker - Suezmax | 22067 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9035010 | 1993 | 135829 | 15 | Tanker - Suezmax | 15447 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

## Puget Sound Emissions Inventory

### Ocean-Going Vessel Data

| Vessel ID | Model Year | DWT (tons) | Max Speed (Knots) | Vessel Type | Main Eng Power (kW) | Aux Eng Demand (kw) | Aux Boiler Energy | Main Eng Fuel Type | Aux Eng Fuel Type | Aux Boiler Fuel Type |
|---|---|---|---|---|---|---|---|---|---|---|
| 9087972 | 1995 | 149834 | 14.97 | Tanker - Suezmax | 15420 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9182746 | 1999 | 153015 | 13.5 | Tanker - Suezmax | 16916 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9193551 | 2001 | 141740 | 16.55 | Tanker - Suezmax | 22087 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9193563 | 2002 | 141740 | 16.55 | Tanker - Suezmax | 22087 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9206114 | 2003 | 141740 | 16.6 | Tanker - Suezmax | 22119 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9208069 | 2000 | 147080 | 14.62 | Tanker - Suezmax | 15403 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9230505 | 2002 | 159435 | 15.7 | Tanker - Suezmax | 18623 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9230892 | 2002 | 149921 | 15.5 | Tanker - Suezmax | 18624 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9233765 | 2003 | 159999 | 15.5 | Tanker - Suezmax | 18624 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244063 | 2004 | 141740 | 16.5 | Tanker - Suezmax | 22087 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244659 | 2004 | 193049 | 15.3 | Tanker - Suezmax | 25198 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244661 | 2005 | 193049 | 15.3 | Tanker - Suezmax | 25198 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9244673 | 2005 | 193048 | 15.3 | Tanker - Suezmax | 25198 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9250660 | 2006 | 141740 | 16.5 | Tanker - Suezmax | 22087 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9253894 | 2002 | 149991 | 15 | Tanker - Suezmax | 12372 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9271432 | 2006 | 193048 | 15.3 | Tanker - Suezmax | 25198 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9297905 | 2005 | 158344 | 15.5 | Tanker - Suezmax | 18623 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9311610 | 2006 | 162397 | 15.5 | Tanker - Suezmax | 21727 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9315185 | 2007 | 163216 | 15.6 | Tanker - Suezmax | 18888 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9336971 | 2007 | 153015 | 15.8 | Tanker - Suezmax | 18479 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9411226 | 2009 | 158769 | 15.8 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9427627 | 2009 | 157048 | 15.1 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9436446 | 2010 | 158555 | 15.5 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9446374 | 2009 | 158319 | 15.5 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9586722 | 2011 | 158777 | 15.5 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |
| 9589748 | 2011 | 158658 | 15.5 | Tanker - Suezmax | 18660 | 965 | 0 | HFO (2.7% S) | HFO (2.7% S) | HFO (2.7% S) |

Legend

Modes

- T - Transit Link
- X - Transition between Transit & Maneuvering
- M - Maneuvering Link

NPE - Near Port Emissions - Emissions assigned to the "port area"

## Puget Sound Emissions Inventory

**OGV-Routing:  VICTORIA (NB1) to SEATTLE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| | | | | | | | | | | | | | | | | Bulkers | | | | | | | | | |
| | | | | | | | | | | | | | | | Reefer | Tankers | | CR-1 | CR-1 | CR-1 | CR-1 | CR-2 | CR-2 | CR-2 | CR-2 |
| | | | | | | | | | | | | | | Container | RO/RO | Log | | Speed | PL | SL | BL | Speed | PL | SL | BL |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | | **End WP** | **Ending Waypoint Lat/Lon** | | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** | **knots** | **(MW)** | **(MW)** | **(MW)** | **knots** | **(MW)** | **(MW)** | **(MW)** |
| NB1_PortAngeles | Arrival | T | N | L1 | VP_A_1 | 48° 13´ 55´´ N | 123° 30´ 34´´ W | VP_A_2 | 48° 12´ 05´´ N | 123° 28´ 55´´ W | 2.1 | Calallam | 18 | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 16.6 | 15.2 | 10.1 | 0.0 |
| NB1_PortAngeles | Arrival | X | N | L2a | VP_A_2 | 48° 12´ 05´´ N | 123° 28´ 55´´ W | PS_A_5 | 48° 09´ 20´´ N | 123° 23´ 28´´ W | 4.5 | Calallam | 16 | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 16 | 15.2 | 9.0 | 0.0 |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09´ 20´´ N | 123° 23´ 28´´ W | PS_A_6 | 48° 09´ 58´´ N | 123° 23´ 25´´ W | 0.6 | Calallam | 8 | 0 | 0 | 0 | 0 | 12 | 5.6 | 7.0 | 0.0 | 10 | 8.0 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 58´´ N | 123° 23´ 25´´ W | PS_A_7 | 48° 11´ 56´´ N | 123° 06´ 35´´ W | 11.4 | Calallam | 18 | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 18 | 14.0 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 56´´ N | 123° 06´ 35´´ W | PS_A_8 | 48° 11´ 11´´ N | 122° 52´ 23´´ W | 9.5 | Calallam | SS | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 11´´ N | 122° 52´ 23´´ W | PS_A_9 | 48° 10´ 57´´ N | 122° 48´ 01´´ W | 2.9 | Jefferson | SS | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N | 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N | 122° 40´ 10´´ W | 6.8 | Jefferson | SS | 0 | 0 | 0 | 0 | 12 | 9.8 | 7.0 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N | 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N | 122° 38´ 08´´ W | 5.6 | Jefferson | SS | 0 | 0 | 0 | 0 | 18 | 16.1 | 6.9 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N | 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N | 122° 35´ 10´´ W | 4.0 | Island | SS | 0 | 0 | 0 | 0 | 18 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N | 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N | 122° 32´ 57´´ W | 1.8 | Island | 19 | 0 | 0 | 0 | 0 | 18 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N | 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N | 122° 30´ 06´´ W | 2.3 | Kitsap | 18 | 0 | 0 | 0 | 0 | 18 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N | 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N | 122° 26´ 45´´ W | 9.7 | Kitsap | 17 | 0 | 0 | 0 | 0 | 16.5 | 16.1 | 6.9 | 0.0 | 16.6 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | Y | L15 | PS_A_15 | 47° 45´ 54´´ N | 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N | 122° 28´ 24´´ W | 6.3 | Kitsap | 17 | 0 | 0 | 0 | 0 | 16.5 | 16.1 | 6.9 | 0.0 | 16.6 | 15.2 | 10.1 | 0.0 |
| ElliottB_PS | Arrival | X | Y | L1a | PS_A_16 | 47° 39´ 42´´ N | 122° 28´ 24´´ W | EB_A_2 | 47° 39´ 21´´ N | 122° 28´ 02´´ W | 0.4 | Kitsap | 16 | 0 | 0 | 0 | 0 | 16 | 7.2 | 6.9 | 0.0 | 16 | 12.0 | 10.1 | 0.0 |
| ElliottB_PS | Arrival | X | Y | L2 | EB_A_2 | 47° 39´ 21´´ N | 122° 28´ 02´´ W | EB_A_3 | 47° 38´ 16´´ N | 122° 26´ 36´´ W | 1.5 | King | 15 | 0 | 0 | 0 | 0 | 15.5 | 7.2 | 6.9 | 0.0 | 15.5 | 12.0 | 10.1 | 0.0 |
| ElliottB_PS | Arrival | M | Y | L3 | EB_A_3 | 47° 38´ 16´´ N | 122° 26´ 36´´ W | EB_A_4 | 47° 36´ 52´´ N | 122° 23´ 21´´ W | 2.6 | King | 15 | 0 | 0 | 0 | 0 | 15 | 7.2 | 6.9 | 0.0 | 15 | 12.0 | 10.1 | 0.0 |
| | | | | | | | | | Total Distance | | 72.1 nm | | Note:  SS - Service Speed | | | | | | | | | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to VICTORIA (NB1)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** | | | | | | | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | | **End WP** | **Ending Waypoint Lat/Lon** | | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° 36´ 52´´ N | 122° 23´ 21´´ W | EB_D_2 | 47° 38´ 22´´ N | 122° 26´ 27´´ W | 2.6 | King | 14 | 0 | 0 | 0 | 0 | 13.5 | 13.2 | 7.0 | 0.0 | 13.5 | 12.1 | 10.1 | 0.0 |
| ElliottB_PS | Departure | X | Y | L2 | EB_D_2 | 47° 38´ 22´´ N | 122° 26´ 27´´ W | PS_D_10 | 47° 39´ 42´´ N | 122° 27´ 25´´ W | 1.5 | King | 18 | 0 | 0 | 0 | 0 | 17.5 | 19.2 | 7.0 | 0.0 | 16.5 | 16.1 | 9.0 | 0.0 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° 39´ 42´´ N | 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N | 122° 26´ 47´´ W | 2.3 | King | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° 41´ 54´´ N | 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N | 122° 25´ 49´´ W | 4.0 | Kitsap | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N | 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N | 122° 26´ 04´´ W | 0.8 | King | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N | 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N | 122° 26´ 29´´ W | 1.5 | Snohomis | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N | 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N | 122° 28´ 08´´ W | 4.6 | Kitsap | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N | 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | 3.1 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | 2.4 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | 1.9 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | 4.5 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | 2.8 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | 2.2 | Jefferson | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | 1.3 | Jefferson | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | 5.3 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | 1.4 | Island | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | 2.4 | Jefferson | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | 9.5 | Calallam | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | 11.2 | Calallam | 17 | 0 | 0 | 0 | 0 | 18 | 19.0 | 7.0 | 0.0 | 18 | 19.5 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N | 123° 23´ 02´´ W | 0.8 | Calallam | 8 | 0 | 0 | 0 | 0 | 10 | 12.0 | 7.0 | 0.0 | 10 | 11.0 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | X | N | L28a | PS_D_28 | 48° 11´ 21´´ N | 123° 23´ 02´´ W | VP_D_1 | 48° 13´ 18´´ N | 123° 26´ 59´´ W | 3.2 | Calallam | 18 | 0 | 0 | 0 | 0 | 18 | 19.0 | 7.0 | 0.0 | 18 | 19.5 | 10.1 | 0.0 |
| PortAngeles_Victoria | Departure | T | N | L1 | VP_D_1 | 48° 13´ 18´´ N | 123° 26´ 59´´ W | VP_D_2 | 48° 14´ 41´´ N | 123° 26´ 36´´ W | 1.4 | Calallam | SS | 0 | 0 | 0 | 0 | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| | | | | | | | | | | Total Distance | 70.7 | nm | Note: SS - Service Speed | | | | | | | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VICTORIA (NB1) to TACOMA**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | Bulkers |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Reefer | Tankers |  |
| **DRAFT** |  |  |  |  |  |  |  |  |  |  |  | Container | RO/RO | Log |  |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| NB1_PortAngeles | Arrival | T | N | L1 | VP_A_1 | 48° 13´ 55´´ N 123° 30´ 34´´ W | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | 2.1 | Calallam | 18 | 0 | 0 | 0 | 0 |
| NB1_PortAngeles | Arrival | X | N | L2a | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | 4.5 | Calallam | 16 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | 0.6 | Calallam | 10 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | 11.4 | Calallam | 17 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | 9.5 | Calallam | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 2.9 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 5.2 | Kitsap | 18 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | 2.8 | Kitsap | 17 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | 5.3 | King | 16 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L19 | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | 4.1 | King | 17 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | 5.3 | King | 14 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | 0.5 | King | 10 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | PS_A_23 | 47° 18´ 07´´ N 122° 27´ 41´´ W | 1.1 | Pierce | 10 | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |  |  | Total Distance | 91.8 | nm |  |  |  |  |  |

Note: SS - Service Speed

Note: Red numbers - engines off

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA to VICTORIA (NB1)**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | **Bulkers** |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | **Reefer** | **Tankers** |  |
| **DRAFT** |  |  |  |  |  |  |  |  |  |  |  | **Containe** | **RO/RO** | **Log** |  |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° 18´ 07´´ N 122° 27´ 41´´ W | PS_D_3 | 47° 19´ 20´´ N 122° 27´ 02´´ W | 1.3 | Pierce | 10 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° 19´ 20´´ N 122° 27´ 02´´ W | PS_D_4 | 47° 19´ 54´´ N 122° 26´ 03´´ W | 0.9 | Pierce | 12 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° 19´ 54´´ N 122° 26´ 03´´ W | PS_D_5 | 47° 23´ 04´´ N 122° 20´ 40´´ W | 4.8 | King | 16 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° 23´ 04´´ N 122° 20´ 40´´ W | PS_D_6 | 47° 26´ 56´´ N 122° 23´ 43´´ W | 4.4 | King | 17 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° 26´ 56´´ N 122° 23´ 43´´ W | PS_D_7 | 47° 34´ 32´´ N 122° 26´ 30´´ W | 7.8 | King | 16 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 34´ 32´´ N 122° 26´ 30´´ W | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | 1.4 | King | 17 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | 1.1 | Kitsap | 20 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | 2.7 | King | 22 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | 2.3 | King | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | 4.0 | Kitsap | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | 0.8 | King | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | 1.5 | Snohomish | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | 4.6 | Kitsap | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | 3.1 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | 2.4 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | 1.9 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | 4.5 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | 2.8 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | 2.2 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | 1.3 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | 5.3 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | 1.4 | Island | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | 2.4 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | 9.5 | Calallam | SS | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 11.2 | Calallam | 18 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | 0.8 | Calallam | 10 | 0 | 0 | 0 | 0 |
| Tacoma_Sea | Departure | X | N | L28a | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | VP_D_1 | 48° 13´ 18´´ N 123° 26´ 59´´ W | 3.2 | Calallam | 14 | 0 | 0 | 0 | 0 |
| PortAngeles_Victoria | Departure | T | N | L1 | VP_D_1 | 48° 13´ 18´´ N 123° 26´ 59´´ W | VP_D_2 | 48° 14´ 41´´ N 123° 26´ 36´´ W | 1.4 | Calallam | 16 | 0 | 0 | 0 | 0 |
|  |  |  |  |  |  |  |  | Total Distance | 91.1 nm |  |  | Note: SS - Service Speed |  |  |  |

# Puget Sound Emissions Inventory

## OGV-Routing: VICTORIA (NB1) to EVERETT

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | End WP | Ending Waypoint Lat/Lon | Dist. | County | Cruise | Containe Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
| NB1_PortAngeles | Arrival | T | N | L1 | VP_A_1 | 48° 13´ 55´´ N 123° 30´ 34´´ W | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | 2.1 | Calallam | 18 | 0 | 0 | 0 | 0 |
| NB1_PortAngeles | Arrival | X | N | L2a | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | 4.5 | Calallam | 16 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | 0.6 | Calallam | 8 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | 11.4 | Calallam | 19 | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | 9.5 | Calallam | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 2.9 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | SS | 0 | 0 | 0 | 0 |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | SS | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | X | N | L1a | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | EV_A_2 | 47° 53´ 08´´ N 122° 29´ 06´´ W | 2.3 | Kitsap | 18 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | X | N | L2 | EV_A_2 | 47° 53´ 08´´ N 122° 29´ 06´´ W | EV_A_3 | 47° 51´ 05´´ N 122° 26´ 26´´ W | 2.7 | Kitsap | 17 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | X | N | L3 | EV_A_3 | 47° 51´ 05´´ N 122° 26´ 26´´ W | EV_A_4 | 47° 51´ 50´´ N 122° 23´ 43´´ W | 2.0 | Island | 16 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | T | N | L4 | EV_A_4 | 47° 51´ 50´´ N 122° 23´ 43´´ W | EV_A_5 | 47° 52´ 03´´ N 122° 22´ 51´´ W | 0.6 | Snohomis | 15 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | T | Y | L5 | EV_A_5 | 47° 52´ 03´´ N 122° 22´ 51´´ W | EV_A_6 | 47° 54´ 06´´ N 122° 20´ 54´´ W | 2.4 | Snohomis | 15 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | T | Y | L6 | EV_A_6 | 47° 54´ 06´´ N 122° 20´ 54´´ W | EV_A_7 | 47° 56´ 25´´ N 122° 19´ 35´´ W | 2.5 | Snohomis | 15 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° 56´ 25´´ N 122° 19´ 35´´ W | EV_A_8 | 47° 57´ 28´´ N 122° 19´ 10´´ W | 1.1 | Snohomis | 14 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° 57´ 28´´ N 122° 19´ 10´´ W | EV_A_9 | 47° 58´ 31´´ N 122° 16´ 42´´ W | 2.0 | Snohomis | 10 | 0 | 0 | 0 | 0 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° 58´ 31´´ N 122° 16´ 42´´ W | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 1.3 | Snohomis | 7 | 0 | 0 | 0 | 0 |
| | | | | | | | | Total Distance | 68.5 nm | | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: VICTORIA (NB1) to PORT ANGELES

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | End WP | Ending Waypoint Lat/Lon | Dist. | County | Cruise | Containe Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
| NB1_PortAngeles | Arrival | T | N | L1 | VP_A_1 | 48° 13´ 55´´ N 123° 30´ 34´´ W | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | 2.1 | Calallam | 18 | 0 | 0 | 0 | 0 |
| NB1_PortAngeles | Arrival | X | Y | L2a | VP_A_2 | 48° 12´ 05´´ N 123° 28´ 55´´ W | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | 4.5 | Calallam | 16 | 0 | 0 | 0 | 0 |
| Sea_PortAngeles | Arrival | M | Y | L1a | PS_A_5 | 48° 09´ 20´´ N 123° 23´ 28´´ W | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | 0.4 | Calallam | 10 | 0 | 0 | 0 | 0 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | 1.6 | Calallam | 8 | 0 | 0 | 0 | 0 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | PA_A_4 | 48° 08´ 00´´ N 123° 23´ 48´´ W | 1.0 | Calallam | 6 | 0 | 0 | 0 | 0 |
| | | | | | | | | Total Distance | 9.6 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: SEA to SEATTLE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **aypoir** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 2 | PS_A_2 | 48° 2 | 10.7 | Calallam | SS | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 2 | PS_A_3 | 48° 1 | 35.9 | Calallam | SS | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 1 | PS_A_4 | 48° 1 | 15.4 | Calallam | 20 | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 1 | PS_A_5 | 48° 0 | 6.9 | Calallam | 16 | 15 | 12 | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 0 | PS_A_6 | 48° 0 | 0.6 | Calallam | 8 | 8 | 8 | 8 | 8 | 10.0 | 6.0 | 6.9 | 0.0 | 10.0 | 8.0 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 0 | PS_A_7 | 48° 1 | 11.4 | Calallam | 16 | 18 | 16 | 12 | SS | 17.0 | 15.0 | 6.9 | 0.0 | 18.0 | 14.0 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 1 | PS_A_8 | 48° 1 | 9.5 | Calallam | SS | SS | SS | SS | SS | 19.0 | 18.4 | 6.9 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 1 | PS_A_9 | 48° 1 | 2.9 | Jefferson | SS | SS | SS | SS | SS | 19.0 | 18.4 | 6.9 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 1 | PS_A_10 | 48° 0 | 6.8 | Jefferson | SS | SS | SS | SS | SS | 19.0 | 18.4 | 6.9 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 0 | PS_A_11 | 48° 0 | 5.6 | Jefferson | SS | SS | SS | SS | SS | 18.0 | 16.1 | 6.9 | 0.0 | 19.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 0 | PS_A_12 | 47° 5 | 4.0 | Island | SS | SS | SS | SS | SS | 18.0 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 5 | PS_A_13 | 47° 5 | 1.8 | Island | SS | SS | SS | SS | SS | 18.0 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 5 | PS_A_14 | 47° 5 | 2.3 | Kitsap | 20 | 20 | SS | SS | SS | 18.0 | 16.1 | 6.9 | 0.0 | 16.8 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 5 | PS_A_15 | 47° 4 | 9.7 | Kitsap | 17 | 16 | SS | SS | SS | 16.5 | 16.1 | 6.9 | 0.0 | 16.6 | 15.2 | 10.1 | 0.0 |
| Sea_Tacoma | Arrival | T | Y | L15 | PS_A_15 | 47° 4 | PS_A_16 | 47° 3 | 6.3 | Kitsap | 16 | 16 | 13 | SS | SS | 16.5 | 16.1 | 6.9 | 0.0 | 16.6 | 15.2 | 10.1 | 0.0 |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 3 | EB_A_2 | 47° 3 | 0.4 | Kitsap | 16 | 15 | 13 | 9 | 8 | 16.0 | 7.2 | 6.9 | 0.0 | 16.0 | 12.0 | 10.1 | 0.0 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 3 | EB_A_3 | 47° 3 | 1.5 | King | 15 | 14 | 12 | 8 | 7 | 15.5 | 7.2 | 6.9 | 0.0 | 15.5 | 12.0 | 10.1 | 0.0 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 3 | EB_A_4 | 47° 3 | 2.6 | King | 15 | 12 | 11 | 6 | 6 | 15.0 | 7.2 | 6.9 | 0.0 | 15.0 | 12.0 | 10.1 | 0.0 |
| | | | | | | | Total Distance | | 134.3 nm | | Note: SS - Service Speed | | | | | | | | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| | | | | | | | | | | | | | | Bulkers | | | | | | | | | |
| | | | | | | | | | | | | | Reefer | Tankers | | CR-1 | CR-1 | CR-1 | CR-1 | CR-2 | CR-2 | CR-2 | CR-2 |
| | | | | | | | | | | | | Contain | RO/RO | Log | | Speed | PL | SL | BL | Speed | PL | SL | BL |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** | **knots** | **(MW)** | **(MW)** | **(MW)** | **knots** | **(MW)** | **(MW)** | **(MW)** |
| PS_ElliottB | SEATTLE | | Arrival | | EB_A_4 | 47 | Mode: | M | | King | | | | | | | | | | | | | |
| ElliottB_PS | SEATTLE | | Departure | | EB_D_1 | 47 | NPE: | Y | | King | | | | | | | | | | | | | |

**ALL ROUTES IN AND OUT GO THROUGH EB_A_4 and EB_D_1 EXCEPT**

**SALMON BAY** **NORTHI LAKE UNION**

**FOSS SHIPYARD** **SHILSHOLE**

| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | | **Contain** | **RO/RO** | **Log** | | **Speed** | **PL** | **SL** | **BL** | **Speed** | **PL** | **SL** | **BL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PS_ElliottB | SEATTLE | 17 | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 17 | Arrival | | EB_WC_1 | 47 | EB_TD_4 | 47° 35´ 28´´ N 122° 21´ 02´´ W | 0.56 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 17 | Arrival | | EB_TD_4 | 47 | EB_B_P17 | 47° 35´ 28´´ N 122° 21´ 00´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 17 | Departure | | EB_B_P17 | 47 | EB_TD_4 | 47° 35´ 28´´ N 122° 21´ 02´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 17 | Departure | | EB_TD_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.56 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 17 | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 15 | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 15 | Arrival | | EB_WC_1 | 47 | EB_TD_2 | 47° 35´ 23´´ N 122° 21´ 12´´ W | 0.56 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 15 | Arrival | | EB_TD_2 | 47 | EB_B_P15 | 47° 35´ 17´´ N 122° 21´ 12´´ W | 0.10 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 15 | Departure | | EB_B_P15 | 47 | EB_TD_2 | 47° 35´ 23´´ N 122° 21´ 12´´ W | 0.10 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 15 | Departure | | EB_TD_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.56 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 15 | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | SHELL | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | SHELL | Arrival | | EB_WC_1 | 47 | EB_TD_2 | 47° 35´ 23´´ N 122° 21´ 12´´ W | 0.56 | King | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | SHELL | Arrival | | EB_TD_2 | 47 | EB_SH_1 | 47° 35´ 20´´ N 122° 21´ 10´´ W | 0.05 | King | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | SHELL | Arrival | | EB_SH_1 | 47 | EB_B_SH | 47° 35´ 17´´ N 122° 21´ 10´´ W | 0.06 | King | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | SHELL | Departure | | EB_B_SH | 47 | EB_SH_1 | 47° 35´ 20´´ N 122° 21´ 10´´ W | 0.06 | King | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | SHELL | Departure | | EB_SH_1 | 47 | EB_TD_2 | 47° 35´ 23´´ N 122° 21´ 12´´ W | 0.05 | King | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | SHELL | Departure | | EB_TD_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.56 | King | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | SHELL | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BP | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BP | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BP | Arrival | | EB_WC_2 | 47 | EB_B_BP | 47° 34´ 57´´ N 122° 21´ 31´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BP | Departure | | EB_B_BP | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BP | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BP | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-NORTH | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-NORTH | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-NORTH | Arrival | | EB_WC_2 | 47 | EB_B_T5N | 47° 34´ 49´´ N 122° 21´ 40´´ W | 0.22 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-NORTH | Departure | | EB_B_T5N | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.22 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-NORTH | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-NORTH | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-CENTE | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-CENTE | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-CENTE | Arrival | | EB_WC_2 | 47 | EB_B_T5C | 47° 34´ 42´´ N 122° 21´ 41´´ W | 0.35 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-CENTE | Departure | | EB_B_T5C | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.35 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-CENTE | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-CENTE | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

# Puget Sound Emissions Inventory

**OGV-Routing:  SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Contain Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
| PS_ElliottB | SEATTLE | 5-SOUTH | Arrival | EB_A_4 | 47 | EB_WC_1 | 47° 35′ 52′′ N 122° 21′ 37′′ W | 1.54 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-SOUTH | Arrival | EB_WC_1 | 47 | EB_WC_2 | 47° 35′ 02′′ N 122° 21′ 36′′ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 5-SOUTH | Arrival | EB_WC_2 | 47 | EB_B_T5S | 47° 34′ 32′′ N 122° 21′ 41′′ W | 0.50 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-SOUTH | Departure | EB_B_T5S | 47 | EB_WC_2 | 47° 35′ 02′′ N 122° 21′ 36′′ W | 0.50 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-SOUTH | Departure | EB_WC_2 | 47 | EB_WC_1 | 47° 35′ 52′′ N 122° 21′ 37′′ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 5-SOUTH | Departure | EB_WC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 1.54 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | KINDER | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | KINDER | Arrival | EB_EC_1 | 47 | EB_B_KM | 47° 35′ 23′′ N 122° 20′ 45′′ W | 0.42 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | KINDER | Departure | EB_B_KM | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 0.42 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | KINDER | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-1 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-1 | Arrival | EB_EC_1 | 47 | EB_B_T181 | 47° 35′ 18′′ N 122° 20′ 45′′ W | 0.51 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-1 | Departure | EB_B_T181 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 0.51 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-1 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-2 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-2 | Arrival | EB_EC_1 | 47 | EB_B_T182 | 47° 35′ 06′′ N 122° 20′ 45′′ W | 0.71 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-2 | Departure | EB_B_T182 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 0.71 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-2 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-3 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-3 | Arrival | EB_EC_1 | 47 | EB_B_T183 | 47° 34′ 55′′ N 122° 20′ 45′′ W | 0.89 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-3 | Departure | EB_B_T183 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 0.89 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-3 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-4 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-4 | Arrival | EB_EC_1 | 47 | EB_B_T184 | 47° 34′ 44′′ N 122° 20′ 45′′ W | 1.08 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-4 | Departure | EB_B_T184 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 1.08 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-4 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-5 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 18-5 | Arrival | EB_EC_1 | 47 | EB_B_T185 | 47° 34′ 34′′ N 122° 20′ 45′′ W | 1.24 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-5 | Departure | EB_B_T185 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 1.24 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 18-5 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 20-1 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 20-1 | Arrival | EB_EC_1 | 47 | EB_B_T201 | 47° 34′ 55′′ N 122° 20′ 45′′ W | 0.89 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 20-1 | Departure | EB_B_T201 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 0.89 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 20-1 | Departure | EB_EC_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 20-2 | Arrival | EB_A_4 | 47 | EB_EC_1 | 47° 35′ 48′′ N 122° 20′ 41′′ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Contain Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
| ElliottB_PS | SEATTLE | 20-2 | Departure | | EB_B_T202 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 0.89 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 20-2 | Departure | | EB_EC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-NORT | Arrival | | EB_A_4 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-NORT | Arrival | | EB_EC_1 | 47 | EB_EC_2 | 47° 34´ 46´´ N 122° 20´ 39´´ W | 1.04 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-NORT | Arrival | | EB_EC_2 | 47 | EB_B_T25N | 47° 34´ 37´´ N 122° 20´ 35´´ W | 0.15 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-NORT | Departure | | EB_B_T25N | 47 | EB_EC_2 | 47° 34´ 46´´ N 122° 20´ 39´´ W | 0.15 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-NORT | Departure | | EB_EC_2 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 1.04 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-NORT | Departure | | EB_EC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-SOUTI | Arrival | | EB_A_4 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 2.08 | King | 0 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-SOUTI | Arrival | | EB_EC_1 | 47 | EB_EC_2 | 47° 34´ 46´´ N 122° 20´ 39´´ W | 1.04 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 25-SOUTI | Arrival | | EB_EC_2 | 47 | EB_B_T25S | 47° 34´ 31´´ N 122° 20´ 35´´ W | 0.25 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-SOUTI | Departure | | EB_B_T25S | 47 | EB_EC_2 | 47° 34´ 46´´ N 122° 20´ 39´´ W | 0.25 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-SOUTI | Departure | | EB_EC_2 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 1.04 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 25-SOUTI | Departure | | EB_EC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.08 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 30-NORT | Arrival | | EB_A_4 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 2.08 | King | 6 | 6 | 6 | 6 | 6 | 4 | 2 | 7 | 0.0 | **4** | 2.6 | 10.5 | 0.0 |
| PS_ElliottB | SEATTLE | 30-NORT | Arrival | | EB_EC_1 | 47 | EB_EC_3 | 47° 35´ 12´´ N 122° 20´ 39´´ W | 0.61 | King | 4 | 4 | 4 | 4 | 4 | 3 | 1 | 7 | 0.0 | **3** | 0.5 | 10.5 | 0.0 |
| PS_ElliottB | SEATTLE | 30-NORT | Arrival | | EB_EC_3 | 47 | EB_B_T30N | 47° 35´ 07´´ N 122° 20´ 35´´ W | 0.09 | King | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 7 | 0.0 | **2** | 0.4 | 10.5 | 0.0 |
| ElliottB_PS | SEATTLE | 30-NORT | Departure | | EB_B_T30N | 47 | EB_EC_3 | 47° 35´ 12´´ N 122° 20´ 39´´ W | 0.09 | King | 3 | 2 | 2 | 2 | 2 | 3 | 7 | 7 | 0.0 | **3** | 6.0 | 10.1 | 0.0 |
| ElliottB_PS | SEATTLE | 30-NORT | Departure | | EB_EC_3 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 0.61 | King | 5 | 4 | 4 | 4 | 4 | 5 | 7 | 7 | 0.0 | **5** | 6.0 | 10.1 | 0.0 |
| ElliottB_PS | SEATTLE | 30-NORT | Departure | | EB_EC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.08 | King | 8 | 7 | 7 | 7 | 7 | 8 | 10 | 7 | 0.0 | **8** | 12.1 | 10.1 | 0.0 |
| PS_ElliottB | SEATTLE | 30-SOUTI | Arrival | | EB_A_4 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 2.08 | King | 8 | 6 | 6 | 6 | 6 | 4 | 2 | 7 | 0.0 | **4** | 2.6 | 10.5 | 0.0 |
| PS_ElliottB | SEATTLE | 30-SOUTI | Arrival | | EB_EC_1 | 47 | EB_EC_3 | 47° 35´ 12´´ N 122° 20´ 39´´ W | 0.61 | King | 4 | 4 | 4 | 4 | 4 | 3 | 1 | 7 | 0.0 | **3** | 0.5 | 10.5 | 0.0 |
| PS_ElliottB | SEATTLE | 30-SOUTI | Arrival | | EB_EC_3 | 47 | EB_B_T30S | 47° 34´ 57´´ N 122° 20´ 35´´ W | 0.25 | King | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 7 | 0.0 | **2** | 0.4 | 10.5 | 0.0 |
| ElliottB_PS | SEATTLE | 30-SOUTI | Departure | | EB_B_T30S | 47 | EB_EC_3 | 47° 35´ 12´´ N 122° 20´ 39´´ W | 0.25 | King | 3 | 2 | 2 | 2 | 2 | 3 | 7 | 7 | 0.0 | **3** | 6.0 | 10.1 | 0.0 |
| ElliottB_PS | SEATTLE | 30-SOUTI | Departure | | EB_EC_3 | 47 | EB_EC_1 | 47° 35´ 48´´ N 122° 20´ 41´´ W | 0.61 | King | 5 | 4 | 4 | 4 | 4 | 5 | 7 | 7 | 0.0 | **5** | 6.0 | 10.1 | 0.0 |
| ElliottB_PS | SEATTLE | 30-SOUTI | Departure | | EB_EC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.08 | King | 8 | 7 | 7 | 7 | 7 | 8 | 10 | 7 | 0.0 | **8** | 12.1 | 10.1 | 0.0 |
| PS_ElliottB | SEATTLE | 37 | Arrival | | EB_A_4 | 47 | EB_FS_1 | 47° 36´ 25´´ N 122° 21´ 14´´ W | 1.5 | King | 0 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 37 | Arrival | | EB_FS_1 | 47 | EB_FS_2 | 47° 35´ 43´´ N 122° 20´ 32´´ W | 0.84 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 37 | Arrival | | EB_FS_2 | 47 | EB_B_T37 | 47° 35´ 35´´ N 122° 20´ 33´´ W | 0.13 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 37 | Departure | | EB_B_T37 | 47 | EB_FS_2 | 47° 35´ 43´´ N 122° 20´ 32´´ W | 0.13 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 37 | Departure | | EB_FS_2 | 47 | EB_FS_1 | 47° 36´ 25´´ N 122° 21´ 14´´ W | 0.84 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 37 | Departure | | EB_FS_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.5 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 46 | Arrival | | EB_A_4 | 47 | EB_FS_1 | 47° 36´ 25´´ N 122° 21´ 14´´ W | 1.5 | King | 0 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 46 | Arrival | | EB_FS_1 | 47 | EB_FN_1 | 47° 35´ 56´´ N 122° 20´ 30´´ W | 0.7 | King | 0 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 46 | Arrival | | EB_FN_1 | 47 | EB_B_T46 | 47° 35´ 50´´ N 122° 20´ 27´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 46 | Departure | | EB_B_T46 | 47 | EB_FN_1 | 47° 35´ 56´´ N 122° 20´ 30´´ W | 0.11 | King | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 46 | Departure | | EB_FN_1 | 47 | EB_FS_1 | 47° 36´ 25´´ N 122° 21´ 14´´ W | 0.7 | King | 0 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 46 | Departure | | EB_FS_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.5 | King | 0 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

## Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk I** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Fast Cruise** | **Fast Contain Auto** | **Medium Reefer RO/RO Fishing** | **Slow Bulkers Tankers Log Fishing** | **Very Slow Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PS_ElliottB | SEATTLE | 66-1 | Arrival | EB_CT_1 | 47 | EB_B_T661 | 47° 36´ 39´´ N 122° 21´ 00´´ W | 0.13 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-1 | Departure | EB_B_T661 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.13 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-1 | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 7 | 0 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-2 | Arrival | EB_A_4 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 1.66 | King | 6 | 0 | 6 | 6 | 6 | 4 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-2 | Arrival | EB_CT_1 | 47 | EB_B_T662 | 47° 36´ 37´´ N 122° 20´ 57´´ W | 0.1 | King | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-2 | Departure | EB_B_T662 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.1 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-2 | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 7 | 0 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-3 | Arrival | EB_A_4 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 1.66 | King | 6 | 0 | 6 | 6 | 6 | 4 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-3 | Arrival | EB_CT_1 | 47 | EB_B_T663 | 47° 36´ 36´´ N 122° 20´ 54´´ W | 0.08 | King | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-3 | Departure | EB_B_T663 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.08 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-3 | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 7 | 0 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-4 | Arrival | EB_A_4 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 1.66 | King | 6 | 0 | 6 | 6 | 6 | 4 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-4 | Arrival | EB_CT_1 | 47 | EB_B_T664 | 47° 36´ 34´´ N 122° 20´ 52´´ W | 0.07 | King | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-4 | Departure | EB_B_T664 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.07 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-4 | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 7 | 0 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-N | Arrival | EB_A_4 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 1.66 | King | 6 | 0 | 6 | 6 | 6 | 4 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 66-N | Arrival | EB_CT_1 | 47 | EB_B_T66N | 47° 36´ 41´´ N 122° 21´ 03´´ W | 0.17 | King | 2 | 0 | 2 | 2 | 2 | 2 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-N | Departure | EB_B_T66N | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.17 | King | 2 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 66-N | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 7 | 0 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| **YACHTS ONLY** | | | | | | | | | | | | | | Yachts only | | | | | | | | |
| PS_ElliottB | SEATTLE | EB MARI | Arrival | EB_A_4 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 1.66 | King | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | EB MARI | Arrival | EB_CT_1 | 47 | EB_EM_1 | 47° 36´ 33´´ N 122° 20´ 44´´ W | 0.14 | King | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | EB MARI | Arrival | EB_EM_1 | 47 | EB_B_EM | 47° 36´ 36´´ N 122° 20´ 50´´ W | 0.09 | King | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | EB MARI | Departure | EB_B_EM | 47 | EB_EM_1 | 47° 36´ 33´´ N 122° 20´ 44´´ W | 0.09 | King | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | EB MARI | Departure | EB_EM_1 | 47 | EB_CT_1 | 47° 36´ 31´´ N 122° 20´ 57´´ W | 0.14 | King | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | EB MARI | Departure | EB_CT_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.66 | King | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 86 | Arrival | EB_A_4 | 47 | EB_GE_1 | 47° 37´ 22´´ N 122° 22´ 14´´ W | 0.9 | King | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 86 | Arrival | EB_GE_1 | 47 | EB_B_T86 | 47° 37´ 25´´ N 122° 22´ 14´´ W | 0.04 | King | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 86 | Departure | EB_B_T86 | 47 | EB_GE_1 | 47° 37´ 22´´ N 122° 22´ 14´´ W | 0.04 | King | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 86 | Departure | EB_GE_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 0.9 | King | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-3 | Arrival | EB_A_4 | 47 | EB_FE_1 | 47° 37´ 26´´ N 122° 22´ 45´´ W | 0.69 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-3 | Arrival | EB_FE_1 | 47 | EB_B_T903 | 47° 37´ 47´´ N 122° 22´ 46´´ W | 0.35 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-3 | Departure | EB_B_T903 | 47 | EB_FE_1 | 47° 37´ 26´´ N 122° 22´ 45´´ W | 0.04 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-3 | Departure | EB_FE_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 0.9 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-3&7 | Arrival | EB_A_4 | 47 | EB_FE_1 | 47° 37´ 26´´ N 122° 22´ 45´´ W | 0.69 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-3&7 | Arrival | EB_FE_1 | 47 | EB_B_T9037 | 47° 37´ 39´´ N 122° 22´ 45´´ W | 0.21 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

# Puget Sound Emissions Inventory

**OGV-Routing:  SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Contain Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** | **CR-1 Speed knots** | **CR-1 PL (MW)** | **CR-1 SL (MW)** | **CR-1 BL (MW)** | **CR-2 Speed knots** | **CR-2 PL (MW)** | **CR-2 SL (MW)** | **CR-2 BL (MW)** |
| ElliottB_PS | SEATTLE | 90-3&7 | Departure | EB_FE_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.69 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-5 | Arrival | EB_A_4 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.63 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-5 | Arrival | EB_FM_1 | 47 | EB_B_T905 | 47° 37′ 47′′ N 122° 22′ 51′′ W | 0.37 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-5 | Departure | EB_B_T905 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.37 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-5 | Departure | EB_FM_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.63 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-5&7 | Arrival | EB_A_4 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.63 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 90-5&7 | Arrival | EB_FM_1 | 47 | EB_B_T9057 | 47° 37′ 48′′ N 122° 22′ 55′′ W | 0.38 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-5&7 | Departure | EB_B_T9057 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.38 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 90-5&7 | Departure | EB_FM_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.63 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-H&I | Arrival | EB_A_4 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.63 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-H&I | Arrival | EB_FM_1 | 47 | EB_B_T91HI | 47° 37′ 48′′ N 122° 22′ 55′′ W | 0.38 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-H&I | Departure | EB_B_T91HI | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.38 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-H&I | Departure | EB_FM_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.63 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-J&K | Arrival | EB_A_4 | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.63 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-J&K | Arrival | EB_FM_1 | 47 | EB_B_T91JK | 47° 37′ 40′′ N 122° 22′ 55′′ W | 0.25 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-J&K | Departure | EB_B_T91JK | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.25 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-J&K | Departure | EB_FM_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.63 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-E&F | Arrival | EB_A_4 | 47 | EB_FW_1 | 47° 37′ 27′′ N 122° 23′ 03′′ W | 0.62 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | 91-E&F | Arrival | EB_FW_1 | 47 | EB_B_T91EF | 47° 37′ 42′′ N 122° 23′ 02′′ W | 0.24 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-E&F | Departure | EB_B_T91EF | 47 | EB_FM_1 | 47° 37′ 25′′ N 122° 22′ 53′′ W | 0.25 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | 91-E&F | Departure | EB_FM_1 | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.63 | King | 0 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | ANCHOR | Arrival | EB_A_4 | 47 | EB_AN_SCE | 47° 37′ 09′′ N 122° 22′ 18′′ W | 0.75 | King | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | ANCHOR | Departure | EB_AN_SCE | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.75 | King | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | ANCHOR | Arrival | EB_A_4 | 47 | EB_AN_SCW | 47° 37′ 34′′ N 122° 24′ 07′′ W | 0.87 | King | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | ANCHOR | Departure | EB_AN_SCW | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 0.87 | King | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | ANCHOR | Arrival | EB_A_4 | 47 | EB_AN_EBE | 47° 35′ 35′′ N 122° 22′ 14′′ W | 1.49 | King | 4 | 4 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | ANCHOR | Departure | EB_AN_EBE | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 1.49 | King | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | ANCHOR | Arrival | EB_A_4 | 47 | EB_AN_EBW | 47° 35′ 42′′ N 122° 21′ 09′′ W | 1.88 | King | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | ANCHOR | Departure | EB_AN_EBW | 47 | EB_D_1 | 47° 36′ 52′′ N 122° 23′ 21′′ W | 1.88 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD 4 | Arrival | EB_A_4 | 47 | EB_WC_1 | 47° 35′ 52′′ N 122° 21′ 37′′ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| Route | To_Port | To_Pier | Arr/Dep | nk l | Start WP | WP | End WP | Ending Waypoint Lat/Lon | Dist. | County | Speed by Link (knots) Fast Cruise | Fast Contain Auto | Medium Reefer RO/RO Fishing | Slow Bulkers Tankers Log Fishing | Very Slow Fishing | CR-1 Speed knots | CR-1 PL (MW) | CR-1 SL (MW) | CR-1 BL (MW) | CR-2 Speed knots | CR-2 PL (MW) | CR-2 SL (MW) | CR-2 BL (MW) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PS_ElliottB | SEATTLE | TODD-4 | Arrival | | EB_TD_3 | 47 | EB_B_TD4 | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-4 | Departure | | EB_B_TD4 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-4 | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-4 | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-5 | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-5 | Arrival | | EB_WC_1 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-5 | Arrival | | EB_TD_3 | 47 | EB_B_TD5 | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-5 | Departure | | EB_B_TD5 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-5 | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-5 | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-D | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-D | Arrival | | EB_WC_1 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-D | Arrival | | EB_TD_3 | 47 | EB_B_TDD3 | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-D | Departure | | EB_B_TDD3 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-D | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-D | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-E | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-E | Arrival | | EB_WC_1 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-E | Arrival | | EB_TD_3 | 47 | EB_B_TDE | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-E | Departure | | EB_B_TDE | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-E | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-E | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-F | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-F | Arrival | | EB_WC_1 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-F | Arrival | | EB_TD_3 | 47 | EB_B_TDF | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-F | Departure | | EB_B_TDF | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-F | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-F | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-H | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 6 | 6 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-H | Arrival | | EB_WC_1 | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | TODD-H | Arrival | | EB_TD_3 | 47 | EB_B_TDH | 47° 35´ 17´´ N 122° 21´ 24´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-H | Departure | | EB_B_TDH | 47 | EB_TD_3 | 47° 35´ 26´´ N 122° 21´ 23´´ W | 0.15 | King | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-H | Departure | | EB_TD_3 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.47 | King | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | TODD-H | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 7 | 7 | 7 | 7 | 7 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_WC_2 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.49 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_WC_3 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_DU_1 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_DU_2 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_DU_3 | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.14 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | LAFARGI | Arrival | | EB_DU_4 | 47 | EB_B_LF | 47° 33´ 14´´ N 122° 20´ 34´´ W | 0.07 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | 0 | 0.0 | 0.0 | 0.0 |

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| | | | | | | | | | | | | | | Bulkers | | | | | | | | | |
| | | | | | | | | | | | | | Reefer | Tankers | | CR-1 | CR-1 | CR-1 | CR-1 | CR-2 | CR-2 | CR-2 | CR-2 |
| | | | | | | | | | | | | Contain | RO/RO | Log | | Speed | PL | SL | BL | Speed | PL | SL | BL |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **nk l** | **Start WP** | **WP** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** | **knots** | **(MW)** | **(MW)** | **(MW)** | **knots** | **(MW)** | **(MW)** | **(MW)** |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_B_LF | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.07 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_DU_4 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.14 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_DU_3 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_DU_2 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_DU_1 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_WC_3 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.49 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | LAFARGI | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_WC_2 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.49 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_WC_3 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_DU_1 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_DU_2 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_DU_3 | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.14 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_DU_4 | 47 | EB_DU_5 | 47° 33´ 14´´ N 122° 20´ 31´´ W | 0.07 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | GLACIER | Arrival | | EB_DU_5 | 47 | EB_B_GL | 47° 33´ 12´´ N 122° 20´ 27´´ W | 0.06 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_B_GL | 47 | EB_DU_5 | 47° 33´ 14´´ N 122° 20´ 31´´ W | 0.06 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_DU_5 | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.07 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_DU_4 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.14 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_DU_3 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_DU_2 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_DU_1 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_WC_3 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.49 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | GLACIER | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 0 | 6 | 6 | 6 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_A_4 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 1.54 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_WC_1 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.84 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_WC_2 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.49 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_WC_3 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_1 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_2 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_3 | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.14 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_4 | 47 | EB_DU_5 | 47° 33´ 14´´ N 122° 20´ 31´´ W | 0.07 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_5 | 47 | EB_DU_6 | 47° 33´ 03´´ N 122° 20´ 25´´ W | 0.2 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_6 | 47 | EB_DU_7 | 47° 32´ 54´´ N 122° 20´ 21´´ W | 0.15 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| PS_ElliottB | SEATTLE | BPB | Arrival | | EB_DU_7 | 47 | EB_B_BPB | 47° 32´ 49´´ N 122° 20´ 15´´ W | 0.11 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_B_BPB | 47 | EB_DU_5 | 47° 33´ 14´´ N 122° 20´ 31´´ W | 0.11 | King | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_7 | 47 | EB_DU_6 | 47° 33´ 03´´ N 122° 20´ 25´´ W | 0.15 | King | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_6 | 47 | EB_DU_5 | 47° 33´ 14´´ N 122° 20´ 31´´ W | 0.2 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_5 | 47 | EB_DU_4 | 47° 33´ 18´´ N 122° 20´ 34´´ W | 0.07 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_4 | 47 | EB_DU_3 | 47° 33´ 26´´ N 122° 20´ 38´´ W | 0.14 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_3 | 47 | EB_DU_2 | 47° 33´ 52´´ N 122° 20´ 50´´ W | 0.44 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_2 | 47 | EB_DU_1 | 47° 34´ 06´´ N 122° 20´ 59´´ W | 0.26 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_DU_1 | 47 | EB_WC_3 | 47° 34´ 33´´ N 122° 21´ 35´´ W | 0.61 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_WC_3 | 47 | EB_WC_2 | 47° 35´ 02´´ N 122° 21´ 36´´ W | 0.49 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_WC_2 | 47 | EB_WC_1 | 47° 35´ 52´´ N 122° 21´ 37´´ W | 0.84 | King | 0 | 0 | 3 | 3 | 3 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |
| ElliottB_PS | SEATTLE | BPB | Departure | | EB_WC_1 | 47 | EB_D_1 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 1.54 | King | 0 | 0 | 4 | 4 | 4 | 0 | 0 | 0 | 0.0 | **0** | 0.0 | 0.0 | 0.0 |

🟧 Engines off during departure due to constricted waterway: Duamish River

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to SEA**

Lat/Long in WGS84 Datum

| | | | | | | | | | | | | | Speed by Link (knots) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow | | | | | | | | |
| | | | | | | | | | | | | | | Bulkers | | | | | | | | | |
| | | | | | | | | | | | | | Reefer | Tankers | | CR-1 | CR-1 | CR-1 | CR-1 | CR-2 | CR-2 | CR-2 | CR-2 |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | | Speed | PL | SL | BL | Speed | PL | SL | BL |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** | **knots** | **(MW)** | **(MW)** | **(MW)** | **knots** | **(MW)** | **(MW)** | **(MW)** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° 36 | EB_D_2 | 47° 38´ | 2.6 | King | 14 | 12 | 9 | 8 | 6 | 13.5 | 13.2 | 7.0 | 0.0 | 13.5 | 12.1 | 10.1 | 0.0 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 38 | PS_D_10 | 47° 39´ | 1.5 | King | 18 | 16 | SS | SS | 7 | 17.5 | 19.2 | 7.0 | 0.0 | 16.5 | 16.1 | 9.0 | 0.0 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° 39 | PS_D_11 | 47° 41´ | 2.3 | King | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° 41 | PS_D_12 | 47° 45´ | 4.0 | Kitsap | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45 | PS_D_13 | 47° 46´ | 0.8 | King | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46 | PS_D_14 | 47° 48´ | 1.5 | Snohomish | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48 | PS_D_15 | 47° 52´ | 4.6 | Kitsap | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52 | PS_D_16 | 47° 55´ | 3.1 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55 | PS_D_17 | 47° 57´ | 2.4 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57 | PS_D_18 | 47° 58´ | 1.9 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58 | PS_D_19 | 48° 02´ | 4.5 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02 | PS_D_20 | 48° 04´ | 2.8 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04 | PS_D_21 | 48° 06´ | 2.2 | Jefferson | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06 | PS_D_22 | 48° 07´ | 1.3 | Jefferson | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07 | PS_D_23 | 48° 11´ | 5.3 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11 | PS_D_24 | 48° 11´ | 1.4 | Island | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11 | PS_D_25 | 48° 11´ | 2.4 | Jefferson | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11 | PS_D_26 | 48° 12´ | 9.5 | Calallam | SS | SS | SS | SS | SS | 19.5 | 21.2 | 7.0 | 0.0 | 19.8 | 22.2 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12 | PS_D_27 | 48° 10´ | 11.2 | Calallam | 17 | 17 | 16 | 12 | SS | 18.0 | 19.0 | 7.0 | 0.0 | 18.0 | 19.5 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10 | PS_D_28 | 48° 11´ | 0.8 | Calallam | 8 | 8 | 8 | 8 | 8 | 10.0 | 12.0 | 7.0 | 0.0 | 10.0 | 11.0 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11 | PS_D_29 | 48° 14´ | 4.9 | Calallam | 15 | 14 | 12 | SS | SS | 21.0 | 27.3 | 7.0 | 0.0 | 22.0 | 29.3 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14 | PS_D_30 | 48° 15´ | 3.1 | Calallam | 19 | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15 | PS_D_31 | 48° 17´ | 15.4 | Calallam | SS | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17 | PS_D_32 | 48° 30´ | 34.1 | Calallam | SS | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30 | PS_D_33 | 48° 30´ | 10.9 | Calallam | SS | SS | SS | SS | SS | 22.0 | 27.3 | 7.0 | 0.0 | 22.7 | 31.4 | 10.1 | 0.0 |

Total Distance 134.4 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to EVERETT**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoir** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° | EB_D_2 | 47° 3 | 2.6 | King | 0 | 12 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° | PS_D_10 | 47° 3 | 1.5 | King | 0 | 16 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41 | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° | PS_D_12 | 47° 4 | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12a | PS_D_12 | 47° | ET_A_1 | 47° 4 | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Everett | Departure | T | N | L1 | ET_A_1 | 47° | ET_A_2 | 47° 4 | 1.6 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Everett | Departure | T | N | L2a | ET_A_2 | 47° | EV_A_5 | 47° 5 | 4.1 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L5 | EV_A_5 | 47° | EV_A_6 | 47° 5 | 2.4 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L6 | EV_A_6 | 47° | EV_A_7 | 47° 5 | 2.5 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° | EV_A_8 | 47° 5 | 1.1 | Snohomish | 0 | 14 | 12 | SS | SS |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° | EV_A_9 | 47° 5 | 2.0 | Snohomish | 0 | 10 | 10 | 10 | 8 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° | EV_A_10 | 47° 5 | 1.3 | Snohomish | 0 | 7 | 6 | 6 | 5 |
| | | | | | | | Total Distance | | 26.1 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: EVERETT to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Everett_PS | Departure | M | Y | L1 | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | 1.7 | Snohomish | 0 | 4 | 4 | 4 | 3 |
| Everett_PS | Departure | M | Y | L2 | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | 2.3 | Snohomish | 0 | 10 | 10 | 10 | 5 |
| Everett_PS | Departure | X | Y | L3 | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | 3.8 | Island | 0 | 14 | SS | SS | 6 |
| Everett_PS | Departure | X | Y | L4 | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | 2.4 | Island | 0 | 17 | SS | SS | SS |
| Everett_PS | Departure | T | N | L5a | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | ET_D_1 | 47° 51´ 53´´ N 122° 23´ 38´´ W | 0.3 | Island | 0 | 19 | SS | SS | SS |
| Everett_Tacoma | Departure | T | N | L1 | ET_D_1 | 47° 51´ 53´´ N 122° 23´ 38´´ W | ET_D_2 | 47° 46´ 44´´ N 122° 26´ 20´´ W | 5.5 | Snohomish | 0 | SS | SS | SS | SS |
| Everett_Tacoma | Departure | T | N | L2a | ET_D_2 | 47° 46´ 44´´ N 122° 26´ 20´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 0.9 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | Y | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | 0.4 | Kitsap | 0 | 15 | 13 | 9 | 8 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | 1.5 | King | 0 | 14 | 12 | 8 | 7 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | EB_A_4 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.6 | King | 0 | 12 | 11 | 6 | 6 |

Total Distance 27.6 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to VANCOUVER (NB2)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° 36´ | EB_D_2 | 47° 38´ | 2.6 | King | 14 | 12 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 38´ | PS_D_10 | 47° 39´ | 1.5 | King | 18 | 16 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° 39´ | PS_D_11 | 47° 41´ | 2.3 | King | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° 41´ | PS_D_12 | 47° 45´ | 4.0 | Kitsap | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ | PS_D_13 | 47° 46´ | 0.8 | King | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ | PS_D_14 | 47° 48´ | 1.5 | Snohomish | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ | PS_D_15 | 47° 52´ | 4.6 | Kitsap | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ | PS_D_16 | 47° 55´ | 3.1 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ | PS_D_17 | 47° 57´ | 2.4 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ | PS_D_18 | 47° 58´ | 1.9 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ | PS_D_19 | 48° 02´ | 4.5 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ | PS_D_20 | 48° 04´ | 2.8 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ | PS_D_21 | 48° 06´ | 2.2 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ | PS_D_22 | 48° 07´ | 1.3 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ | PS_D_23 | 48° 11´ | 5.3 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ | PS_D_24 | 48° 11´ | 1.4 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ | PS_D_25 | 48° 11´ | 2.4 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12´ | 9.5 | Calallam | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10´ | 11.2 | Calallam | 17 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ | PS_A_6 | 48° 09´ | 0.8 | Calallam | 8 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ | PS_A_7 | 48° 11´ | 11.4 | Calallam | 18 | 18 | 12 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ | PS_A_8 | 48° 11´ | 9.5 | Calallam | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8a | PS_A_8 | 48° 11´ | PS_D_24 | 48° 11´ | 2.5 | Jefferson | SS | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L1a | PS_D_24 | 48° 11´ | AD_D_2 | 48° 13´ | 2.1 | San Juan | 18 | 18 | 17 | 16 | SS |
| AI_NB2 | Departure | T | N | L2 | AD_D_2 | 48° 13´ | AD_D_3 | 48° 19´ | 8.1 | San Juan | 16 | 16 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L3 | AD_D_3 | 48° 19´ | AD_D_4 | 48° 24´ | 5.1 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L4 | AD_D_4 | 48° 24´ | AD_D_5 | 48° 29´ | 7.3 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L5 | AD_D_5 | 48° 29´ | AD_D_6 | 48° 34´ | 5.8 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L6 | AD_D_6 | 48° 34´ | AD_D_7 | 48° 40´ | 5.4 | San Juan | 15 | 15 | 15 | 15 | SS |

Total Distance 123.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB2) to SEATTLE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | **Speed by Link (knots)** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| NB2_AI | Arrival | T | N | L1 | AD_A_1 | 48° 40´ | AD_A_2 | 48° 34´ | 5.2 | San Juan | 15 | 16 | SS | SS | SS |
| NB2_AI | Arrival | T | N | L2 | AD_A_2 | 48° 34´ | AD_A_3 | 48° 29´ | 5.9 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L3 | AD_A_3 | 48° 29´ | AD_A_4 | 48° 27´ | 2.4 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L4 | AD_A_4 | 48° 27´ | AD_A_5 | 48° 25´ | 3.6 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L5 | AD_A_5 | 48° 25´ | AD_A_6 | 48° 22´ | 3.3 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L6 | AD_A_6 | 48° 22´ | AD_A_7 | 48° 20´ | 2.9 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L7 | AD_A_7 | 48° 20´ | AD_A_8 | 48° 12´ | 8.8 | San Juan | 15 | SS | SS | SS | SS |
| NB2_AI | Arrival | T | N | L8a | AD_A_8 | 48° 12´ | PS_D_25 | 48° 11´ | 0.9 | Jefferson | 15 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12´ | 9.5 | Calallam | 18 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10´ | 11.2 | Calallam | 16 | 16 | 12 | SS | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ | PS_A_6 | 48° 09´ | 0.8 | Calallam | 8 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ | PS_A_7 | 48° 11´ | 11.4 | Calallam | 18 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ | PS_A_8 | 48° 11´ | 9.5 | Calallam | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ | PS_A_9 | 48° 10´ | 2.9 | Jefferson | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ | PS_A_10 | 48° 06´ | 6.8 | Jefferson | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ | PS_A_11 | 48° 01´ | 5.6 | Jefferson | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ | PS_A_12 | 47° 57´ | 4.0 | Island | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ | PS_A_13 | 47° 56´ | 1.8 | Island | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ | PS_A_14 | 47° 55´ | 2.3 | Kitsap | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ | PS_A_15 | 47° 45´ | 9.7 | Kitsap | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | Y | L15 | PS_A_15 | 47° 45´ | PS_A_16 | 47° 39´ | 6.3 | Kitsap | SS | SS | SS | SS | SS |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 39´ | EB_A_2 | 47° 39´ | 0.4 | Kitsap | 18 | 16 | SS | SS | 8 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 39´ | EB_A_3 | 47° 38´ | 1.5 | King | 14 | 12 | 10 | 9 | 7 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 38´ | EB_A_4 | 47° 36´ | 2.6 | King | 12 | 10 | 6 | 6 | 6 |

Total Distance 119.3 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEATTLE to NANIAMO (NB2)

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ng WP La** | **End WP** | **g Waypoint La** | **Dist.** | **County** | **Fast Cruise** | **Fast Container Auto** | **Medium Reefer RO/RO Fishing** | **Slow Bulkers Tankers Log Fishing** | **Very Slow Fishing** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° 36´ 5 | EB_D_2 | 47° 38´ 22´´ N | 2.6 | King | 14 | 12 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 38´ 2 | PS_D_10 | 47° 39´ 42´´ N | 1.5 | King | 18 | 16 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° 39´ 4 | PS_D_11 | 47° 41´ 54´´ N | 2.3 | King | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° 41´ 5 | PS_D_12 | 47° 45´ 52´´ N | 4.0 | Kitsap | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 5 | PS_D_13 | 47° 46´ 40´´ N | 0.8 | King | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 4 | PS_D_14 | 47° 48´ 06´´ N | 1.5 | Snohomish | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 0 | PS_D_15 | 47° 52´ 36´´ N | 4.6 | Kitsap | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 3 | PS_D_16 | 47° 55´ 34´´ N | 3.1 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 3 | PS_D_17 | 47° 57´ 01´´ N | 2.4 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 0 | PS_D_18 | 47° 58´ 07´´ N | 1.9 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 0 | PS_D_19 | 48° 02´ 01´´ N | 4.5 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 0 | PS_D_20 | 48° 04´ 48´´ N | 2.8 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 4 | PS_D_21 | 48° 06´ 58´´ N | 2.2 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 5 | PS_D_22 | 48° 07´ 51´´ N | 1.3 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 5 | PS_D_23 | 48° 11´ 20´´ N | 5.3 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 2 | PS_D_24 | 48° 11´ 44´´ N | 1.4 | Island | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 4 | PS_D_25 | 48° 11´ 57´´ N | 2.4 | Jefferson | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 5 | PS_D_26 | 48° 12´ 45´´ N | 9.5 | Calallam | SS | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 4 | PS_D_27 | 48° 10´ 33´´ N | 11.2 | Calallam | 17 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ 3 | PS_A_6 | 48° 09´ 58´´ N | 0.8 | Calallam | 8 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 5 | PS_A_7 | 48° 11´ 56´´ N | 11.4 | Calallam | 21 | 18 | 15 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 5 | PS_A_8 | 48° 11´ 11´´ N | 9.5 | Calallam | SS | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8a | PS_A_8 | 48° 11´ 1 | PS_D_24 | 48° 11´ 44´´ N | 2.5 | Jefferson | SS | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L1a | PS_D_24 | 48° 11´ 4 | AD_D_2 | 48° 13´ 19´´ N | 2.1 | San Juan | 18 | 18 | 17 | 16 | SS |
| AI_NB2 | Departure | T | N | L2 | AD_D_2 | 48° 13´ 1 | AD_D_3 | 48° 19´ 51´´ N | 8.1 | San Juan | 16 | 16 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L3 | AD_D_3 | 48° 19´ 5 | AD_D_4 | 48° 24´ 17´´ N | 5.1 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L4 | AD_D_4 | 48° 24´ 1 | AD_D_5 | 48° 29´ 18´´ N | 7.3 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L5 | AD_D_5 | 48° 29´ 1 | AD_D_6 | 48° 34´ 47´´ N | 5.8 | San Juan | 15 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L6 | AD_D_6 | 48° 34´ 4 | AD_D_7 | 48° 40´ 00´´ N | 5.4 | San Juan | 15 | 15 | 15 | 15 | SS |

Total Distance 123.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEATTLE to PORT ANGELES

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **aypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| ElliottB_PS | Departure | M | Y | L1 | EB_D_1 | 47° 36´ | EB_D_2 | 47° 38´ | 2.6 | King | 0 | 12 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 38´ | PS_D_10 | 47° 39´ | 1.5 | King | 0 | 16 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | Y | L10 | PS_D_10 | 47° 39´ | PS_D_11 | 47° 41´ | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | Y | L11 | PS_D_11 | 47° 41´ | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ | PS_D_13 | 47° 46´ | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ | PS_D_14 | 47° 48´ | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ | PS_D_23 | 48° 11´ | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ | PS_D_24 | 48° 11´ | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ | PS_D_25 | 48° 11´ | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12´ | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10´ | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | Y | L27a | PS_D_27 | 48° 10´ | PA_A_2 | 48° 09´ | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ | PA_A_3 | 48° 08´ | 1.6 | Calallam | 0 | 8 | 8 | 8 | 7 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ | PA_A_4 | 48° 08´ | 1.0 | Calallam | 0 | 6 | 6 | 6 | 6 |

Total Distance 68.5 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: SEA to EVERETT**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPM** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 28´ | 10.72 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 13´ | 35.85 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 13´ | 15.36 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° 09´ | 6.94 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° 09´ | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09 | PS_A_7 | 48° 11´ | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11 | PS_A_8 | 48° 11´ | 9.49 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11 | PS_A_9 | 48° 10´ | 2.92 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10 | PS_A_10 | 48° 06´ | 6.82 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06 | PS_A_11 | 48° 01´ | 5.62 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01 | PS_A_12 | 47° 57´ | 3.97 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57 | PS_A_13 | 47° 56´ | 1.82 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56 | PS_A_14 | 47° 55´ | 2.33 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L1a | PS_A_14 | 47° 55 | EV_A_2 | 47° 53´ | 2.26 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L2 | EV_A_2 | 47° 53 | EV_A_3 | 47° 51´ | 2.72 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L3 | EV_A_3 | 47° 51 | EV_A_4 | 47° 51´ | 1.97 | Island | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L4 | EV_A_4 | 47° 51 | EV_A_5 | 47° 52´ | 0.62 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L5 | EV_A_5 | 47° 52 | EV_A_6 | 47° 54´ | 2.42 | Snohomish | 0 | 20 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L6 | EV_A_6 | 47° 54 | EV_A_7 | 47° 56´ | 2.49 | Snohomish | 0 | 18 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° 56 | EV_A_8 | 47° 57´ | 1.07 | Snohomish | 0 | 14 | 14 | 12 | SS |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° 57 | EV_A_9 | 47° 58´ | 1.95 | Snohomish | 0 | 10 | 10 | 10 | 9 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° 58 | EV_A_10 | 47° 58´ | 1.32 | Snohomish | 0 | 7 | 7 | 6 | 6 |

Total Distance 130.68 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: EVERETT HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **To_Port** | | **Arr/Dep** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | | | | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| PS_Everett | EVERETT | | Arrival | L9 | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | | | | Snohomish | | | | | |
| Everett_PS | EVERETT | | Departure | L1 | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | | | | Snohomish | | | | | |
| NOTE: All ARRIVAL harbor transits branch from EV_A_10 | | | | | | | | | | | | | | | |
| NOTE: All DEPARTURE harbor transits goto EV_D_1 | | | | | | | | | | | | | | | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | | | | | |
| Everett_1-North | EVERETT | 1-NORTH | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.40 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_1-North | EVERETT | 1-NORTH | Arrival | L2 | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_H_2 | 47° 58´ 54´´ N 122° 13´ 26´´ W | 0.23 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Everett_1-North | EVERETT | 1-NORTH | Arrival | L3 | EV_H_2 | 47° 58´ 54´´ N 122° 13´ 26´´ W | EV_B_1 | 47° 58´ 52´´ N 122° 13´ 17´´ W | 0.11 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| | | | | | | | | Total Distance | 0.74 nm | | | | | | |
| 1-North_Everett | EVERETT | 1-NORTH | Departure | L3 | EV_B_1 | 47° 58´ 52´´ N 122° 13´ 17´´ W | EV_H_2 | 47° 58´ 54´´ N 122° 13´ 26´´ W | 0.11 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| 1-North_Everett | EVERETT | 1-NORTH | Departure | L2 | EV_H_2 | 47° 58´ 54´´ N 122° 13´ 26´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.23 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| 1-North_Everett | EVERETT | 1-NORTH | Departure | L1a | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.40 | Snohomish | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | | Total Distance | 0.74 nm | | | | | | |
| Everett_3-South | EVERETT | 3-SOUTH | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.40 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_3-South | EVERETT | 3-SOUTH | Arrival | L2 | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_H_3 | 47° 58´ 52´´ N 122° 13´ 30´´ W | 0.17 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Everett_3-South | EVERETT | 3-SOUTH | Arrival | L3 | EV_H_3 | 47° 58´ 52´´ N 122° 13´ 30´´ W | EV_B_2 | 47° 58´ 50´´ N 122° 13´ 17´´ W | 0.14 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| | | | | | | | | Total Distance | 0.71 nm | | | | | | |
| 3-South_Everett | EVERETT | 3-SOUTH | Departure | L3 | EV_B_2 | 47° 58´ 50´´ N 122° 13´ 17´´ W | EV_H_3 | 47° 58´ 52´´ N 122° 13´ 30´´ W | 0.14 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| 3-South_Everett | EVERETT | 3-SOUTH | Departure | L2 | EV_H_3 | 47° 58´ 52´´ N 122° 13´ 30´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.17 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| 3-South_Everett | EVERETT | 3-SOUTH | Departure | L1a | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.40 | Snohomish | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | | Total Distance | 0.71 nm | | | | | | |
| Everett_Hewitt | EVERETT | HEWITT | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.40 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_Hewitt | EVERETT | HEWITT | Arrival | L2 | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_H_4 | 47° 58´ 50´´ N 122° 13´ 32´´ W | 0.13 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Everett_Hewitt | EVERETT | HEWITT | Arrival | L3 | EV_H_4 | 47° 58´ 50´´ N 122° 13´ 32´´ W | EV_B_3 | 47° 58´ 45´´ N 122° 13´ 22´´ W | 0.13 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| | | | | | | | | Total Distance | 0.66 nm | | | | | | |
| Hewitt_Everett | EVERETT | HEWITT | Departure | L3 | EV_B_3 | 47° 58´ 45´´ N 122° 13´ 22´´ W | EV_H_4 | 47° 58´ 50´´ N 122° 13´ 32´´ W | 0.13 | Snohomish | 0 | 1 | 1 | 1 | 1 |
| Hewitt_Everett | EVERETT | HEWITT | Departure | L2 | EV_H_4 | 47° 58´ 50´´ N 122° 13´ 32´´ W | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | 0.13 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Hewitt_Everett | EVERETT | HEWITT | Departure | L1a | EV_H_1 | 47° 58´ 44´´ N 122° 13´ 39´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.40 | Snohomish | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | | Total Distance | 0.66 nm | | | | | | |
| PortAngeles_Tesoro | EVERETT | PACIFIC TERMINAL | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_B_4 | 48° 58´ 40´´ N 122° 13´ 25´´ W | 0.56 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Tesoro_PortAngeles | EVERETT | PACIFIC TERMINAL | Departure | L1a | EV_B_4 | 48° 58´ 40´´ N 122° 13´ 25´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.56 | Snohomish | 0 | 3 | 3 | 3 | 3 |
| PortAngeles_Tesoro | EVERETT | SOUTH TERMINAL | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_B_5 | 47° 58´ 28´´ N 122° 13´ 45´´ W | 0.39 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Tesoro_PortAngeles | EVERETT | SOUTH TERMINAL | Departure | L1a | EV_B_5 | 47° 58´ 28´´ N 122° 13´ 45´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.39 | Snohomish | 0 | 3 | 3 | 3 | 3 |
| PortAngeles_Tesoro | EVERETT | ANCHORAGE | Arrival | L1a | EV_A_10 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_B_6 | 47° 58´ 54´´ N 122° 14´ 37´´ W | 0.34 | Snohomish | 0 | 2 | 2 | 2 | 2 |
| Tesoro_PortAngeles | EVERETT | ANCHORAGE | Departure | L1a | EV_B_6 | 47° 58´ 54´´ N 122° 14´ 37´´ W | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | 0.34 | Snohomish | 0 | 3 | 3 | 3 | 3 |

# Puget Sound Emissions Inventory

**OGV-Routing: EVERETT to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | **Speed by Link (knots)** | | | | |
| | | | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | | **End WP** | **Ending Waypoint Lat/Lon** | | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Everett_PS | Departure | M | Y | L1 | EV_D_1 | 47° 58´ 40´´ N | 122° 14´ 15´´ W | EV_D_2 | 47° 58´ 51´´ N | 122° 16´ 44´´ W | 1.7 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_PS | Departure | M | Y | L2 | EV_D_2 | 47° 58´ 51´´ N | 122° 16´ 44´´ W | EV_D_3 | 47° 57´ 44´´ N | 122° 19´ 42´´ W | 2.3 | Snohomish | 0 | 10 | 10 | 10 | 9 |
| Everett_PS | Departure | X | Y | L3 | EV_D_3 | 47° 57´ 44´´ N | 122° 19´ 42´´ W | EV_D_4 | 47° 54´ 11´´ N | 122° 21´ 32´´ W | 3.8 | Island | 0 | 16 | 14 | SS | SS |
| Everett_PS | Departure | X | Y | L4 | EV_D_4 | 47° 54´ 11´´ N | 122° 21´ 32´´ W | EV_D_5 | 47° 52´ 10´´ N | 122° 23´ 30´´ W | 2.4 | Island | 0 | 20 | 17 | SS | SS |
| Everett_PS | Departure | T | N | L5 | EV_D_5 | 47° 52´ 10´´ N | 122° 23´ 30´´ W | EV_D_6 | 47° 51´ 21´´ N | 122° 26´ 29´´ W | 2.2 | Island | 0 | SS | SS | SS | SS |
| Everett_PS | Departure | T | N | L6a | EV_D_6 | 47° 51´ 21´´ N | 122° 26´ 29´´ W | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | 4.6 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N | 123° 23´ 02´´ W | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N | 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N | 123° 28´ 57´´ W | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 13´´ N | 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N | 123° 33´ 17´´ W | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N | 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N | 123° 56´ 06´´ W | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N | 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N | 124° 43´ 36´´ W | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N | 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N | 125° 00´ 00´´ W | 10.9 | Calallam | 0 | SS | SS | SS | SS |
| | | | | | | | | | | Total Distance | 131.0 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: EVERETT to VANCOUVER (NB2)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Everett_PS | Departure | M | Y | L1 | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | 1.7 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_PS | Departure | M | Y | L2 | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | 2.3 | Snohomish | 0 | 10 | 10 | 10 | 9 |
| Everett_PS | Departure | X | Y | L3 | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | 3.8 | Island | 0 | 16 | 14 | SS | SS |
| Everett_PS | Departure | X | Y | L4 | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | 2.4 | Island | 0 | 20 | 17 | SS | SS |
| Everett_PS | Departure | T | N | L5 | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | EV_D_6 | 47° 51´ 21´´ N 122° 26´ 29´´ W | 2.2 | Island | 0 | SS | SS | SS | SS |
| Everett_PS | Departure | T | N | L6a | EV_D_6 | 47° 51´ 21´´ N 122° 26´ 29´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | 4.6 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 58´´ N 123° 23´ 25´´ W | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | 11.4 | Calallam | 0 | 18 | 15 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 56´´ N 123° 06´ 35´´ W | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8a | PS_A_8 | 48° 11´ 11´´ N 122° 52´ 23´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | 2.5 | Jefferson | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L1a | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | AD_D_2 | 48° 13´ 19´´ N 122° 50´ 53´´ W | 2.1 | San Juan | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L2 | AD_D_2 | 48° 13´ 19´´ N 122° 50´ 53´´ W | AD_D_3 | 48° 19´ 51´´ N 122° 58´ 00´´ W | 8.1 | San Juan | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L3 | AD_D_3 | 48° 19´ 51´´ N 122° 58´ 00´´ W | AD_D_4 | 48° 24´ 17´´ N 123° 01´ 52´´ W | 5.1 | San Juan | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L4 | AD_D_4 | 48° 24´ 17´´ N 123° 01´ 52´´ W | AD_D_5 | 48° 29´ 18´´ N 123° 09´ 56´´ W | 7.3 | San Juan | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L5 | AD_D_5 | 48° 29´ 18´´ N 123° 09´ 56´´ W | AD_D_6 | 48° 34´ 47´´ N 123° 12´ 43´´ W | 5.8 | San Juan | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L6 | AD_D_6 | 48° 34´ 47´´ N 123° 12´ 43´´ W | AD_D_7 | 48° 40´ 00´´ N 123° 14´ 28´´ W | 5.4 | San Juan | 0 | 18 | 16 | 11 | SS |
| | | | | | | | | Total Distance | 119.8 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: VANCOUVER (NB2) to EVERETT

Lat/Long in WGS84 Datum

DRAFT

Speed by Link (knots)

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | ng WP La | End WP | Waypoint | Dist. | County | Fast Cruise | Fast Containe Auto | Medium Reefer RO/RO Fishing | Slow Bulkers Tankers Log Fishing | Very Slow Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NBndry_AI | Arrival | T | N | L1 | AD_A_1 | 48° 40´ 0 | AD_A_2 | 48° 34´ 56 | 5.2 | San Juan | 0 | 18 | 16 | SS | SS |
| NBndry_AI | Arrival | T | N | L2 | AD_A_2 | 48° 34´ 5 | AD_A_3 | 48° 29´ 20 | 5.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L3 | AD_A_3 | 48° 29´ 2 | AD_A_4 | 48° 27´ 27 | 2.4 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L4 | AD_A_4 | 48° 27´ 2 | AD_A_5 | 48° 25´ 07 | 3.6 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L5 | AD_A_5 | 48° 25´ 0 | AD_A_6 | 48° 22´ 36 | 3.3 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L6 | AD_A_6 | 48° 22´ 3 | AD_A_7 | 48° 20´ 00 | 2.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L7 | AD_A_7 | 48° 20´ 0 | AD_A_8 | 48° 12´ 48 | 8.8 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L8a | AD_A_8 | 48° 12´ 4 | PS_D_25 | 48° 11´ 57 | 0.9 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 5 | PS_D_26 | 48° 12´ 45 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 4 | PS_D_27 | 48° 10´ 33 | 11.2 | Calallam | 0 | 16 | 12 | SS | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ 3 | PS_A_6 | 48° 09´ 58 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 5 | PS_A_7 | 48° 11´ 56 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 5 | PS_A_8 | 48° 11´ 11 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 1 | PS_A_9 | 48° 10´ 57 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 5 | PS_A_10 | 48° 06´ 35 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 3 | PS_A_11 | 48° 01´ 08 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 0 | PS_A_12 | 47° 57´ 41 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 4 | PS_A_13 | 47° 56´ 38 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 3 | PS_A_14 | 47° 55´ 17 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L1a | PS_A_14 | 47° 55´ 1 | EV_A_2 | 47° 53´ 08 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L2 | EV_A_2 | 47° 53´ 0 | EV_A_3 | 47° 51´ 05 | 2.7 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L3 | EV_A_3 | 47° 51´ 0 | EV_A_4 | 47° 51´ 50 | 2.0 | Island | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L4 | EV_A_4 | 47° 51´ 5 | EV_A_5 | 47° 52´ 03 | 0.6 | Snohomis | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L5 | EV_A_5 | 47° 52´ 0 | EV_A_6 | 47° 54´ 06 | 2.4 | Snohomis | 0 | 19 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L6 | EV_A_6 | 47° 54´ 0 | EV_A_7 | 47° 56´ 25 | 2.5 | Snohomis | 0 | 18 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° 56´ 2 | EV_A_8 | 47° 57´ 28 | 1.1 | Snohomis | 0 | 14 | 14 | 12 | SS |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° 57´ 2 | EV_A_9 | 47° 58´ 31 | 2.0 | Snohomis | 0 | 10 | 10 | 10 | 10 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° 58´ 3 | EV_A_10 | 47° 58´ 40 | 1.3 | Snohomis | 0 | 7 | 7 | 6 | 6 |

Total Distance 115.7 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing:  SEATTLE to TACOMA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPM** | **Link ID** | **Start WP** | **ing WP Lat/** | **End WP** | **'aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| ElliottBay_Tacoma | Departure | X | Y | L1 | E_D_1 | 47° 36´ 52´´ | EB_D_S1 | 47° 36 | 1.7 | King | 0 | 14 | 12 | 10 | 9 |
| ElliottBay_Tacoma | Departure | X | Y | L2 | EB_D_S1 | 47° 36´ 19´´ | EB_D_S2 | 47° 35 | 1.5 | King | 0 | 18 | 16 | SS | SS |
| ElliottBay_Tacoma | Departure | X | Y | L3a | EB_D_S2 | 47° 35´ 06´´ | PS_A_17 | 47° 34 | 0.7 | Kitsap | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | Y | L17 | PS_A_17 | 47° 34´ 32´´ | PS_A_18 | 47° 31 | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 51´´ | PS_A_19 | 47° 26 | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L19 | PS_A_19 | 47° 26´ 44´´ | PS_A_20 | 47° 23 | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 09´´ | PS_A_21 | 47° 19 | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 39´´ | PS_A_22 | 47° 19 | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 10´´ | PS_A_23 | 47° 18 | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |
| | | | | | | Total Distance | | | 22.9 | nm | Note:  SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: TACOMA to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP | End WP | aypoir | Dist. | County | Fast<br>Cruise | Fast<br>Containe<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° | PS_D_3 | 47° 1 | 1.3 | Pierce | 0 | 10 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° | PS_D_4 | 47° 1 | 0.9 | Pierce | 0 | 12 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° | PS_D_5 | 47° 2 | 4.8 | King | 0 | 16 | 14 | SS | SS |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° | PS_D_6 | 47° 2 | 4.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° | PS_D_7 | 47° 3 | 7.8 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | Y | L7a | PS_D_7 | 47° | EB_A_S1 | 47° 3 | 2.2 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_ElliottBay | Arrival | X | Y | L1 | EB_A_S1 | 47° | EB_A_4 | 47° 3 | 1.3 | King | 0 | 15 | 13 | 10 | 9 |

Total Distance 22.6 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: TACOMA to PORT ANGELES

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° 1 | PS_D_3 | 47° 19 | 1.3 | Pierce | 0 | 10 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° 1 | PS_D_4 | 47° 19 | 0.9 | Pierce | 0 | 12 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° 1 | PS_D_5 | 47° 23 | 4.8 | King | 0 | 16 | 14 | SS | SS |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° 2 | PS_D_6 | 47° 26 | 4.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° 2 | PS_D_7 | 47° 34 | 7.8 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 3 | PS_D_8 | 47° 35 | 1.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 3 | PS_D_9 | 47° 37 | 1.1 | Kitsap | 0 | 20 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 3 | PS_D_10 | 47° 39 | 2.7 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 41 | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 46 | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 48 | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 55 | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 57 | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 58 | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 02 | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 04 | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 11 | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 11 | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 1 | PS_D_25 | 48° 11 | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 1 | PS_D_26 | 48° 12 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L26 | PS_D_26 | 48° 1 | PS_D_27 | 48° 10 | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | Y | L27a | PS_D_27 | 48° 1 | PA_A_2 | 48° 09 | 0.6 | Calallam | 0 | 10 | 10 | 10 | 9 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 0 | PA_A_3 | 48° 08 | 1.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 0 | PA_A_4 | 48° 08 | 1.0 | Calallam | 0 | 6 | 6 | 6 | 6 |
| | | | | | | | Total Distance | | 88.8 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing:  PORT ANGELES to TACOMA

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | Bulkers |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Reefer | Tankers |  |
| DRAFT |  |  |  |  |  |  |  |  |  |  |  | Container | RO/RO | Log |  |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | ng WP La | End WP | Waypoint | Dist. | County | Cruise | Auto | Fishing | Fishing | Fishing |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08´ 0 | PA_D_2 | 48° 08´ 18 | 1.2 | Calallam | 0 | 6 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08´ 1 | PA_D_3 | 48° 09´ 36 | 1.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 09´ 3 | PS_A_6 | 48° 09´ 58 | 0.5 | Calallam | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | X | Y | L6 | PS_A_6 | 48° 09´ 5 | PS_A_7 | 48° 11´ 56 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 5 | PS_A_8 | 48° 11´ 11 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 1 | PS_A_9 | 48° 10´ 57 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 5 | PS_A_10 | 48° 06´ 35 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 3 | PS_A_11 | 48° 01´ 08 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 0 | PS_A_12 | 47° 57´ 41 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 4 | PS_A_13 | 47° 56´ 38 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 3 | PS_A_14 | 47° 55´ 17 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 1 | PS_A_15 | 47° 45´ 54 | 9.7 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 5 | PS_A_16 | 47° 39´ 42 | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 4 | PS_A_17 | 47° 34´ 32 | 5.2 | Kitsap | 0 | 18 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 3 | PS_A_18 | 47° 31´ 51 | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 5 | PS_A_19 | 47° 26´ 44 | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | N | L19 | PS_A_19 | 47° 26´ 4 | PS_A_20 | 47° 23´ 09 | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 0 | PS_A_21 | 47° 19´ 39 | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 3 | PS_A_22 | 47° 19´ 10 | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 1 | PS_A_23 | 47° 18´ 07 | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |

Total Distance 87.7 nm

Note:  SS - Service Speed

Note: Red numbers - engines off

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA to EVERETT**

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° | PS_D_3 | 47° 19 | 1.3 | Pierce | 0 | 10 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° | PS_D_4 | 47° 19 | 0.9 | Pierce | 0 | 12 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° | PS_D_5 | 47° 23 | 4.8 | King | 0 | 16 | 14 | SS | SS |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° | PS_D_6 | 47° 26 | 4.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° | PS_D_7 | 47° 34 | 7.8 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° | PS_D_8 | 47° 35 | 1.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° | PS_D_9 | 47° 37 | 1.1 | Kitsap | 0 | 20 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° | PS_D_10 | 47° 39 | 2.7 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41 | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12a | PS_D_12 | 47° | ET_A_1 | 47° 46 | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Everett | Departure | T | N | L1 | ET_A_1 | 47° | ET_A_2 | 47° 48 | 1.6 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Everett | Departure | T | N | L2a | ET_A_2 | 47° | EV_A_5 | 47° 52 | 4.1 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L5 | EV_A_5 | 47° | EV_A_6 | 47° 54 | 2.4 | Snohomish | 0 | 19 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L6 | EV_A_6 | 47° | EV_A_7 | 47° 56 | 2.5 | Snohomish | 0 | 18 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° | EV_A_8 | 47° 57 | 1.1 | Snohomish | 0 | 14 | 14 | 12 | SS |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° | EV_A_9 | 47° 58 | 2.0 | Snohomish | 0 | 10 | 10 | 10 | 9 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° | EV_A_10 | 47° 58 | 1.3 | Snohomish | 0 | 7 | 7 | 6 | 6 |

Total Distance 46.5 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: EVERETT to TACOMA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Everett_PS | Departure | M | Y | L1 | EV_D_1 | 47° 58´ 40´´ N 122° 14´ 15´´ W | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | 1.7 | Snohomish | 0 | 4 | 4 | 4 | 4 |
| Everett_PS | Departure | M | Y | L2 | EV_D_2 | 47° 58´ 51´´ N 122° 16´ 44´´ W | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | 2.3 | Snohomish | 0 | 10 | 10 | 10 | 9 |
| Everett_PS | Departure | X | Y | L3 | EV_D_3 | 47° 57´ 44´´ N 122° 19´ 42´´ W | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | 3.8 | Island | 0 | 16 | 14 | SS | SS |
| Everett_PS | Departure | X | Y | L4 | EV_D_4 | 47° 54´ 11´´ N 122° 21´ 32´´ W | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | 2.4 | Island | 0 | 20 | 17 | SS | SS |
| Everett_PS | Departure | T | N | L5a | EV_D_5 | 47° 52´ 10´´ N 122° 23´ 30´´ W | ET_D_1 | 47° 51´ 53´´ N 122° 23´ 38´´ W | 0.3 | Island | 0 | SS | SS | SS | SS |
| Everett_Tacoma | Departure | T | N | L1 | ET_D_1 | 47° 51´ 53´´ N 122° 23´ 38´´ W | ET_D_2 | 47° 46´ 44´´ N 122° 26´ 20´´ W | 5.5 | Snohomish | 0 | SS | SS | SS | SS |
| Everett_Tacoma | Departure | T | N | L2a | ET_D_2 | 47° 46´ 44´´ N 122° 26´ 20´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 0.9 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 5.2 | Kitsap | 0 | 18 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | N | L19 | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | PS_A_23 | 47° 18´ 07´´ N 122° 27´ 41´´ W | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |
| | | | | | | | | Total Distance | 47.3 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: SEA to TACOMA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | Reefer<br>RO/RO | Bulkers<br>Tankers<br>Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPM** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Container<br>Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28´ 3 | PS_A_2 | 48° 28 | 10.7 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28´ 3 | PS_A_3 | 48° 13 | 35.9 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13´ 2 | PS_A_4 | 48° 13 | 15.4 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13´ 2 | PS_A_5 | 48° 09 | 6.9 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09´ 2 | PS_A_6 | 48° 09 | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ 5 | PS_A_7 | 48° 11 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ 5 | PS_A_8 | 48° 11 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ 1 | PS_A_9 | 48° 10 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 5 | PS_A_10 | 48° 06 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 3 | PS_A_11 | 48° 01 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 0 | PS_A_12 | 47° 57 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 4 | PS_A_13 | 47° 56 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 3 | PS_A_14 | 47° 55 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 1 | PS_A_15 | 47° 45 | 9.7 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 5 | PS_A_16 | 47° 39 | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 4 | PS_A_17 | 47° 34 | 5.2 | Kitsap | 0 | 18 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 3 | PS_A_18 | 47° 31 | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 5 | PS_A_19 | 47° 26 | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | N | L19 | PS_A_19 | 47° 26´ 4 | PS_A_20 | 47° 23 | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 0 | PS_A_21 | 47° 19 | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 3 | PS_A_22 | 47° 19 | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 1 | PS_A_23 | 47° 18 | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |

Total Distance 154.0 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| Route | To_Port | To_Pier | Arr/Dep nk | Start WP | ıg WP La | End WP | ıding Waypoint Lat/L | Dist. | County | Speed by Link (knots) Fast Cruise | Fast Container Auto | Medium Reefer RO/RO Fishing | Slow Bulkers Tankers Log Fishing | Very Slow Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sea_Tacoma | SEATTLE | | Arrival | PS_A_23 | 47° 18´ 0 | Mode: | M | | King | | | | | |
| Tacoma_Sea | SEATTLE | | Departure | PS_D_2 | 47° 18´ 0 | NPE: | Y | | King | | | | | |

| Route | To_Port | To_Pier | Arr/Dep nk | Start WP | ıg WP La | End WP | ıding Waypoint Lat/L | Dist. | County | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sea_Tacoma | TACOMA | 4-A | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 4-A | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | 4-A | Arrival | TA_BW_2 | 47° 16´ 4 | TA_B_4A | 47° 16´ 23´´ N 122° 24 | 0.37 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-A | Departure | TA_B_4A | 47° 16´ 2 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.37 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-A | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 4-A | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | 4-A&B | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 4-A&B | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | 4-A&B | Arrival | TA_BW_2 | 47° 16´ 4 | TA_B_4AB | 47° 16´ 25´´ N 122° 24 | 0.29 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-A&B | Departure | TA_B_4AB | 47° 16´ 2 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.29 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-A&B | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 4-A&B | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | 4-B | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 4-B | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | 4-B | Arrival | TA_BW_2 | 47° 16´ 4 | TA_B_4B | 47° 16´ 29´´ N 122° 24 | 0.20 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-B | Departure | TA_B_4B | 47° 16´ 2 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.20 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 4-B | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 4-B | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | BLAIR-A | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | BLAIR-A | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | BLAIR-A | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | BLAIR-A | Arrival | TA_BW_3 | 47° 15´ 5 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.40 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | BLAIR-A | Arrival | TA_BW_4 | 47° 15´ 4 | TA_B_BLA | 47° 15´ 34´´ N 122° 23 | 0.16 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | BLAIR-A | Departure | TA_B_BLA | 47° 15´ 3 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.16 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | BLAIR-A | Departure | TA_BW_4 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.40 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | BLAIR-A | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | BLAIR-A | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | BLAIR-A | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | TA_BW_3 | 47° 15´ 5 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.40 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | TA_BW_4 | 47° 15´ 4 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | BLAIR-B | Arrival | TA_BW_5 | 47° 15´ 3 | TA_B_BLB | 47° 15´ 20´´ N 122° 22 | 0.18 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_B_BLB | 47° 15´ 2 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.18 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_BW_5 | 47° 15´ 3 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_BW_4 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.40 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | BLAIR-B | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk** | **Start WP** | **ıg WP La** | **End WP** | **ıding Waypoint Lat/L** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | TACOMA | WA UNITED 1 | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | WA UNITED 1 | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | WA UNITED 1 | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WA UNITED 1 | Arrival | TA_BW_3 | 47° 15´ 5 | TA_B_WU1 | 47° 15´ 41´´ N 122° 23 | 0.38 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WA UNITED 1 | Departure | TA_B_WU1 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.38 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WA UNITED 1 | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WA UNITED 1 | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WA UNITED 1 | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | WA UNITED 2 | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | WA UNITED 2 | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | WA UNITED 2 | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WA UNITED 2 | Arrival | TA_BW_3 | 47° 15´ 5 | TA_B_WU2 | 47° 15´ 49´´ N 122° 23 | 0.19 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WA UNITED 2 | Departure | TA_B_WU2 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.19 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WA UNITED 2 | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WA UNITED 2 | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WA UNITED 2 | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | TA_BW_3 | 47° 15´ 5 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.40 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | TA_BW_4 | 47° 15´ 4 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | PCT-A | Arrival | TA_BW_5 | 47° 15´ 3 | TA_B_PCTA | 47° 15´ 17´´ N 122° 22 | 0.23 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_B_PCTA | 47° 15´ 1 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.23 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_BW_5 | 47° 15´ 3 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_BW_4 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.40 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-A | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | TA_BW_3 | 47° 15´ 5 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.40 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | TA_BW_4 | 47° 15´ 4 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | PCT-B | Arrival | TA_BW_5 | 47° 15´ 3 | TA_B_PCTB | 47° 15´ 23´´ N 122° 22 | 0.26 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_B_PCTB | 47° 15´ 2 | TA_BW_5 | 47° 15´ 30´´ N 122° 22 | 0.26 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_BW_5 | 47° 15´ 3 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.28 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_BW_4 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.40 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | PCT-B | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | WEYCO CHIP | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | WEYCO CHIP | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | WEYCO CHIP | Arrival | TA_BW_2 | 47° 16´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 1.03 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO CHIP | Arrival | TA_BW_3 | 47° 15´ 5 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.40 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | WEYCO CHIP | Arrival | TA_BW_4 | 47° 15´ 4 | TA_B_WYCF | 47° 15´ 43´´ N 122° 23 | 0.04 | Pierce | 0 | 1 | 1 | 1 | 1 |

## Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk** | **Start WP** | **ıg WP La** | **End WP** | **ıding Waypoint Lat/L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | TACOMA | WEYCO CHIP | Departure | TA_B_WYCF | 47° 15´ 4 | TA_BW_4 | 47° 15´ 42´´ N 122° 23 | 0.04 | Pierce | 0 | 1 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WEYCO CHIP | Departure | TA_BW_4 | 47° 15´ 4 | TA_BW_3 | 47° 15´ 58´´ N 122° 23 | 0.40 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO CHIP | Departure | TA_BW_3 | 47° 15´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 1.03 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WEYCO CHIP | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | WEYCO CHIP | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | TOTE | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | TOTE | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | TOTE | Arrival | TA_BW_2 | 47° 16´ 4 | TA_B_TO | 47° 16´ 24´´ N 122° 24 | 0.45 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | TOTE | Departure | TA_B_TO | 47° 16´ 2 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.45 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | TOTE | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | TOTE | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | ANCHORAGE | Arrival | PS_A_23 | 47° 18´ 0 | TA_AN_1 | 47° 17´ 25´´ N 122° 25 | 1.54 | Pierce | 0 | 3 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | ANCHORAGE | Departure | TA_AN_1 | 47° 17´ 2 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.54 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 7-A | Arrival | PS_A_23 | 47° 18´ 0 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 1.69 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 7-A | Arrival | PS_A_24 | 47° 16´ 5 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | 7-A | Arrival | TA_SI_1 | 47° 16´ 2 | TA_B_7A | 47° 16´ 02´´ N 122° 24 | 0.42 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-A | Departure | TA_B_7A | 47° 16´ 0 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.42 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-A | Departure | TA_SI_1 | 47° 16´ 2 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 7-A | Departure | PS_A_24 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.69 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | 7-B | Arrival | PS_A_23 | 47° 18´ 0 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 1.69 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 7-B | Arrival | PS_A_24 | 47° 16´ 5 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | 7-B | Arrival | TA_SI_1 | 47° 16´ 2 | TA_B_7B | 47° 16´ 07´´ N 122° 24 | 0.32 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-B | Departure | TA_B_7B | 47° 16´ 0 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.32 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-B | Departure | TA_SI_1 | 47° 16´ 2 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 7-B | Departure | PS_A_24 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.69 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | 7-C | Arrival | PS_A_23 | 47° 18´ 0 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 1.69 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 7-C | Arrival | PS_A_24 | 47° 16´ 5 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | 7-C | Arrival | TA_SI_1 | 47° 16´ 2 | TA_B_7C | 47° 16´ 12´´ N 122° 25 | 0.22 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-C | Departure | TA_B_7C | 47° 16´ 1 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.22 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-C | Departure | TA_SI_1 | 47° 16´ 2 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 7-C | Departure | PS_A_24 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.69 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | 7-D | Arrival | PS_A_23 | 47° 18´ 0 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 1.69 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | 7-D | Arrival | PS_A_24 | 47° 16´ 5 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | 7-D | Arrival | TA_SI_1 | 47° 16´ 2 | TA_B_7D | 47° 16´ 16´´ N 122° 25 | 0.13 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-D | Departure | TA_B_7D | 47° 16´ 1 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.13 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | 7-D | Departure | TA_SI_1 | 47° 16´ 2 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | 7-D | Departure | PS_A_24 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.69 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | MAERSK | Arrival | PS_A_23 | 47° 18´ 0 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 1.69 | Pierce | 0 | 5 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | MAERSK | Arrival | PS_A_24 | 47° 16´ 5 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |

## Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Speed by Link (knots) | | | | |
| | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk** | **Start WP** | **ıg WP La** | **End WP** | **ıding Waypoint Lat/L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | TACOMA | MAERSK | Departure | TA_B_MK | 47° 16´ 0 | TA_SI_1 | 47° 16´ 20´´ N 122° 25 | 0.37 | Pierce | 0 | 2 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | MAERSK | Departure | TA_SI_1 | 47° 16´ 2 | PS_A_24 | 47° 16´ 53´´ N 122° 25 | 0.74 | Pierce | 0 | 4 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | MAERSK | Departure | PS_A_24 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.69 | Pierce | 0 | 9 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | Sound Oil | Arrival | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 6 | 6 | 6 |
| Sea_Tacoma | TACOMA | Sound Oil | Arrival | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | Sound Oil | Arrival | TA_HY_2 | 47° 17´ 0 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | Sound Oil | Arrival | TA_HY_3 | 47° 16´ 4 | TA_B_SO | 47° 16´ 33´´ N 122° 23 | 0.65 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | Sound Oil | Departure | TA_B_SO | 47° 16´ 2 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.65 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | Sound Oil | Departure | TA_HY_3 | 47° 16´ 4 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | Sound Oil | Departure | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 5 | 5 | 5 |
| Tacoma_Sea | TACOMA | Sound Oil | Departure | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 6 | 6 | 6 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_2 | 47° 17´ 0 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_3 | 47° 16´ 4 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_4 | 47° 16´ 2 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_5 | 47° 16´ 1 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | WEYCO LOG 1 | Arrival | TA_HY_6 | 47° 15´ 5 | TA_B_WYL1 | 47° 15´ 47´´ N 122° 21 | 0.11 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_B_WYL1 | 47° 15´ 4 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.11 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_6 | 47° 15´ 5 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_5 | 47° 16´ 1 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_4 | 47° 16´ 2 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_3 | 47° 16´ 4 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 5 | 5 | 5 |
| Tacoma_Sea | TACOMA | WEYCO LOG 1 | Departure | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 6 | 6 | 6 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_2 | 47° 17´ 0 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_3 | 47° 16´ 4 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_4 | 47° 16´ 2 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_5 | 47° 16´ 1 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | WEYCO LOG 2 | Arrival | TA_HY_6 | 47° 15´ 5 | TA_B_WYL2 | 47° 15´ 51´´ N 122° 21 | 0.03 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_B_WYL2 | 47° 15´ 5 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.03 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_6 | 47° 15´ 5 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_5 | 47° 16´ 1 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_4 | 47° 16´ 2 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_3 | 47° 16´ 4 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 5 | 5 | 5 |
| Tacoma_Sea | TACOMA | WEYCO LOG 2 | Departure | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 6 | 6 | 6 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | TA_HY_2 | 47° 17´ 0 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | TA_HY_3 | 47° 16´ 4 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | TA_HY_4 | 47° 16´ 2 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | SCHNITZER | Arrival | TA_HY_5 | 47° 16´ 1 | TA_B_SHZ | 47° 16´ 02´´ N 122° 22 | 0.23 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | SCHNITZER | Departure | TA_B_SHZ | 47° 16´ 0 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.23 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | SCHNITZER | Departure | TA_HY_5 | 47° 16´ 1 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | SCHNITZER | Departure | TA_HY_4 | 47° 16´ 2 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **nk** | **Start WP** | **ıg WP La** | **End WP** | **ıding Waypoint Lat/L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | TACOMA | SCHNITZER | Departure | | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Tacoma_Sea | TACOMA | SCHNITZER | Departure | | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| | | | | | | | | | | | | | | | |
| Sea_Tacoma | TACOMA | PIONEER | Arrival | | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 5 | 5 | 5 |
| Sea_Tacoma | TACOMA | PIONEER | Arrival | | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PIONEER | Arrival | | TA_HY_2 | 47° 17´ 0 | TA_B_PI | 47° 16´ 58´´ N 122° 24 | 0.13 | Pierce | 0 | 0 | 1 | 1 | 1 |

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep nk** | **Start WP** | **ng WP La** | **End WP** | **nding Waypoint Lat/L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | TACOMA | PIONEER | Departure | TA_B_PI | 47° 16´ 5 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.13 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PIONEER | Departure | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | PIONEER | Departure | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | PNW | Arrival | PS_A_23 | 47° 18´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 2.09 | Pierce | 0 | 0 | 6 | 6 | 6 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_1 | 47° 17´ 1 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 4 | 4 | 4 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_2 | 47° 17´ 0 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_3 | 47° 16´ 4 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_4 | 47° 16´ 2 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_5 | 47° 16´ 1 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Sea_Tacoma | TACOMA | PNW | Arrival | TA_HY_6 | 47° 15´ 5 | TA_B_PNW | 47° 15´ 50´´ N 122° 21 | 0.21 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_B_PNW | 47° 15´ 5 | TA_HY_6 | 47° 15´ 52´´ N 122° 21 | 0.21 | Pierce | 0 | 0 | 1 | 1 | 1 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_6 | 47° 15´ 5 | TA_HY_5 | 47° 16´ 10´´ N 122° 22 | 0.45 | Pierce | 0 | 0 | 2 | 2 | 2 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_5 | 47° 16´ 1 | TA_HY_4 | 47° 16´ 28´´ N 122° 22 | 0.44 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_4 | 47° 16´ 2 | TA_HY_3 | 47° 16´ 46´´ N 122° 24 | 0.83 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_3 | 47° 16´ 4 | TA_HY_2 | 47° 17´ 04´´ N 122° 24 | 0.46 | Pierce | 0 | 0 | 3 | 3 | 3 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_2 | 47° 17´ 0 | TA_HY_1 | 47° 17´ 16´´ N 122° 24 | 0.30 | Pierce | 0 | 0 | 5 | 5 | 5 |
| Tacoma_Sea | TACOMA | PNW | Departure | TA_HY_1 | 47° 17´ 1 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.09 | Pierce | 0 | 0 | 9 | 6 | 6 |
| Sea_Tacoma | TACOMA | US OIL | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 0 | 0 | 5 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Arrival | TA_BW_2 | 47° 16´ 4 | TA_UO_1 | 47° 16´ 11´´ N 122° 23 | 0.72 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Arrival | TA_UO_1 | 47° 16´ 1 | TA_B_USO | 47° 16´ 00´´ N 122° 23 | 0.20 | Pierce | 0 | 0 | 0 | 1 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Departure | TA_B_USO | 47° 16´ 0 | TA_UO_1 | 47° 16´ 11´´ N 122° 23 | 0.20 | Pierce | 0 | 0 | 0 | 1 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Departure | TA_UO_1 | 47° 16´ 1 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.72 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | US OIL | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 0 | 0 | 6 | 0 |
| Sea_Tacoma | TACOMA | TEMCO | Arrival | PS_A_23 | 47° 18´ 0 | TA_TC_1 | 47° 16´ 07´´ N 122° 26 | 2.12 | Pierce | 0 | 0 | 0 | 5 | 0 |
| Sea_Tacoma | TACOMA | TEMCO | Arrival | TA_TC_1 | 47° 16´ 0 | TA_B_TEM | 47° 15´ 59´´ N 122° 26 | 0.15 | Pierce | 0 | 0 | 0 | 2 | 0 |
| Tacoma_Sea | TACOMA | TEMCO | Departure | TA_B_TEM | 47° 15´ 5 | TA_TC_1 | 47° 16´ 07´´ N 122° 26 | 0.15 | Pierce | 0 | 0 | 0 | 2 | 0 |
| Tacoma_Sea | TACOMA | TEMCO | Departure | TA_TC_1 | 47° 16´ 0 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.12 | Pierce | 0 | 0 | 0 | 6 | 0 |
| Sea_Tacoma | TACOMA | SPERRY | Arrival | PS_A_23 | 47° 18´ 0 | TA_SP_1 | 47° 16´ 36´´ N 122° 27 | 1.54 | Pierce | 0 | 6 | 6 | 5 | 0 |
| Sea_Tacoma | TACOMA | SPERRY | Arrival | TA_SP_1 | 47° 16´ 3 | TA_B_SPR | 47° 16´ 26´´ N 122° 27 | 0.16 | Pierce | 0 | 2 | 2 | 2 | 0 |
| Tacoma_Sea | TACOMA | SPERRY | Departure | TA_B_SPR | 47° 16´ 2 | TA_SP_1 | 47° 16´ 36´´ N 122° 27 | 0.16 | Pierce | 0 | 2 | 2 | 2 | 0 |
| Tacoma_Sea | TACOMA | SPERRY | Departure | TA_SP_1 | 47° 16´ 3 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 1.53 | Pierce | 0 | 9 | 9 | 6 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Arrival | PS_A_23 | 47° 18´ 0 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 2.24 | Pierce | 0 | 0 | 0 | 5 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Arrival | TA_BW_1 | 47° 16´ 5 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.25 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Arrival | TA_BW_2 | 47° 16´ 4 | TA_UO_1 | 47° 16´ 11´´ N 122° 23 | 0.72 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Arrival | TA_UO_1 | 47° 16´ 1 | TA_B_3S | 47° 16´ 07´´ N 122° 23 | 0.13 | Pierce | 0 | 0 | 0 | 1 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Departure | TA_B_3S | 47° 16´ 0 | TA_UO_1 | 47° 16´ 11´´ N 122° 23 | 0.13 | Pierce | 0 | 0 | 0 | 1 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Departure | TA_UO_1 | 47° 16´ 1 | TA_BW_2 | 47° 16´ 40´´ N 122° 24 | 0.72 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Departure | TA_BW_2 | 47° 16´ 4 | TA_BW_1 | 47° 16´ 50´´ N 122° 24 | 0.25 | Pierce | 0 | 0 | 0 | 3 | 0 |
| Sea_Tacoma | TACOMA | 3-SOUTH | Departure | TA_BW_1 | 47° 16´ 5 | PS_D_2 | 47° 18´ 07´´ N 122° 27 | 2.24 | Pierce | 0 | 0 | 0 | 6 | 0 |

🟧 Engines off in constricted channels:
Hylebos, Blair, & Sitcum Waterways
Ships pulled out by tugs

# Puget Sound Emissions Inventory

**OGV-Routing: TACOMA to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPM** | **Link ID** | **Start WP** | **WP L** | **End WP** | **aypoin** | **Dist.** | **County** | **Fast Cruise** | **Fast Containe Auto** | **Medium Reefer RO/RO Fishing** | **Slow Bulkers Tankers Log Fishing** | **Very Slow Fishing** |
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° 1 | PS_D_3 | 47° 19 | 1.3 | Pierce | 0 | 10 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° 1 | PS_D_4 | 47° 19 | 0.9 | Pierce | 0 | 12 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° 1 | PS_D_5 | 47° 23 | 4.8 | King | 0 | 16 | 14 | SS | SS |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° 2 | PS_D_6 | 47° 26 | 4.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° 2 | PS_D_7 | 47° 34 | 7.8 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 3 | PS_D_8 | 47° 35 | 1.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 3 | PS_D_9 | 47° 37 | 1.1 | Kitsap | 0 | 20 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 3 | PS_D_10 | 47° 39 | 2.7 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 41 | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 46 | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 48 | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 55 | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 57 | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 58 | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 02 | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 04 | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 11 | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 11 | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 1 | PS_D_25 | 48° 11 | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 1 | PS_D_26 | 48° 12 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 1 | PS_D_27 | 48° 10 | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 1 | PS_D_28 | 48° 11 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 1 | PS_D_29 | 48° 14 | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 1 | PS_D_30 | 48° 15 | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 1 | PS_D_31 | 48° 17 | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 1 | PS_D_32 | 48° 30 | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 3 | PS_D_33 | 48° 30 | 10.9 | Calallam | 0 | SS | SS | SS | SS |

Total Distance 154.8 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing:  VANCOUVER (NB2) to TACOMA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPM** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| NBndry_AI | Arrival | T | N | L1 | AD_A_1 | 48° 40´ | AD_A_2 | 48° 34´ 5 | 5.2 | San Juan | 0 | 18 | 16 | SS | SS |
| NBndry_AI | Arrival | T | N | L2 | AD_A_2 | 48° 34´ | AD_A_3 | 48° 29´ 2 | 5.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L3 | AD_A_3 | 48° 29´ | AD_A_4 | 48° 27´ 2 | 2.4 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L4 | AD_A_4 | 48° 27´ | AD_A_5 | 48° 25´ 0 | 3.6 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L5 | AD_A_5 | 48° 25´ | AD_A_6 | 48° 22´ 3 | 3.3 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L6 | AD_A_6 | 48° 22´ | AD_A_7 | 48° 20´ 0 | 2.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L7 | AD_A_7 | 48° 20´ | AD_A_8 | 48° 12´ 4 | 8.8 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L8 | AD_A_8 | 48° 12´ | PS_D_25 | 48° 11´ 5 | 0.9 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12´ 4 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10´ 3 | 11.2 | Calallam | 0 | 16 | 12 | SS | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10´ | PS_A_6 | 48° 09´ 5 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09´ | PS_A_7 | 48° 11´ 5 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ | PS_A_8 | 48° 11´ 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ | PS_A_9 | 48° 10´ 5 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ | PS_A_10 | 48° 06´ 3 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ | PS_A_11 | 48° 01´ 0 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ | PS_A_12 | 47° 57´ 4 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ | PS_A_13 | 47° 56´ 3 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ | PS_A_14 | 47° 55´ 1 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ | PS_A_15 | 47° 45´ 5 | 9.7 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ | PS_A_16 | 47° 39´ 4 | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ | PS_A_17 | 47° 34´ 3 | 5.2 | Kitsap | 0 | 18 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ | PS_A_18 | 47° 31´ 5 | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ | PS_A_19 | 47° 26´ 4 | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | N | L19 | PS_A_19 | 47° 26´ | PS_A_20 | 47° 23´ 0 | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ | PS_A_21 | 47° 19´ 3 | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ | PS_A_22 | 47° 19´ 1 | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ | PS_A_23 | 47° 18´ 0 | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |

Total Distance  139.1  nm

Note:  SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: TACOMA to VANCOUVER (NB2)

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP | End WP | 'aypoin | Dist. | County | Cruise | Container Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
| Tacoma_Sea | Departure | X | Y | L2 | PS_D_2 | 47° | PS_D_3 | 47° 19 | 1.3 | Pierce | 0 | 10 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° | PS_D_4 | 47° 19 | 0.9 | Pierce | 0 | 12 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° | PS_D_5 | 47° 23 | 4.8 | King | 0 | 16 | 14 | SS | SS |
| Tacoma_Sea | Departure | T | N | L5 | PS_D_5 | 47° | PS_D_6 | 47° 26 | 4.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° | PS_D_7 | 47° 34 | 7.8 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° | PS_D_8 | 47° 35 | 1.4 | King | 0 | 17 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° | PS_D_9 | 47° 37 | 1.1 | Kitsap | 0 | 20 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° | PS_D_10 | 47° 39 | 2.7 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41 | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° | PS_D_13 | 47° 46 | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° | PS_D_14 | 47° 48 | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° | PS_D_16 | 47° 55 | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° | PS_D_17 | 47° 57 | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° | PS_D_18 | 47° 58 | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° | PS_D_19 | 48° 02 | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° | PS_D_20 | 48° 04 | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° | PS_D_23 | 48° 11 | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° | PS_D_24 | 48° 11 | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° | PS_D_25 | 48° 11 | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° | PS_D_26 | 48° 12 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° | PS_D_27 | 48° 10 | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° | PS_A_6 | 48° 09 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° | PS_A_7 | 48° 11 | 11.4 | Calallam | 0 | 18 | 15 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° | PS_A_8 | 48° 11 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8a | PS_A_8 | 48° | PS_D_24 | 48° 11 | 2.5 | Jefferson | 0 | SS | SS | SS | SS |
| AI_NB2 | Departure | T | N | L1a | PS_D_24 | 48° | AD_D_2 | 48° 13 | 2.1 | San Juan | 0 | 18 | 17 | 16 | SS |
| AI_NB2 | Departure | T | N | L2 | AD_D_2 | 48° | AD_D_3 | 48° 19 | 8.1 | San Juan | 0 | 16 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L3 | AD_D_3 | 48° | AD_D_4 | 48° 24 | 5.1 | San Juan | 0 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L4 | AD_D_4 | 48° | AD_D_5 | 48° 29 | 7.3 | San Juan | 0 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L5 | AD_D_5 | 48° | AD_D_6 | 48° 34 | 5.8 | San Juan | 0 | 15 | 15 | 15 | SS |
| AI_NB2 | Departure | T | N | L6 | AD_D_6 | 48° | AD_D_7 | 48° 40 | 5.4 | San Juan | 0 | 15 | 15 | 15 | SS |

Total Distance 143.6 nm

# Puget Sound Emissions Inventory

**OGV-Routing: SEA to Point Wells**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | Bulkers |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Reefer | Tankers |  |
| **DRAFT** |  |  |  |  |  |  |  |  |  |  |  | Containe | RO/RO | Log |  |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 28 | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 13 | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 13 | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° 09 | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° 09 | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09 | PS_A_7 | 48° 11 | 11.4 | Calallam | 0 | 0 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11 | PS_A_8 | 48° 11 | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11 | PS_A_9 | 48° 10 | 2.9 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10 | PS_A_10 | 48° 06 | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06 | PS_A_11 | 48° 01 | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01 | PS_A_12 | 47° 57 | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57 | PS_A_13 | 47° 56 | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56 | PS_A_14 | 47° 55 | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L14a | PS_A_14 | 47° 55 | PW_A_1 | 47° 49 | 6.2 | Kitsap | 0 | 0 | 12 | 9 | SS |
| PS_PointWells | Arrival | M | Y | L1 | PW_A_1 | 47° 49 | PW_A_2 | 47° 48 | 1.3 | Kitsap | 0 | 0 | 8 | 6 | 6 |
| PS_PointWells | Arrival | M | Y | L2 | PW_A_2 | 47° 48 | PW_B_1 | 47° 46 | 2.3 | Snohomish | 0 | 0 | 4 | 2 | 2 |
|  |  |  |  |  |  |  | Total Distance |  | 123.6 | nm |  |  |  |  |  |

# Puget Sound Emissions Inventory

**OGV-Routing: POINT WELLS to SEA**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | Bulkers |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Reefer | Tankers |  |
| DRAFT |  |  |  |  |  |  |  |  |  |  |  | Container | RO/RO | Log |  |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP La | End WP | aypoin | Dist. | County | Cruise | Auto | Fishing | Fishing | Fishing |
| PointWells_PS | Departure | M | Y | L1a | PW_B_1 | 47° 46´ | PS_D_14 | 47° 48 | 2.1 | Snohomish | 0 | 0 | 9 | 6 | 5 |
| Tacoma_Sea | Departure | X | Y | L14 | PS_D_14 | 47° 48´ | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | 0 | 12 | 8 | SS |
| Tacoma_Sea | Departure | X | Y | L15 | PS_D_15 | 47° 52´ | PS_D_16 | 47° 55 | 3.1 | Island | 0 | 0 | 14 | 10 | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ | PS_D_17 | 47° 57 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ | PS_D_18 | 47° 58 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ | PS_D_19 | 48° 02 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ | PS_D_20 | 48° 04 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ | PS_D_23 | 48° 11 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ | PS_D_24 | 48° 11 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ | PS_D_25 | 48° 11 | 2.4 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12 | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10 | 11.2 | Calallam | 0 | 0 | 16 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L27 | PS_D_27 | 48° 10´ | PS_D_28 | 48° 11 | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | T | N | L28 | PS_D_28 | 48° 11´ | PS_D_29 | 48° 14 | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ | PS_D_30 | 48° 15 | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ | PS_D_31 | 48° 17 | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ | PS_D_32 | 48° 30 | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ | PS_D_33 | 48° 30 | 10.9 | Calallam | 0 | 0 | SS | SS | SS |
|  |  |  |  |  |  |  |  | Total Distance | 123.9 | nm |  |  |  |  |  |

# Puget Sound Emissions Inventory

## OGV-Routing: POINT WELLS to PORT ANGELES

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **aypoint** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| PointWells_PS | Departure | M | Y | L1a | PW_B_1 | 47° 46´ | PS_D_14 | 47° 48´ | 2.1 | Snohomish | 0 | 0 | 9 | 6 | 5 |
| Tacoma_Sea | Departure | X | Y | L14 | PS_D_14 | 47° 48´ | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | 0 | 12 | 8 | SS |
| Tacoma_Sea | Departure | X | Y | L15 | PS_D_15 | 47° 52´ | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | 0 | 14 | 10 | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ | PS_D_23 | 48° 11´ | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ | PS_D_24 | 48° 11´ | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ | PS_D_25 | 48° 11´ | 2.4 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ | PS_D_26 | 48° 12´ | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L26 | PS_D_26 | 48° 12´ | PS_D_27 | 48° 10´ | 11.2 | Calallam | 0 | 0 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | Y | L27a | PS_D_27 | 48° 10´ | PA_A_2 | 48° 09´ | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngele | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ | PA_A_3 | 48° 08´ | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngele | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ | PA_A_4 | 48° 08´ | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |
| | | | | | | | Total Distance | | 58.0 | nm | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: PORT ANGELES to POINT WELLS**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP I | End WP | aypoint | Dist. | County | Fast Cruise | Fast Containe Auto | Medium Reefer RO/RO Fishing | Slow Bulkers Tankers Log Fishing | Very Slow Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 0 | PA_D_2 | 48° 08´ | 1.2 | Calallam | 0 | 0 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 0 | PA_D_3 | 48° 09´ | 1.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 0 | PS_A_6 | 48° 09´ | 0.5 | Calallam | 0 | 0 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | X | Y | L6 | PS_A_6 | 48° 0 | PS_A_7 | 48° 11´ | 11.4 | Calallam | 0 | 0 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 1 | PS_A_8 | 48° 11´ | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 1 | PS_A_9 | 48° 10´ | 2.9 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 1 | PS_A_10 | 48° 06´ | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 0 | PS_A_11 | 48° 01´ | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 0 | PS_A_12 | 47° 57´ | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 5 | PS_A_13 | 47° 56´ | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 5 | PS_A_14 | 47° 55´ | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L14a | PS_A_14 | 47° 5 | PW_A_1 | 47° 49´ | 6.2 | Kitsap | 0 | 0 | 12 | 9 | SS |
| PS_PointWells | Arrival | M | Y | L1 | PW_A_1 | 47° 4 | PW_A_2 | 47° 48´ | 1.3 | Kitsap | 0 | 0 | 8 | 6 | 6 |
| PS_PointWells | Arrival | M | Y | L2 | PW_A_2 | 47° 4 | PW_B_1 | 47° 46´ | 2.3 | Snohomis | 0 | 0 | 4 | 2 | 2 |
|  |  |  |  |  |  |  |  | Total Distance | 57.3 | nm |  |  |  |  |  |

# Puget Sound Emissions Inventory

## OGV-Routing: POINT WELLS to MARCH POINT

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP L | End WP | aypoir | Dist. | County | Fast<br>Cruise | Fast<br>Containe<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PointWells_PS | Departure | M | Y | L1a | PW_B_1 | 47° 46 | PS_D_14 | 47° 4 | 2.1 | Snohomish | 0 | 0 | 9 | 6 | 5 |
| Tacoma_Sea | Departure | X | Y | L14 | PS_D_14 | 47° 48 | PS_D_15 | 47° 5 | 4.6 | Kitsap | 0 | 0 | 12 | 8 | SS |
| Tacoma_Sea | Departure | X | Y | L15 | PS_D_15 | 47° 52 | PS_D_16 | 47° 5 | 3.1 | Island | 0 | 0 | 14 | 10 | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55 | PS_D_17 | 47° 5 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57 | PS_D_18 | 47° 5 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58 | PS_D_19 | 48° 0 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02 | PS_D_20 | 48° 0 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04 | PS_D_21 | 48° 0 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06 | PS_D_22 | 48° 0 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07 | PS_D_23 | 48° 1 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11 | PS_D_24 | 48° 1 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 11 | AA_A_1 | 48° 1 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacorte | Arrival | T | N | L1 | AA_A_1 | 48° 13 | AA_A_2 | 48° 2 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacorte | Arrival | T | N | L2 | AA_A_2 | 48° 24 | AA_A_3 | 48° 2 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacorte | Arrival | T | N | L3a | AA_A_3 | 48° 24 | RS_A_6 | 48° 2 | 3.2 | Skagit | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 3 | 2.0 | Skagit | 0 | 0 | 11 | 11 | SS |
| RS_MarchPT | Arrival | T | Y | L1a | RS_A_7 | 48° 30 | MP_A_2 | 48° 3 | 1.6 | Skagit | 0 | 0 | 11 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 3 | 0.7 | Skagit | 0 | 0 | 11 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L3 | MP_A_3 | 48° 31 | MP_A_4 | 48° 3 | 3.1 | Skagit | 0 | 0 | 11 | 10 | SS |
| RS_MarchPT | Arrival | M | Y | L3 | MP_A_4 | 48° 31 | MP_A_5 | 48° 3 | 1.1 | Skagit | 0 | 0 | 11 | 9 | 6 |

Total Distance 57.6 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing:  MARCH POINT to POINT WELLS

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° 31´ | MP_D_2 | 48° 31´ 3 | 1.1 | Skagit | 0 | 0 | 10 | 8 | 6 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_2 | 48° 31´ | MP_D_3 | 48° 31´ 0 | 3.1 | Skagit | 0 | 0 | 13 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° 31´ | MP_D_4 | 48° 31´ 0 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | T | N | L4a | MP_D_4 | 48° 31´ | RS_A_7 | 48° 30´ 0 | 1.6 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L1a | RS_A_7 | 48° 30´ | RS_D_10 | 48° 29´ 3 | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L9 | RS_D_10 | 48° 29´ | RS_D_11 | 48° 28´ 5 | 0.7 | Skagit | 0 | 0 | 16 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° 28´ | AA_D_1 | 48° 26´ 0 | 2.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26´ | AA_D_2 | 48° 24´ 0 | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° 24´ | AA_D_3 | 48° 22´ 2 | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L3 | AA_D_3 | 48° 22´ | AA_D_4 | 48° 13´ 2 | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ | AA_D_5 | 48° 11´ 3 | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ | PS_A_9 | 48° 10´ 5 | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ | PS_A_10 | 48° 06´ 3 | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ | PS_A_11 | 48° 01´ 0 | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ | PS_A_12 | 47° 57´ 4 | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ | PS_A_13 | 47° 56´ 3 | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ | PS_A_14 | 47° 55´ 1 | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L14a | PS_A_14 | 47° 55´ | PW_A_1 | 47° 49´ 1 | 6.2 | Kitsap | 0 | 0 | 12 | 9 | SS |
| PS_PointWells | Arrival | M | N | L1 | PW_A_1 | 47° 49´ | PW_A_2 | 47° 48´ 2 | 1.3 | Kitsap | 0 | 0 | 8 | 6 | 6 |
| PS_PointWells | Arrival | M | N | L2 | PW_A_2 | 47° 48´ | PW_B_1 | 47° 46´ 5 | 2.3 | Snohomis | 0 | 0 | 4 | 2 | 2 |
| | | | | | | | | Total Distance | 56.8 | nm | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: SEA to OLYMPIA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 2 | 10.7 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 1 | 35.9 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 1 | 15.4 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° 0 | 6.9 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° 0 | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09 | PS_A_7 | 48° 1 | 11.4 | Clallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11 | PS_A_8 | 48° 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11 | PS_A_9 | 48° 1 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10 | PS_A_10 | 48° 0 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06 | PS_A_11 | 48° 0 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01 | PS_A_12 | 47° 5 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57 | PS_A_13 | 47° 5 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56 | PS_A_14 | 47° 5 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55 | PS_A_15 | 47° 4 | 9.7 | Kitsap | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45 | PS_A_16 | 47° 3 | 6.3 | Kitsap | 0 | 18 | 17 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39 | PS_A_17 | 47° 3 | 5.2 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° 34 | VW_A_1 | 47° 3 | 1.5 | Kitsap | 0 | 14 | 13 | 13 | SS |
| Vash_Olympia | Arrival | T | N | L1 | VW_A_1 | 47° 33 | VW_A_2 | 47° 3 | 2.0 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L2 | VW_A_2 | 47° 31 | VW_A_3 | 47° 3 | 0.7 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L3 | VW_A_3 | 47° 30 | VW_A_4 | 47° 2 | 1.9 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L4 | VW_A_4 | 47° 28 | VW_A_5 | 47° 2 | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L5 | VW_A_5 | 47° 27 | VW_A_6 | 47° 2 | 1.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L6 | VW_A_6 | 47° 25 | VW_A_7 | 47° 2 | 1.3 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L7 | VW_A_7 | 47° 24 | VW_A_8 | 47° 2 | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L8 | VW_A_8 | 47° 23 | VW_A_9 | 47° 2 | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L9 | VW_A_9 | 47° 23 | VW_A_10 | 47° 2 | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L10 | VW_A_10 | 47° 22 | VW_A_11 | 47° 2 | 1.6 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympia | Arrival | T | N | L11a | VW_A_11 | 47° 22 | OL_A_4 | 47° 1 | 3.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L4 | OL_A_4 | 47° 19 | OL_A_5 | 47° 1 | 1.0 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L5 | OL_A_5 | 47° 18 | OL_A_6 | 47° 1 | 1.3 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L6 | OL_A_6 | 47° 17 | OL_A_7 | 47° 1 | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L7 | OL_A_7 | 47° 16 | OL_A_8 | 47° 1 | 2.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L8 | OL_A_8 | 47° 14 | OL_A_9 | 47° 1 | 3.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L9 | OL_A_9 | 47° 11 | OL_A_10 | 47° 1 | 1.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L10 | OL_A_10 | 47° 10 | OL_A_11 | 47° 0 | 3.8 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L11 | OL_A_11 | 47° 07 | OL_A_12 | 47° 0 | 0.9 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L12 | OL_A_12 | 47° 07 | OL_A_13 | 47° 0 | 1.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L13 | OL_A_13 | 47° 07 | OL_A_14 | 47° 0 | 0.7 | Thurston | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L14 | OL_A_14 | 47° 07 | OL_A_15 | 47° 0 | 1.3 | Thurston | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L15 | OL_A_15 | 47° 08 | OL_A_16 | 47° 0 | 0.8 | Thurston | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L16 | OL_A_16 | 47° 09 | OL_A_17 | 47° 1 | 1.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L17 | OL_A_17 | 47° 10 | OL_A_18 | 47° 1 | 0.9 | Thurston | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L18 | OL_A_18 | 47° 10 | OL_A_19 | 47° 1 | 0.8 | Thurston | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | M | Y | L19 | OL_A_19 | 47° 11 | OL_A_20 | 47° 1 | 0.9 | Thurston | 0 | 9 | 9 | 9 | 9 |
| PS_Olympia | Arrival | M | Y | L20 | OL_A_20 | 47° 10 | OL_A_21 | 47° 1 | 0.7 | Thurston | 0 | 9 | 9 | 9 | 9 |
| PS_Olympia | Arrival | M | Y | L21 | OL_A_21 | 47° 10 | OL_A_22 | 47° 0 | 1.3 | Mason | 0 | 9 | 9 | 9 | 9 |
| PS_Olympia | Arrival | M | Y | L22 | OL_A_22 | 47° 09 | OL_A_23 | 47° 0 | 0.5 | Mason | 0 | 9 | 9 | 9 | 9 |
| PS_Olympia | Arrival | M | Y | L23 | OL_A_23 | 47° 09 | OL_A_24 | 47° 0 | 1.2 | Thurston | 0 | 8 | 8 | 8 | 8 |
| PS_Olympia | Arrival | M | Y | L24 | OL_A_24 | 47° 08 | OL_A_25 | 47° 0 | 2.2 | Thurston | 0 | 7 | 7 | 7 | 7 |
| PS_Olympia | Arrival | M | Y | L25 | OL_A_25 | 47° 06 | OL_A_26 | 47° 0 | 1.6 | Thurston | 0 | 6 | 6 | 6 | 6 |
| PS_Olympia | Arrival | M | Y | L26 | OL_A_26 | 47° 05 | OL_A_27 | 47° 0 | 1.1 | Thurston | 0 | 4 | 4 | 4 | 4 |
| PS_Olympia | Arrival | M | Y | L27 | OL_A_27 | 47° 04 | OL_A_28 | 47° 0 | 0.3 | Thurston | 0 | 4 | 4 | 4 | 4 |
| PS_Olympia | Arrival | M | Y | L28 | OL_A_28 | 47° 04 | OL_A_29 | 47° 0 | 0.2 | Thurston | 0 | 4 | 4 | 4 | 4 |

Total Distance 183.9 nm

# Puget Sound Emissions Inventory

## OGV-Routing: OLYMPIA HARBOR

Lat/Long in WGS84 Datum

| | | | | | | | | | | | | Speed by Link (knots) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **'aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| PS_Olympia | OLYMPIA | | Arrival | | OL_A_29 | 47° 03 | Mode: | M | | Thurston | | | | | |
| Olympia_PS | OLYMPIA | | Departure | | OL_D_1 | 47° 03 | NPE: | Y | | Thurston | | | | | |

NOTE: All ARRIVAL harbor transits branch from OL_A_29

NOTE: All DEPARTURE harbor transits goto OL_D_1

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Olympia_PortDock1 | OLYMPIA | PORT DOCK 1 | Arrival | L1a | OL_A_29 | 47° 03 | OL_B_1 | 47° 03 | 0.49 | Thurston | 0 | 2 | 2 | 2 | 2 |
| Olympia_PortDock1 | OLYMPIA | PORT DOCK 1 | Departure | L1a | OL_B_1 | 47° 03 | OL_D_1 | 47° 03 | 0.49 | Thurston | 0 | 2 | 2 | 2 | 2 |
| Olympia_PortDock2 | OLYMPIA | PORT DOCK 2 | Arrival | L1a | OL_A_29 | 47° 03 | OL_B_2 | 47° 03 | 0.60 | Thurston | 0 | 2 | 2 | 2 | 2 |
| Olympia_PortDock2 | OLYMPIA | PORT DOCK 2 | Departure | L1a | OL_B_2 | 47° 03 | OL_D_1 | 47° 03 | 0.60 | Thurston | 0 | 3 | 3 | 3 | 3 |
| Olympia_PortDock3 | OLYMPIA | PORT DOCK 3 | Arrival | L1a | OL_A_29 | 47° 03 | OL_B_3 | 47° 03 | 0.71 | Thurston | 0 | 2 | 2 | 2 | 2 |
| Olympia_PortDock3 | OLYMPIA | PORT DOCK 3 | Departure | L1a | OL_B_3 | 47° 03 | OL_D_1 | 47° 03 | 0.71 | Thurston | 0 | 3 | 3 | 3 | 3 |
| Olympia_Anchorage | OLYMPIA | ANCHORAGE | Arrival | L1a | OL_A_29 | 47° 03 | OL_B_4 | 47° 05 | 1.35 | Thurston | 0 | 3 | 3 | 3 | 3 |
| Olympia_Anchorage | OLYMPIA | ANCHORAGE | Arrival | L2 | OL_B_4 | 47° 05 | OL_AN_1 | 47° 06 | 2.62 | Thurston | 0 | 3 | 3 | 3 | 2 |
| Olympia_Anchorage | OLYMPIA | ANCHORAGE | Departure | L2 | OL_AN_1 | 47° 06 | OL_A_29 | 47° 03 | 2.62 | Thurston | 0 | 3 | 3 | 3 | 3 |
| Olympia_Anchorage | OLYMPIA | ANCHORAGE | Departure | L1a | OL_A_29 | 47° 03 | OL_B_4 | 47° 05 | 1.35 | Thurston | 0 | 3 | 3 | 3 | 2 |

# Puget Sound Emissions Inventory

**OGV-Routing: OLYMPIA to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Olympia_PS | Departure | M | Y | L1 | OL_D_1 | 47° 03´ 51´´ N 122° 54´ 29´´ W | OL_D_2 | 47° 04´ 04´´ N 122° 54´ 37´´ | 0.2 | Thurston | 0 | 4 | 4 | 4 | 4 |
| Olympia_PS | Departure | M | Y | L2 | OL_D_2 | 47° 04´ 04´´ N 122° 54´ 37´´ W | OL_D_3 | 47° 04´ 20´´ N 122° 54´ 52´´ | 0.3 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L3 | OL_D_3 | 47° 04´ 20´´ N 122° 54´ 52´´ W | OL_D_4 | 47° 05´ 13´´ N 122° 55´ 42´´ | 1.1 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L4 | OL_D_4 | 47° 05´ 13´´ N 122° 55´ 42´´ W | OL_D_5 | 47° 06´ 33´´ N 122° 54´ 30´´ | 1.57 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L5 | OL_D_5 | 47° 06´ 33´´ N 122° 54´ 30´´ W | OL_D_6 | 47° 08´ 44´´ N 122° 54´ 40´´ | 2.19 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L6 | OL_D_6 | 47° 08´ 44´´ N 122° 54´ 40´´ W | OL_D_7 | 47° 09´ 25´´ N 122° 53´ 15´´ | 1.18 | Thurston | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L7 | OL_D_7 | 47° 09´ 25´´ N 122° 53´ 15´´ W | OL_D_8 | 47° 09´ 35´´ N 122° 52´ 35´´ | 0.5 | Mason | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L8 | OL_D_8 | 47° 09´ 35´´ N 122° 52´ 35´´ W | OL_D_9 | 47° 10´ 24´´ N 122° 51´ 03´´ | 1.3 | Mason | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L9 | OL_D_9 | 47° 10´ 24´´ N 122° 51´ 03´´ W | OL_D_10 | 47° 10´ 53´´ N 122° 50´ 18´´ | 0.7 | Thurston | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L10 | OL_D_10 | 47° 10´ 53´´ N 122° 50´ 18´´ W | OL_D_11 | 47° 11´ 21´´ N 122° 49´ 12´´ | 0.9 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L11 | OL_D_11 | 47° 11´ 21´´ N 122° 49´ 12´´ W | OL_D_12 | 47° 10´ 53´´ N 122° 48´ 17´´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L12 | OL_D_12 | 47° 10´ 53´´ N 122° 48´ 17´´ W | OL_D_13 | 47° 10´ 10´´ N 122° 47´ 23´´ | 0.9 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L13 | OL_D_13 | 47° 10´ 10´´ N 122° 47´ 23´´ W | OL_D_14 | 47° 09´ 16´´ N 122° 46´ 29´´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L14 | OL_D_14 | 47° 09´ 16´´ N 122° 46´ 29´´ W | OL_D_15 | 47° 08´ 37´´ N 122° 45´ 45´´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L15 | OL_D_15 | 47° 08´ 37´´ N 122° 45´ 45´´ W | OL_D_16 | 47° 07´ 34´´ N 122° 44´ 36´´ | 1.3 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L16 | OL_D_16 | 47° 07´ 34´´ N 122° 44´ 36´´ W | OL_D_17 | 47° 07´ 23´´ N 122° 43´ 33´´ | 0.7 | Thurston | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L17 | OL_D_17 | 47° 07´ 23´´ N 122° 43´ 33´´ W | OL_D_18 | 47° 07´ 07´´ N 122° 41´ 59´´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L18 | OL_D_18 | 47° 07´ 07´´ N 122° 41´ 59´´ W | OL_D_19 | 47° 07´ 47´´ N 122° 41´ 01´´ | 0.9 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L19 | OL_D_19 | 47° 07´ 47´´ N 122° 41´ 01´´ W | OL_D_20 | 47° 10´ 52´´ N 122° 37´ 42´´ | 3.8 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L20 | OL_D_20 | 47° 10´ 52´´ N 122° 37´ 42´´ W | OL_D_21 | 47° 11´ 45´´ N 122° 36´ 09´´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L21 | OL_D_21 | 47° 11´ 45´´ N 122° 36´ 09´´ W | OL_D_22 | 47° 14´ 52´´ N 122° 34´ 15´´ | 3.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L22 | OL_D_22 | 47° 14´ 52´´ N 122° 34´ 15´´ W | OL_D_23 | 47° 16´ 51´´ N 122° 32´ 24´´ | 2.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L23 | OL_D_23 | 47° 16´ 51´´ N 122° 32´ 24´´ W | OL_D_24 | 47° 17´ 23´´ N 122° 32´ 18´´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L24 | OL_D_24 | 47° 17´ 23´´ N 122° 32´ 18´´ W | OL_D_25 | 47° 18´ 34´´ N 122° 33´ 08´´ | 1.3 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L25 | OL_D_25 | 47° 18´ 34´´ N 122° 33´ 08´´ W | OL_D_26 | 47° 19´ 36´´ N 122° 33´ 14´´ | 1.0 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L26a | OL_D_26 | 47° 19´ 36´´ N 122° 33´ 14´´ W | VW_D_1 | 47° 20´ 58´´ N 122° 32´ 29´´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L1 | VW_D_1 | 47° 20´ 58´´ N 122° 32´ 29´´ W | VW_D_2 | 47° 22´ 29´´ N 122° 31´ 39´´ | 1.6 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L2 | VW_D_2 | 47° 22´ 29´´ N 122° 31´ 39´´ W | VW_D_3 | 47° 23´ 00´´ N 122° 31´ 53´´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L3 | VW_D_3 | 47° 23´ 00´´ N 122° 31´ 53´´ W | VW_D_4 | 47° 23´ 43´´ N 122° 32´ 19´´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L4 | VW_D_4 | 47° 23´ 43´´ N 122° 32´ 19´´ W | VW_D_5 | 47° 24´ 32´´ N 122° 32´ 02´´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L5 | VW_D_5 | 47° 24´ 32´´ N 122° 32´ 02´´ W | VW_D_6 | 47° 25´ 48´´ N 122° 31´ 25´´ | 1.3 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L6 | VW_D_6 | 47° 25´ 48´´ N 122° 31´ 25´´ W | VW_D_7 | 47° 27´ 35´´ N 122° 31´ 09´´ | 1.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L7 | VW_D_7 | 47° 27´ 35´´ N 122° 31´ 09´´ W | VW_D_8 | 47° 28´ 56´´ N 122° 30´ 17´´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L8 | VW_D_8 | 47° 28´ 56´´ N 122° 30´ 17´´ W | VW_D_9 | 47° 30´ 38´´ N 122° 29´ 10´´ | 1.9 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L9 | VW_D_9 | 47° 30´ 38´´ N 122° 29´ 10´´ W | VW_D_10 | 47° 31´ 17´´ N 122° 28´ 45´´ | 0.7 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L10 | VW_D_10 | 47° 31´ 17´´ N 122° 28´ 45´´ W | VW_D_11 | 47° 33´ 05´´ N 122° 27´ 36´´ | 2.0 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | X | N | L11a | VW_D_11 | 47° 33´ 05´´ N 122° 27´ 36´´ W | PS_D_7 | 47° 34´ 32´´ N 122° 26´ 30´´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 34´ 32´´ N 122° 26´ 30´´ W | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ | 1.4 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ | 1.1 | Kitsap | 0 | 18 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ | 2.7 | King | 0 | 20 | 19 | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ | 2.3 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N 125° 00´ 00´´ | 10.9 | Calallam | 0 | SS | SS | SS | SS |

## Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB2) to OLYMPIA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| NBndry_AI | Arrival | T | N | L1 | AD_A_1 | 48° 40 | AD_A_2 | 48° 34´ 5 | 5.2 | San Juan | 0 | 18 | 16 | SS | SS |
| NBndry_AI | Arrival | T | N | L2 | AD_A_2 | 48° 34 | AD_A_3 | 48° 29´ 2 | 5.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L3 | AD_A_3 | 48° 29 | AD_A_4 | 48° 27´ 2 | 2.4 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L4 | AD_A_4 | 48° 27 | AD_A_5 | 48° 25´ 0 | 3.6 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L5 | AD_A_5 | 48° 25 | AD_A_6 | 48° 22´ 3 | 3.3 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L6 | AD_A_6 | 48° 22 | AD_A_7 | 48° 20´ 0 | 2.9 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L7 | AD_A_7 | 48° 20 | AD_A_8 | 48° 12´ 4 | 8.8 | San Juan | 0 | SS | SS | SS | SS |
| NBndry_AI | Arrival | T | N | L8a | AD_A_8 | 48° 12 | PS_D_25 | 48° 11´ 5 | 0.9 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11 | PS_D_26 | 48° 12´ 4 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12 | PS_D_27 | 48° 10´ 3 | 11.2 | Calallam | 0 | 16 | 12 | SS | SS |
| Tacoma_Sea | Departure | M | N | L27a | PS_D_27 | 48° 10 | PS_A_6 | 48° 09´ 5 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 09 | PS_A_7 | 48° 11´ 5 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11 | PS_A_8 | 48° 11´ 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11 | PS_A_9 | 48° 10´ 5 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10 | PS_A_10 | 48° 06´ 3 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06 | PS_A_11 | 48° 01´ 0 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01 | PS_A_12 | 47° 57´ 4 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57 | PS_A_13 | 47° 56´ 3 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56 | PS_A_14 | 47° 55´ 1 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55 | PS_A_15 | 47° 45´ 5 | 9.7 | Kitsap | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45 | PS_A_16 | 47° 39´ 4 | 6.3 | Kitsap | 0 | 18 | 17 | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39 | PS_A_17 | 47° 34´ 3 | 5.2 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° 34 | VW_A_1 | 47° 33´ 0 | 1.5 | Kitsap | 0 | 14 | 13 | 13 | SS |
| Vash_Olympi | Arrival | T | N | L1 | VW_A_1 | 47° 33 | VW_A_2 | 47° 31´ 1 | 2.0 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L2 | VW_A_2 | 47° 31 | VW_A_3 | 47° 30´ 3 | 0.7 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L3 | VW_A_3 | 47° 30 | VW_A_4 | 47° 28´ 5 | 1.9 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L4 | VW_A_4 | 47° 28 | VW_A_5 | 47° 27´ 3 | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L5 | VW_A_5 | 47° 27 | VW_A_6 | 47° 25´ 4 | 1.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L6 | VW_A_6 | 47° 25 | VW_A_7 | 47° 24´ 3 | 1.3 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L7 | VW_A_7 | 47° 24 | VW_A_8 | 47° 23´ 4 | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L8 | VW_A_8 | 47° 23 | VW_A_9 | 47° 23´ 0 | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L9 | VW_A_9 | 47° 23 | VW_A_1 | 47° 22´ 2 | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L10 | VW_A_1 | 47° 22 | VW_A_11 | 47° 20´ 5 | 1.6 | King | 0 | 13 | 13 | 13 | 9 |
| Vash_Olympi | Arrival | T | N | L11a | VW_A_11 | 47° 22 | OL_A_4 | 47° 19´ 3 | 3.1 | Pierce | 0 | 13 | 13 | 13 | 9 |
| PS_Olympia | Arrival | T | N | L4 | OL_A_4 | 47° 19 | OL_A_5 | 47° 18´ 3 | 1.0 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L5 | OL_A_5 | 47° 18 | OL_A_6 | 47° 17´ 2 | 1.3 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L6 | OL_A_6 | 47° 17 | OL_A_7 | 47° 16´ 5 | 0.5 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L7 | OL_A_7 | 47° 16 | OL_A_8 | 47° 14´ 5 | 2.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L8 | OL_A_8 | 47° 14 | OL_A_9 | 47° 11´ 4 | 3.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L9 | OL_A_9 | 47° 11 | OL_A_10 | 47° 10´ 5 | 1.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L10 | OL_A_10 | 47° 10 | OL_A_11 | 47° 07´ 4 | 3.8 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L11 | OL_A_11 | 47° 07 | OL_A_12 | 47° 07´ 0 | 0.9 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L12 | OL_A_12 | 47° 07 | OL_A_13 | 47° 07´ 2 | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L13 | OL_A_13 | 47° 07 | OL_A_14 | 47° 07´ 3 | 0.7 | Thurston | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L14 | OL_A_14 | 47° 07 | OL_A_15 | 47° 08´ 3 | 1.3 | Thurston | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L15 | OL_A_15 | 47° 08 | OL_A_16 | 47° 09´ 1 | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L16 | OL_A_16 | 47° 09 | OL_A_17 | 47° 10´ 1 | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L17 | OL_A_17 | 47° 10 | OL_A_18 | 47° 10´ 5 | 0.9 | Thurston | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | T | N | L18 | OL_A_18 | 47° 10 | OL_A_19 | 47° 11´ 2 | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| PS_Olympia | Arrival | M | Y | L19 | OL_A_19 | 47° 11 | OL_A_20 | 47° 10´ 5 | 0.9 | Thurston | 0 | 9 | 9 | 9 | 8 |
| PS_Olympia | Arrival | M | Y | L20 | OL_A_20 | 47° 10 | OL_A_21 | 47° 10´ 2 | 0.7 | Thurston | 0 | 9 | 9 | 9 | 8 |
| PS_Olympia | Arrival | M | Y | L21 | OL_A_21 | 47° 10 | OL_A_22 | 47° 09´ 3 | 1.3 | Mason | 0 | 9 | 9 | 9 | 8 |
| PS_Olympia | Arrival | M | Y | L22 | OL_A_22 | 47° 09 | OL_A_23 | 47° 09´ 2 | 0.5 | Mason | 0 | 9 | 9 | 9 | 8 |
| PS_Olympia | Arrival | M | Y | L23 | OL_A_23 | 47° 09 | OL_A_24 | 47° 08´ 4 | 1.2 | Thurston | 0 | 8 | 8 | 8 | 8 |
| PS_Olympia | Arrival | M | Y | L24 | OL_A_24 | 47° 08 | OL_A_25 | 47° 06´ 3 | 2.2 | Thurston | 0 | 7 | 7 | 7 | 7 |
| PS_Olympia | Arrival | M | Y | L25 | OL_A_25 | 47° 06 | OL_A_26 | 47° 05´ 1 | 1.6 | Thurston | 0 | 6 | 6 | 6 | 6 |
| PS_Olympia | Arrival | M | Y | L26 | OL_A_26 | 47° 05 | OL_A_27 | 47° 04´ 2 | 1.1 | Thurston | 0 | 4 | 4 | 4 | 4 |
| PS_Olympia | Arrival | M | Y | L27 | OL_A_27 | 47° 04 | OL_A_28 | 47° 04´ 0 | 0.3 | Thurston | 0 | 4 | 4 | 4 | 4 |
| PS_Olympia | Arrival | M | Y | L28 | OL_A_28 | 47° 04 | OL_A_29 | 47° 03´ 5 | 0.2 | Thurston | 0 | 4 | 4 | 4 | 4 |

Total Distance 169.0 nm

# Puget Sound Emissions Inventory

## OGV-Routing:  OLYMPIA to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **aypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Olympia_PS | Departure | M | Y | L1 | OL_D_1 | 47° 03´ | OL_D_2 | 47° 04´ | 0.2 | Thurston | 0 | 4 | 4 | 4 | 4 |
| Olympia_PS | Departure | M | Y | L2 | OL_D_2 | 47° 04´ | OL_D_3 | 47° 04´ | 0.3 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L3 | OL_D_3 | 47° 04´ | OL_D_4 | 47° 05´ | 1.1 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L4 | OL_D_4 | 47° 05´ | OL_D_5 | 47° 06´ | 1.57 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L5 | OL_D_5 | 47° 06´ | OL_D_6 | 47° 08´ | 2.19 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L6 | OL_D_6 | 47° 08´ | OL_D_7 | 47° 09´ | 1.18 | Thurston | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L7 | OL_D_7 | 47° 09´ | OL_D_8 | 47° 09´ | 0.5 | Mason | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L8 | OL_D_8 | 47° 09´ | OL_D_9 | 47° 10´ | 1.3 | Mason | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | M | Y | L9 | OL_D_9 | 47° 10´ | OL_D_10 | 47° 10´ | 0.7 | Thurston | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | M | Y | L10 | OL_D_10 | 47° 10´ | OL_D_11 | 47° 11´ | 0.9 | Thurston | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | T | N | L11 | OL_D_11 | 47° 11´ | OL_D_12 | 47° 10´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L12 | OL_D_12 | 47° 10´ | OL_D_13 | 47° 10´ | 0.9 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L13 | OL_D_13 | 47° 10´ | OL_D_14 | 47° 09´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L14 | OL_D_14 | 47° 09´ | OL_D_15 | 47° 08´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L15 | OL_D_15 | 47° 08´ | OL_D_16 | 47° 07´ | 1.3 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L16 | OL_D_16 | 47° 07´ | OL_D_17 | 47° 07´ | 0.7 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L17 | OL_D_17 | 47° 07´ | OL_D_18 | 47° 07´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L18 | OL_D_18 | 47° 07´ | OL_D_19 | 47° 07´ | 0.9 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L19 | OL_D_19 | 47° 07´ | OL_D_20 | 47° 10´ | 3.8 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L20 | OL_D_20 | 47° 10´ | OL_D_21 | 47° 11´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L21 | OL_D_21 | 47° 11´ | OL_D_22 | 47° 14´ | 3.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L22 | OL_D_22 | 47° 14´ | OL_D_23 | 47° 16´ | 2.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L23 | OL_D_23 | 47° 16´ | OL_D_24 | 47° 17´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L24 | OL_D_24 | 47° 17´ | OL_D_25 | 47° 18´ | 1.3 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L25 | OL_D_25 | 47° 18´ | OL_D_26 | 47° 19´ | 1.0 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L26a | OL_D_26 | 47° 19´ | VW_D_1 | 47° 20´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L1 | VW_D_1 | 47° 20´ | VW_D_2 | 47° 22´ | 1.6 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L2 | VW_D_2 | 47° 22´ | VW_D_3 | 47° 23´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L3 | VW_D_3 | 47° 23´ | VW_D_4 | 47° 23´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L4 | VW_D_4 | 47° 23´ | VW_D_5 | 47° 24´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L5 | VW_D_5 | 47° 24´ | VW_D_6 | 47° 25´ | 1.3 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L6 | VW_D_6 | 47° 25´ | VW_D_7 | 47° 27´ | 1.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L7 | VW_D_7 | 47° 27´ | VW_D_8 | 47° 28´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L8 | VW_D_8 | 47° 28´ | VW_D_9 | 47° 30´ | 1.9 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L9 | VW_D_9 | 47° 30´ | VW_D_1( | 47° 31´ | 0.7 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vash | Departure | T | N | L10 | VW_D_10 | 47° 31´ | VW_D_11 | 47° 33´ | 2.0 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | X | N | L11a | VW_D_11 | 47° 33´ | PS_D_7 | 47° 34´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° 26´ | PS_D_7 | 47° 34´ | 7.8 | King | 0 | 20 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | Y | L7a | PS_D_7 | 47° 34´ | EB_A_S1 | 47° 36´ | 2.2 | King | 0 | 20 | 17 | SS | SS |
| Tacoma_Elliot | Arrival | X | Y | L1 | EB_A_S1 | 47° 36´ | EB_A_4 | 47° 36´ | 1.3 | King | 0 | 15 | 13 | 10 | 10 |

Total Distance 58.5 nm

Note:  SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: OLYMPIA to EVERETT**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **/aypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Olympia_PS | Departure | M | Y | L1 | OL_D_1 | 47° 03 | OL_D_2 | 47° 04´ | 0.2 | Thurston | 0 | 4 | 4 | 4 | 4 |
| Olympia_PS | Departure | M | Y | L2 | OL_D_2 | 47° 04 | OL_D_3 | 47° 04´ | 0.3 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L3 | OL_D_3 | 47° 04 | OL_D_4 | 47° 05´ | 1.1 | Thurston | 0 | 5 | 5 | 5 | 5 |
| Olympia_PS | Departure | M | Y | L4 | OL_D_4 | 47° 05 | OL_D_5 | 47° 06´ | 1.57 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L5 | OL_D_5 | 47° 06 | OL_D_6 | 47° 08´ | 2.19 | Thurston | 0 | 7 | 7 | 7 | 7 |
| Olympia_PS | Departure | M | Y | L6 | OL_D_6 | 47° 08 | OL_D_7 | 47° 09´ | 1.18 | Thurston | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L7 | OL_D_7 | 47° 09 | OL_D_8 | 47° 09´ | 0.5 | Mason | 0 | 9 | 9 | 9 | 9 |
| Olympia_PS | Departure | M | Y | L8 | OL_D_8 | 47° 09 | OL_D_9 | 47° 10´ | 1.3 | Mason | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | M | Y | L9 | OL_D_9 | 47° 10 | OL_D_10 | 47° 10´ | 0.7 | Thurston | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | M | Y | L10 | OL_D_10 | 47° 10 | OL_D_11 | 47° 11´ | 0.9 | Thurston | 0 | 9 | 9 | 9 | 8 |
| Olympia_PS | Departure | T | N | L11 | OL_D_11 | 47° 11 | OL_D_12 | 47° 10´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L12 | OL_D_12 | 47° 10 | OL_D_13 | 47° 10´ | 0.9 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L13 | OL_D_13 | 47° 10 | OL_D_14 | 47° 09´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L14 | OL_D_14 | 47° 09 | OL_D_15 | 47° 08´ | 0.8 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L15 | OL_D_15 | 47° 08 | OL_D_16 | 47° 07´ | 1.3 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L16 | OL_D_16 | 47° 07 | OL_D_17 | 47° 07´ | 0.7 | Thurston | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L17 | OL_D_17 | 47° 07 | OL_D_18 | 47° 07´ | 1.1 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L18 | OL_D_18 | 47° 07 | OL_D_19 | 47° 07´ | 0.9 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L19 | OL_D_19 | 47° 07 | OL_D_20 | 47° 10´ | 3.8 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L20 | OL_D_20 | 47° 10 | OL_D_21 | 47° 11´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L21 | OL_D_21 | 47° 11 | OL_D_22 | 47° 14´ | 3.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L22 | OL_D_22 | 47° 14 | OL_D_23 | 47° 16´ | 2.4 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L23 | OL_D_23 | 47° 16 | OL_D_24 | 47° 17´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L24 | OL_D_24 | 47° 17 | OL_D_25 | 47° 18´ | 1.3 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L25 | OL_D_25 | 47° 18 | OL_D_26 | 47° 19´ | 1.0 | Pierce | 0 | 13 | 13 | 13 | SS |
| Olympia_PS | Departure | T | N | L25 | OL_D_25 | 47° 18 | OL_D_26 | 47° 19´ | 1.0 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_PS | Departure | T | N | L26a | OL_D_26 | 47° 19 | VW_D_1 | 47° 20´ | 1.4 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L1 | VW_D_1 | 47° 20 | VW_D_2 | 47° 22´ | 1.6 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L2 | VW_D_2 | 47° 22 | VW_D_3 | 47° 23´ | 0.5 | Pierce | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L3 | VW_D_3 | 47° 23 | VW_D_4 | 47° 23´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L4 | VW_D_4 | 47° 23 | VW_D_5 | 47° 24´ | 0.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L5 | VW_D_5 | 47° 24 | VW_D_6 | 47° 25´ | 1.3 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L6 | VW_D_6 | 47° 25 | VW_D_7 | 47° 27´ | 1.8 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L7 | VW_D_7 | 47° 27 | VW_D_8 | 47° 28´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L8 | VW_D_8 | 47° 28 | VW_D_9 | 47° 30´ | 1.9 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L9 | VW_D_9 | 47° 30 | VW_D_10 | 47° 31´ | 0.7 | King | 0 | 13 | 13 | 13 | 9 |
| Olympia_Vasl | Departure | T | N | L10 | VW_D_10 | 47° 31 | VW_D_11 | 47° 33´ | 2.0 | Kitsap | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | X | N | L11a | VW_D_11 | 47° 33 | PS_D_7 | 47° 34´ | 1.5 | King | 0 | 13 | 13 | 13 | 9 |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 34 | PS_D_8 | 47° 35´ | 1.4 | King | 0 | 16 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35 | PS_D_9 | 47° 37´ | 1.1 | Kitsap | 0 | 18 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37 | PS_D_10 | 47° 39´ | 2.7 | King | 0 | 20 | 19 | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39 | PS_D_11 | 47° 41´ | 2.3 | King | 0 | 22 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41 | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12a | PS_D_12 | 47° 45 | ET_A_1 | 47° 46´ | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Ever | Departure | T | N | L1 | ET_A_1 | 47° 46 | ET_A_2 | 47° 48´ | 1.6 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Ever | Departure | T | N | L2a | ET_A_2 | 47° 48 | EV_A_5 | 47° 52´ | 4.1 | Snohomish | 0 | SS | SS | SS | SS |
| PS_Everett | Arrival | T | N | L5 | EV_A_5 | 47° 52 | EV_A_6 | 47° 54´ | 2.4 | Snohomish | 0 | 19 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L6 | EV_A_6 | 47° 54 | EV_A_7 | 47° 56´ | 2.5 | Snohomish | 0 | 18 | SS | SS | SS |
| PS_Everett | Arrival | X | Y | L7 | EV_A_7 | 47° 56 | EV_A_8 | 47° 57´ | 1.1 | Snohomish | 0 | 14 | 14 | 12 | SS |
| PS_Everett | Arrival | M | Y | L8 | EV_A_8 | 47° 57 | EV_A_9 | 47° 58´ | 2.0 | Snohomish | 0 | 10 | 10 | 10 | 10 |
| PS_Everett | Arrival | M | Y | L9 | EV_A_9 | 47° 58 | EV_A_10 | 47° 58´ | 1.3 | Snohomish | 0 | 7 | 7 | 6 | 6 |

Total Distance 75.5 nm Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: SEA to PORT TOWNSEND/INDIAN ISLAND**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 2 | PS_A_2 | 48° 2 | 10.7 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 2 | PS_A_3 | 48° 1 | 35.9 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 1 | PS_A_4 | 48° 1 | 15.4 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 1 | PS_A_5 | 48° 0 | 6.9 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° | PS_A_6 | 48° 0 | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° | PS_A_7 | 48° 1 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 1 | PS_A_8 | 48° 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 1 | PS_A_9 | 48° 1 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L1a | PS_A_9 | 48° 1 | PT_A_1 | 48° 0 | 3.6 | Jefferson | 0 | 16 | 14 | 10 | SS |
| SJ_PortTownsend | Arrival | X | N | L2 | PT_A_1 | 48° | PT_A_2 | 48° 0 | 1.7 | Jefferson | 0 | 10 | 8 | 6 | 6 |
| | | | | | | | Total Distance | | 98.6 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: PORT TOWNSEND/INDIAN ISLAND HARBOR

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | Speed by Link (knots) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **ypoi** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| SJ_PortTownsend | PORT TOWNSEND | | Arrival | L2 | PT_A_2 | 48° 07 | Mode: | M | | | | | | | |
| PortTownsend_SJ | PORT TOWNSEND | | Departure | L1 | PT_D_1 | 48° 07 | NPE: | Y | | | | | | | |
| NOTE: All ARRIVAL harbor transits branch from PT_A_2 | | | | | | | | | | | | | | | |
| NOTE: All DEPARTURE harbor transits goto PT_D_1 | | | | | | | | | | | | | | | |
| PortTownsend_Anchoı | PORT TOWNS | ANCHORAGE | Arrival | L1a | PT_A_2 | 48° 07 | PT_B_1 | N 12 | 1.3 | Jefferson | 0 | 3 | 3 | 3 | 3 |
| Anchorage_PortTowns | PORT TOWNS | ANCHORAGE | Departure | L1a | PT_B_1 | N 123 | PT_D_1 | 48° | 1.3 | Jefferson | 0 | 3 | 3 | 3 | 3 |
| IndianIsland_Ammo | INDIAN ISLAI | AMMO | Arrival | L1a | PT_A_2 | 48° 07 | II_A_1 | N 12 | 2.28 | Jefferson | 0 | 4 | 4 | 4 | 4 |
| IndianIsland_Ammo | INDIAN ISLAI | AMMO | Arrival | L2 | II_A_1 | N 122 | II_B_1 | 48° | 0.52 | Jefferson | 0 | 2 | 2 | 2 | 2 |
| | | | | | | | Total Distance | | 5.4 nm | | | | | | |
| Ammo_IndianIsland | INDIAN ISLAI | AMMO | Departure | L1 | II_B_1 | 48° 04 | II_D_1 | N 12 | 0.52 | Jefferson | 0 | 2 | 2 | 2 | 2 |
| Ammo_IndianIsland | INDIAN ISLAI | AMMO | Departure | L2a | II_D_1 | N 122 | PT_D_1 | 48° | 2.28 | Jefferson | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | Total Distance | | 13.6 nm | | | | | | |
| PORT TOWNSEND TO INDIAN ISLAND | | | | | | | | | | | | | | | |
| PortTownsend_IndianI | PORT TOWNS | ANCHORAGE | Arrival | L1 | PT_A_2 | 48° 07 | II_A_1 | N 12 | 1.88 | Jefferson | 0 | 4 | 4 | 4 | 4 |
| IndianIsland_Ammo | INDIAN ISLAI | AMMO | Arrival | L2 | II_A_1 | N 122 | II_B_1 | 48° | 0.52 | Jefferson | 0 | 2 | 2 | 2 | 2 |
| | | | | | | | Total Distance | | 2.4 nm | | | | | | |
| INDIAN ISLAND TO PORT TOWNSEND | | | | | | | | | | | | | | | |
| IndianIsland_PortTowı | INDIAN ISLAI | AMMO | Departure | L1 | II_B_1 | 48° 04 | II_A_1 | N 12 | 1.88 | Jefferson | 0 | 2 | 2 | 2 | 2 |
| IndianIsland_PortTowı | PORT TOWNS | ANCHORAGE | Departure | L2 | II_A_1 | N 122 | PT_A_2 | 48° | 0.52 | Jefferson | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | Total Distance | | 2.4 nm | | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: PORT TOWNSEND/INDIAN ISLAND to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP | End WP | aypoi | Dist. | County | Fast<br>Cruise | Fast<br>Container<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PortTownsend_SJ | Arrival | X | Y | L1 | PT_D_1 | 48° | PT_D_2 | 48° 0 | 1.7 | Jefferson | 0 | 12 | 10 | 8 | 6 |
| PortTownsend_SJ | Arrival | X | Y | L2 | PT_D_2 | 48° | PT_D_3 | 48° 0 | 2.1 | Jefferson | 0 | 15 | 13 | 10 | 8 |
| PortTownsend_SJ | Arrival | X | Y | L3 | PT_D_3 | 48° | PT_D_4 | 48° 0 | 0.7 | Island | 0 | 17 | 15 | SS | SS |
| PortTownsend_SJ | Arrival | X | Y | L4a | PT_D_4 | 48° | PS_D_23 | 48° 1 | 2.6 | Island | 0 | 20 | 18 | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° | PS_D_24 | 48° 1 | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° | PS_D_25 | 48° 1 | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° | PS_D_26 | 48° 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° | PS_D_27 | 48° 1 | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° | PS_D_28 | 48° 1 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° | PS_D_29 | 48° 1 | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° | PS_D_30 | 48° 1 | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° | PS_D_31 | 48° 1 | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° | PS_D_32 | 48° 3 | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° | PS_D_33 | 48° 3 | 10.9 | Calallam | 0 | SS | SS | SS | SS |

Total Distance 100.6 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: PORT ANGELES to PORT TOWNSEND/INDIAN ISLAND

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP La | End WP | Waypoint | Dist. | County | Cruise | Containe<br>Auto | Reefer<br>RO/RO<br>Fishing | Bulkers<br>Tankers<br>Log<br>Fishing | Fishing |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08´ | PA_D_2 | 48° 08´ 18 | 1.2 | Calallam | 0 | 6 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08´ | PA_D_3 | 48° 09´ 36 | 1.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 09´ | PS_A_6 | 48° 09´ 58 | 0.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | Y | L6 | PS_A_6 | 48° 09´ | PS_A_7 | 48° 11´ 56 | 11.4 | Calallam | 0 | 19 | 17 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ | PS_A_8 | 48° 11´ 11 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ | PS_A_9 | 48° 10´ 57 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L1a | PS_A_9 | 48° 10´ | PT_A_1 | 48° 08´ 40 | 3.6 | Jefferson | 0 | 16 | 14 | 10 | SS |
| SJ_PortTownsend | Arrival | M | Y | L2 | PT_A_1 | 48° 08´ | PT_A_2 | 48° 07´ 00 | 1.7 | Jefferson | 0 | 10 | 8 | 6 | 6 |

Total Distance 32.2 nm

# Puget Sound Emissions Inventory

## OGV-Routing: PORT TOWNSEND/INDIAN ISLAND to BREMERTON

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| PTII_Bremerton | Departure | X | Y | L1 | PI_D_1 | 48° 0 | PI_D_2 | 48° 07 | 0.7 | Jefferson | 0 | 12 | 10 | 8 | 6 |
| PTII_Bremerton | Departure | X | Y | L2 | PI_D_2 | 48° 0 | PI_D_3 | 48° 07 | 0.6 | Jefferson | 0 | 14 | 12 | 9 | 7 |
| PTII_Bremerton | Departure | X | Y | L3a | PI_D_3 | 48° 0 | PS_A_10 | 48° 0 | 2.3 | Jefferson | 0 | 18 | 16 | 10 | 9 |
| Sea_Tacoma | Arrival | X | Y | L10 | PS_A_10 | 48° 0 | PS_A_11 | 48° 01 | 5.6 | Jefferson | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 0 | PS_A_12 | 47° 57 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 5 | PS_A_13 | 47° 5 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 5 | PS_A_14 | 47° 5 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 5 | PS_A_15 | 47° 4 | 9.7 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 4 | PS_A_16 | 47° 3 | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 3 | PS_A_17 | 47° 3 | 5.2 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° 3 | BR_A_1 | 47° 3 | 2.1 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Bremerton | Arrival | X | Y | L1 | BR_A_1 | 47° 3 | BR_A_2 | 47° 3 | 0.6 | Kitsap | 0 | 20 | 18 | SS | SS |
| PS_Bremerton | Arrival | X | Y | L2 | BR_A_2 | 47° 3 | BR_A_3 | 47° 3 | 0.7 | Kitsap | 0 | 18 | 16 | 11 | SS |
| PS_Bremerton | Arrival | X | Y | L3 | BR_A_3 | 47° 3 | BR_A_4 | 47° 3 | 1.2 | Kitsap | 0 | 14 | 12 | 10 | 8 |
| PS_Bremerton | Arrival | X | Y | L4 | BR_A_4 | 47° 3 | BR_A_5 | 47° 3 | 0.4 | Kitsap | 0 | 13 | 11 | 9 | 8 |
| PS_Bremerton | Arrival | X | Y | L5 | BR_A_5 | 47° 3 | BR_A_6 | 47° 3 | 0.9 | Kitsap | 0 | 12 | 10 | 9 | 8 |
| PS_Bremerton | Arrival | M | Y | L6 | BR_A_6 | 47° 3 | BR_A_7 | 47° 3 | 2.0 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| PS_Bremerton | Arrival | M | Y | L7 | BR_A_7 | 47° 3 | BR_A_8 | 47° 3 | 1.3 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| PS_Bremerton | Arrival | M | Y | L8 | BR_A_8 | 47° 3 | BR_B_1 | 47° 3 | 0.4 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| | | | | | | | Total Distance | | 48 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: BREMERTON to PORT TOWNSEND/INDIAN ISLAND**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Bremerton_PS | Departure | M | Y | L1 | BR_B_1 | 47° 33´ 21´´ N 122° 38´ 32´´ W | BR_D_1 | 47° 33´ 09´´ N 122° 38´ 06´´ W | 0.4 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L2 | BR_D_1 | 47° 33´ 09´´ N 122° 38´ 06´´ W | BR_D_2 | 47° 33´ 45´´ N 122° 36´ 22´´ W | 1.3 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L3 | BR_D_2 | 47° 33´ 45´´ N 122° 36´ 22´´ W | BR_D_3 | 47° 35´ 10´´ N 122° 34´ 23´´ W | 2.0 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | X | Y | L4 | BR_D_3 | 47° 35´ 10´´ N 122° 34´ 23´´ W | BR_D_4 | 47° 35´ 39´´ N 122° 33´ 16´´ W | 0.9 | Kitsap | 0 | 12 | 10 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L5 | BR_D_4 | 47° 35´ 39´´ N 122° 33´ 16´´ W | BR_D_5 | 47° 35´ 34´´ N 122° 32´ 46´´ W | 0.4 | Kitsap | 0 | 13 | 11 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L6 | BR_D_5 | 47° 35´ 34´´ N 122° 32´ 46´´ W | BR_D_6 | 47° 34´ 24´´ N 122° 32´ 12´´ W | 1.2 | Kitsap | 0 | 14 | 12 | 10 | 8 |
| Bremerton_PS | Departure | X | Y | L7 | BR_D_6 | 47° 34´ 24´´ N 122° 32´ 12´´ W | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | 0.7 | Kitsap | 0 | 18 | 16 | 11 | SS |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | 0.6 | Kitsap | 0 | 19 | 17 | SS | SS |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 20 | SS | SS | SS |
| PSCross_Brem | Departure | T | N | L10a | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | 1.5 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | 1.1 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | 2.7 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | 20 | 18 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L22a | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PI_A_1 | 48° 08´ 08´´ N 122° 41´ 34´´ W | 0.6 | Island | 0 | 19 | 17 | 10 | SS |
| Bremerton_PTII | Arrival | X | Y | L1 | PI_A_1 | 48° 08´ 08´´ N 122° 41´ 34´´ W | PI_A_2 | 48° 08´ 03´´ N 122° 42´ 10´´ W | 0.4 | Island | 0 | 18 | 16 | 10 | SS |
| Bremerton_PTII | Arrival | X | Y | L2 | PI_A_2 | 48° 08´ 03´´ N 122° 42´ 10´´ W | PI_A_3 | 48° 07´ 48´´ N 122° 44´ 03´´ W | 1.3 | Jefferson | 0 | 14 | 12 | 8 | 8 |
| Bremerton_PTII | Arrival | X | Y | L3 | PI_A_3 | 48° 07´ 48´´ N 122° 44´ 03´´ W | PI_A_4 | 48° 07´ 00´´ N 122° 44´ 13´´ W | 0.8 | Jefferson | 0 | 12 | 10 | 8 | 8 |

Total Distance 49.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEATTLE to PORT TOWNSEND/INDIAN ISLAND

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/De** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| ElliottB_PS | Departu | X | Y | L1 | EB_D_1 | 47° | EB_D_2 | 47° 38´ | 2.6 | King | 0 | 12 | 9 | 8 | 6 |
| ElliottB_PS | Departu | X | Y | L2a | EB_D_2 | 47° | PS_D_10 | 47° 39´ | 1.5 | King | 0 | 16 | SS | SS | 7 |
| Tacoma_Sea | Departu | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41´ | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departu | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departu | T | N | L12 | PS_D_12 | 47° | PS_D_13 | 47° 46´ | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departu | T | N | L13 | PS_D_13 | 47° | PS_D_14 | 47° 48´ | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L14 | PS_D_14 | 47° | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L15 | PS_D_15 | 47° | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L16 | PS_D_16 | 47° | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L17 | PS_D_17 | 47° | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L18 | PS_D_18 | 47° | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L19 | PS_D_19 | 48° | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L20 | PS_D_20 | 48° | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departur | T | N | L21 | PS_D_21 | 48° | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | 20 | 18 | SS | SS |
| Tacoma_Sea | Departur | X | Y | L22a | PS_D_22 | 48° | PI_A_1 | 48° 08´ | 0.6 | Island | 0 | 19 | 17 | 10 | SS |
| Bremerton_PT | Arrival | X | Y | L1 | PI_A_1 | 48° | PI_A_2 | 48° 08´ | 0.4 | Island | 0 | 18 | 16 | 10 | SS |
| Bremerton_PT | Arrival | X | Y | L2 | PI_A_2 | 48° | PI_A_3 | 48° 07´ | 1.3 | Jefferson | 0 | 14 | 12 | 8 | 8 |
| Bremerton_PT | Arrival | X | Y | L3 | PI_A_3 | 48° | PI_A_4 | 48° 07´ | 0.8 | Jefferson | 0 | 12 | 10 | 8 | 8 |
| | | | | | | | | Total Distance | 38.6 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing:  SEA to BREMERTON

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | Bulkers |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | Reefer | Tankers |  |
| DRAFT |  |  |  |  |  |  |  |  |  |  |  | Containe | RO/RO | Log |  |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP L | End WP | Waypoint | Dist. | County | Cruise | Auto | Fishing | Fishing | Fishing |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28´ | PS_A_2 | 48° 28´ 3 | 10.7 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28´ | PS_A_3 | 48° 13´ 2 | 35.9 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L3 | PS_A_3 | 48° 13´ | PS_A_4 | 48° 13´ 2 | 15.4 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13´ | PS_A_5 | 48° 09´ 2 | 6.9 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | X | N | L5 | PS_A_5 | 48° 09´ | PS_A_6 | 48° 09´ 5 | 0.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | T | N | L6 | PS_A_6 | 48° 09´ | PS_A_7 | 48° 11´ 5 | 11.4 | Calallam | 0 | 18 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 11´ | PS_A_8 | 48° 11´ 1 | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 11´ | PS_A_9 | 48° 10´ 5 | 2.9 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ | PS_A_10 | 48° 06´ 3 | 6.8 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ | PS_A_11 | 48° 01´ 0 | 5.6 | Jefferson | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ | PS_A_12 | 47° 57´ 4 | 4.0 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ | PS_A_13 | 47° 56´ 3 | 1.8 | Island | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ | PS_A_14 | 47° 55´ 1 | 2.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ | PS_A_15 | 47° 45´ 5 | 9.7 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ | PS_A_16 | 47° 39´ 4 | 6.3 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ | PS_A_17 | 47° 34´ 3 | 5.2 | Kitsap | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° 34´ | BR_A_1 | 47° 33´ 5 | 2.1 | Kitsap | 0 | SS | SS | SS | SS |
| PS_Bremerton | Arrival | X | Y | L1 | BR_A_1 | 47° 33´ | BR_A_2 | 47° 34´ 0 | 0.6 | Kitsap | 0 | 20 | 18 | SS | SS |
| PS_Bremerton | Arrival | X | Y | L2 | BR_A_2 | 47° 34´ | BR_A_3 | 47° 34´ 2 | 0.7 | Kitsap | 0 | 18 | 16 | 11 | SS |
| PS_Bremerton | Arrival | X | Y | L3 | BR_A_3 | 47° 34´ | BR_A_4 | 47° 35´ 3 | 1.2 | Kitsap | 0 | 14 | 12 | 10 | 8 |
| PS_Bremerton | Arrival | X | Y | L4 | BR_A_4 | 47° 35´ | BR_A_5 | 47° 35´ 3 | 0.4 | Kitsap | 0 | 13 | 11 | 9 | 8 |
| PS_Bremerton | Arrival | X | Y | L5 | BR_A_5 | 47° 35´ | BR_A_6 | 47° 35´ 1 | 0.9 | Kitsap | 0 | 12 | 10 | 9 | 8 |
| PS_Bremerton | Arrival | M | Y | L6 | BR_A_6 | 47° 35´ | BR_A_7 | 47° 33´ 4 | 2.0 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| PS_Bremerton | Arrival | M | Y | L7 | BR_A_7 | 47° 33´ | BR_A_8 | 47° 33´ 0 | 1.3 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| PS_Bremerton | Arrival | M | Y | L8 | BR_A_8 | 47° 33´ | BR_B_1 | 47° 33´ 2 | 0.4 | Kitsap | 0 | 10 | 10 | 9 | 9 |

Total Distance  144.4 nm

Note:  SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: BREMERTON to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | End WP | Ending Waypoint Lat/Lon | Dist. | County | Fast<br>Cruise | Fast<br>Containei<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bremerton_PS | Departure | M | Y | L1 | BR_B_1 | 47° 33´ 21´´ N 122° 38´ 32´´ W | BR_D_1 | 47° 33´ 09´´ N 122° 38´ 06´´ W | 0.4 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L2 | BR_D_1 | 47° 33´ 09´´ N 122° 38´ 06´´ W | BR_D_2 | 47° 33´ 45´´ N 122° 36´ 22´´ W | 1.3 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L3 | BR_D_2 | 47° 33´ 45´´ N 122° 36´ 22´´ W | BR_D_3 | 47° 35´ 10´´ N 122° 34´ 23´´ W | 2.0 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | X | Y | L4 | BR_D_3 | 47° 35´ 10´´ N 122° 34´ 23´´ W | BR_D_4 | 47° 35´ 39´´ N 122° 33´ 16´´ W | 0.9 | Kitsap | 0 | 12 | 10 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L5 | BR_D_4 | 47° 35´ 39´´ N 122° 33´ 16´´ W | BR_D_5 | 47° 35´ 34´´ N 122° 32´ 46´´ W | 0.4 | Kitsap | 0 | 13 | 11 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L6 | BR_D_5 | 47° 35´ 34´´ N 122° 32´ 46´´ W | BR_D_6 | 47° 34´ 24´´ N 122° 32´ 12´´ W | 1.2 | Kitsap | 0 | 14 | 12 | 10 | 8 |
| Bremerton_PS | Departure | X | Y | L7 | BR_D_6 | 47° 34´ 24´´ N 122° 32´ 12´´ W | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | 0.7 | Kitsap | 0 | 18 | 16 | 11 | SS |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | 0.6 | Kitsap | 0 | 19 | 17 | SS | SS |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 20 | SS | SS | SS |
| PSCross_Brem | Departure | T | N | L10a | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | 1.5 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | 1.1 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | 2.7 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | 2.3 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | 4.0 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | 0.8 | King | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | 1.5 | Snohomish | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | 4.6 | Kitsap | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | 3.1 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | 2.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | 1.9 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | 4.5 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | 2.8 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | 5.3 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | 1.4 | Island | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | 2.4 | Jefferson | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | 9.5 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 45´´ N 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 11.2 | Calallam | 0 | 17 | 16 | 12 | SS |
| Tacoma_Sea | Departure | X | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | X | N | L29 | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N 125° 00´ 00´´ W | 10.9 | Calallam | 0 | SS | SS | SS | SS |

Total Distance 145.0 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: BREMERTON to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | | End WP | Ending Waypoint Lat/Lon | | Dist. | County | Speed by Link (knots)<br>Fast<br>Cruise | Fast<br>Containei<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bremerton_PS | Departure | M | Y | L1 | BR_B_1 | 47° 33´ 21´´ N | 122° 38´ 32´´ W | BR_D_1 | 47° 33´ 09´´ N | 122° 38´ 06´´ W | 0.4 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L2 | BR_D_1 | 47° 33´ 09´´ N | 122° 38´ 06´´ W | BR_D_2 | 47° 33´ 45´´ N | 122° 36´ 22´´ W | 1.3 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | M | Y | L3 | BR_D_2 | 47° 33´ 45´´ N | 122° 36´ 22´´ W | BR_D_3 | 47° 35´ 10´´ N | 122° 34´ 23´´ W | 2.0 | Kitsap | 0 | 10 | 10 | 9 | 9 |
| Bremerton_PS | Departure | X | Y | L4 | BR_D_3 | 47° 35´ 10´´ N | 122° 34´ 23´´ W | BR_D_4 | 47° 35´ 39´´ N | 122° 33´ 16´´ W | 0.9 | Kitsap | 0 | 12 | 10 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L5 | BR_D_4 | 47° 35´ 39´´ N | 122° 33´ 16´´ W | BR_D_5 | 47° 35´ 34´´ N | 122° 32´ 46´´ W | 0.4 | Kitsap | 0 | 13 | 11 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L6 | BR_D_5 | 47° 35´ 34´´ N | 122° 32´ 46´´ W | BR_D_6 | 47° 34´ 24´´ N | 122° 32´ 12´´ W | 1.2 | Kitsap | 0 | 14 | 12 | 10 | 8 |
| Bremerton_PS | Departure | T | N | L7 | BR_D_6 | 47° 34´ 24´´ N | 122° 32´ 12´´ W | BR_D_7 | 47° 34´ 04´´ N | 122° 31´ 22´´ W | 0.7 | Kitsap | 0 | 18 | 16 | 11 | SS |
| Bremerton_PS | Departure | T | N | L8 | BR_D_7 | 47° 34´ 04´´ N | 122° 31´ 22´´ W | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | 0.6 | Kitsap | 0 | 19 | 17 | SS | SS |
| Bremerton_PS | Departure | T | N | L9a | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N | 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 20 | SS | SS | SS |
| PSCross_Brem | Departure | T | N | L10a | PS_A_17 | 47° 34´ 32´´ N | 122° 27´ 32´´ W | PS_X_8 | 47° 34´ 55´´ N | 122° 26´ 58´´ W | 0.5 | Kitsap | 0 | SS | SS | SS | SS |
| BremCross_ElliottBay | Arrival | X | Y | L8a | PS_X_8 | 47° 34´ 55´´ N | 122° 26´ 58´´ W | EB_A_S1 | 47° 36´ 28´´ N | 122° 25´ 05´´ W | 2.0 | Kitsap | 0 | 17 | SS | SS | SS |
| Tacoma_ElliottBay | Arrival | X | Y | L1 | EB_A_S1 | 47° 36´ 28´´ N | 122° 25´ 05´´ W | EB_A_4 | 47° 36´ 52´´ N | 122° 23´ 21´´ W | 1.3 | King | 0 | 15 | 13 | 10 | 10 |

Total Distance 13.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEA to MANCHESTER

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **'aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 2 | PS_A_2 | 48° 28 | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 2 | PS_A_3 | 48° 13 | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 1 | PS_A_4 | 48° 13 | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 1 | PS_A_5 | 48° 09 | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | X | N | L5 | PS_A_5 | 48° 0 | PS_A_6 | 48° 09 | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_Tacoma | Arrival | X | N | L6 | PS_A_6 | 48° 0 | PS_A_7 | 48° 11 | 11.4 | Calallam | 0 | 0 | 16 | 12 | SS |
| Sea_Tacoma | Arrival | T | N | L7 | PS_A_7 | 48° 1 | PS_A_8 | 48° 11 | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L8 | PS_A_8 | 48° 1 | PS_A_9 | 48° 10 | 2.9 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 1 | PS_A_10 | 48° 06 | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 0 | PS_A_11 | 48° 01 | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 0 | PS_A_12 | 47° 57 | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 5 | PS_A_13 | 47° 56 | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 5 | PS_A_14 | 47° 55 | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 5 | PS_A_15 | 47° 45 | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 4 | PS_A_16 | 47° 39 | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 3 | PS_A_17 | 47° 34 | 5.2 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L17a | PS_A_17 | 47° 3 | BR_A_1 | 47° 33 | 2.1 | Kitsap | 0 | 0 | 16 | 10 | SS |
| PS_Bremerton | Arrival | X | Y | L1a | BR_A_1 | 47° 3 | MU_A_1 | 47° 33 | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Brem_Manchester | Arrival | X | Y | L2a | MU_A_1 | 47° 3 | MU_B_1 | 47° 33 | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |

Total Distance 138.3 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

### OGV-Routing: MANCHESTER to SEA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ıg WP La** | **End WP** | **ıypoi** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33´ 4 | MU_D_2 | 47° | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33´ 3 | BR_D_7 | 47° | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ 0 | BR_D_8 | 47° | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 5 | PS_A_17 | 47° | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34´ 3 | PS_D_8 | 47° | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 5 | PS_D_9 | 47° | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 0 | PS_D_10 | 47° | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 4 | PS_D_11 | 47° | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 5 | PS_D_12 | 47° | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 5 | PS_D_13 | 47° | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 4 | PS_D_14 | 47° | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 0 | PS_D_15 | 47° | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 3 | PS_D_16 | 47° | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 3 | PS_D_17 | 47° | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 0 | PS_D_18 | 47° | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 0 | PS_D_19 | 48° | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 0 | PS_D_20 | 48° | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 4 | PS_D_21 | 48° | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 5 | PS_D_22 | 48° | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 5 | PS_D_23 | 48° | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 2 | PS_D_24 | 48° | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 4 | PS_D_25 | 48° | 2.4 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 5 | PS_D_26 | 48° | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | X | N | L26 | PS_D_26 | 48° 12´ 4 | PS_D_27 | 48° | 11.2 | Calallam | 0 | 0 | 16 | 12 | SS |
| Tacoma_Sea | Departure | X | N | L27 | PS_D_27 | 48° 10´ 3 | PS_D_28 | 48° | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 2 | PS_D_29 | 48° | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 1 | PS_D_30 | 48° | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 2 | PS_D_31 | 48° | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 3 | PS_D_32 | 48° | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 3 | PS_D_33 | 48° | 10.9 | Calallam | 0 | 0 | SS | SS | SS |

Total Distance 139 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: MANCHESTER to CHERRY POINT/FERNDALE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33´ 42´´ N 122° 32´ 10´´ W | MU_D_2 | 47° 33´ 39´´ N 122° 31´ 51´´ W | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33´ 39´´ N 122° 31´ 51´´ W | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ 04´´ N 122° 31´ 22´´ W | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58´´ N 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 11´ 44´´ N 122° 48´ 45´´ W | AA_A_1 | 48° 13´ 14´´ N 122° 48´ 23´´ W | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | N | L1 | AA_A_1 | 48° 13´ 14´´ N 122° 48´ 23´´ W | AA_A_2 | 48° 24´ 06´´ N 122° 43´ 42´´ W | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | N | L2 | AA_A_2 | 48° 24´ 06´´ N 122° 43´ 42´´ W | AA_A_3 | 48° 24´ 50´´ N 122° 43´ 44´´ W | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | X | N | L3a | AA_A_3 | 48° 24´ 50´´ N 122° 43´ 44´´ W | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | 2.0 | Skagit | 0 | 0 | 15 | 12 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | RS_A_8 | 48° 31´ 00´´ N 122° 44´ 21´´ W | 1.0 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° 31´ 00´´ N 122° 44´ 21´´ W | RS_A_9 | 48° 36´ 04´´ N 122° 45´ 07´´ W | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° 36´ 04´´ N 122° 45´ 07´´ W | RS_A_10 | 48° 37´ 59´´ N 122° 43´ 52´´ W | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° 37´ 59´´ N 122° 43´ 52´´ W | RS_A_11 | 48° 40´ 15´´ N 122° 42´ 24´´ W | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° 40´ 15´´ N 122° 42´ 24´´ W | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | RS_A_13 | 48° 45´ 17´´ N 122° 45´ 50´´ W | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |
| | | | | | | | | Total Distance | 82.9 nm | | Note: SS - Service Speed | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: CHERRY POINT/FERNDALE to MANCHESTER**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Fast Cruise** | **Fast Container Auto** | **Medium Reefer RO/RO Fishing** | **Slow Bulkers Tankers Log Fishing** | **Very Slow Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L8 | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 2.1 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L9 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 16 | 12 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° 28´ 53´´ N 122° 44´ 31´´ W | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | 2.8 | Skagit | 0 | 0 | 15 | 11 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | 1.9 | San Juan | 0 | 0 | 15 | 11 | SS |
| Anacortes_Admr | Departure | X | N | L2 | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | 1.8 | San Juan | 0 | 0 | 16 | 12 | SS |
| Anacortes_Admr | Departure | X | N | L3 | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 5.2 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L17a | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | BR_A_1 | 47° 33´ 58´´ N 122° 30´ 31´´ W | 2.1 | Kitsap | 0 | 0 | 16 | 10 | SS |
| PS_Bremerton | Arrival | X | Y | L1a | BR_A_1 | 47° 33´ 58´´ N 122° 30´ 31´´ W | MU_A_1 | 47° 33´ 39´´ N 122° 31´ 51´´ W | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Brem_Manchester | Arrival | X | Y | L2a | MU_A_1 | 47° 33´ 39´´ N 122° 31´ 51´´ W | MU_B_1 | 47° 33´ 42´´ N 122° 32´ 10´´ W | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| | | | | | | | | Total Distance | 80.8 | nm | | | | | |

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: MANCHESTER to SEATTLE**

Lat/Long in WGS84 Datum

**DRAFT**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP La | End WP | aypoint | Dist. | County | Speed by Link (knots)<br>Fast<br>Cruise | Fast<br>Container Auto | Medium<br>Reefer RO/RO Fishing | Slow<br>Bulkers Tankers Log Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33´ | MU_D_2 | 47° 33´ | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33´ | BR_D_7 | 47° 34´ | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ | BR_D_8 | 47° 33´ | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | T | N | L9a | BR_D_8 | 47° 33´ | PS_A_17 | 47° 34´ | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | T | N | L10a | PS_A_17 | 47° 34´ | PS_X_8 | 47° 34´ | 0.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| BremCross_ElliottBa | Arrival | X | Y | L8a | PS_X_8 | 47° 34´ | EB_A_S1 | 47° 36´ | 2.0 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_ElliottBay | Arrival | X | Y | L1 | EB_A_S1 | 47° 36´ | EB_A_4 | 47° 36´ | 1.3 | King | 0 | 0 | 13 | 10 | 10 |
| | | | | | | | Total Distance | | 7.6 | nm | | | | | |

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to MANCHESTER**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **ypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| ElliotBay_Manchester | Departure | M | Y | L1 | EB_D_1 | 47° | EB_D_B1 | 47° | 1.7 | King | 0 | 0 | 8 | 6 | 7 |
| ElliotBay_Manchester | Departure | M | Y | L2 | EB_D_B1 | 47° | EB_D_B2 | 47° | 1.5 | King | 0 | 0 | 8 | 8 | 8 |
| ElliotBay_Manchester | Departure | M | Y | L3a | EB_D_B2 | 47° | PS_A_17 | 47° | 0.7 | Kitsap | 0 | 0 | 9 | 9 | 9 |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° | BR_A_1 | 47° | 2.1 | Kitsap | 0 | 0 | 16 | 10 | SS |
| PS_Bremerton | Arrival | X | Y | L1a | BR_A_1 | 47° | MU_A_1 | 47° | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Brem_Manchester | Arrival | X | Y | L2a | MU_A_1 | 47° | MU_B_1 | 47° | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| | | | | | | | Total Distance | | 7.1 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: SEATTLE to BLAKE ISLAND (ANCHORAGE)

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP L | End WP | aypoin | Dist. | County | Fast<br>Cruise | Fast<br>Container<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ElliotBay_Manchester | Departure | M | Y | L1 | EB_D_1 | 47° 36 | EB_D_B1 | 47° 3 | 1.7 | King | 0 | 0 | 8 | 6 | 7 |
| ElliotBay_Manchester | Departure | M | Y | L2 | EB_D_B1 | 47° 36 | EB_D_B2 | 47° 3 | 1.5 | King | 0 | 0 | 8 | 8 | 8 |
| ElliotBay_Manchester | Departure | M | Y | L3a | EB_D_B2 | 47° 35 | PS_A_17 | 47° 3 | 0.7 | Kitsap | 0 | 0 | 9 | 9 | 9 |
| Sea_Tacoma | Arrival | T | N | L17a | PS_A_17 | 47° 34 | BR_A_1 | 47° 3 | 2.1 | Kitsap | 0 | 0 | 9 | 8 | SS |
| PS_BlakeIsland | Arrival | M | Y | L1a | BR_A_1 | 47° 33 | BI_AN_1 | 47° 3 | 0.7 | Kitsap | 0 | 0 | 4 | 4 | 4 |
| | | | | | | | Total Distance | | 6.6 | nm | | | | | |

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: MANCHESTER to PORT TOWNSEND/INDIAN ISLAND

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ng WP La** | **End WP** | **g Waypoint La** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33´ 42 | MU_D_2 | 47° 33´ 39´´ N | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33´ 39 | BR_D_7 | 47° 34´ 04´´ N | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34´ 04 | BR_D_8 | 47° 33´ 58´´ N | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58 | PS_A_17 | 47° 34´ 32´´ N | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34´ 32 | PS_D_8 | 47° 35´ 55´´ N | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55 | PS_D_9 | 47° 37´ 02´´ N | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02 | PS_D_10 | 47° 39´ 42´´ N | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42 | PS_D_11 | 47° 41´ 54´´ N | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54 | PS_D_12 | 47° 45´ 52´´ N | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52 | PS_D_13 | 47° 46´ 40´´ N | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40 | PS_D_14 | 47° 48´ 06´´ N | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06 | PS_D_15 | 47° 52´ 36´´ N | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36 | PS_D_16 | 47° 55´ 34´´ N | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34 | PS_D_17 | 47° 57´ 01´´ N | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01 | PS_D_18 | 47° 58´ 07´´ N | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07 | PS_D_19 | 48° 02´ 01´´ N | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01 | PS_D_20 | 48° 04´ 48´´ N | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48 | PS_D_21 | 48° 06´ 58´´ N | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58 | PS_D_22 | 48° 07´ 51´´ N | 1.3 | Jefferson | 0 | 0 | 18 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L22a | PS_D_22 | 48° 07´ 51 | PI_A_1 | 48° 08´ 08´´ N | 0.6 | Island | 0 | 0 | 17 | 10 | SS |
| Bremerton_PTII | Arrival | X | Y | L1 | PI_A_1 | 48° 08´ 08 | PI_A_2 | 48° 08´ 03´´ N | 0.4 | Island | 0 | 0 | 16 | 10 | SS |
| Bremerton_PTII | Arrival | X | Y | L2 | PI_A_2 | 48° 08´ 03 | PI_A_3 | 48° 07´ 48´´ N | 1.3 | Jefferson | 0 | 0 | 12 | 8 | 8 |
| Bremerton_PTII | Arrival | M | Y | L3 | PI_A_3 | 48° 07´ 48 | PI_A_4 | 48° 07´ 00´´ N | 0.8 | Jefferson | 0 | 0 | 10 | 8 | 8 |

Total Distance 43.7 nm

# Puget Sound Emissions Inventory

**OGV-Routing: MANCHESTER to MARCH POINT**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33 | MU_D_2 | 47° 33´ 39 | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33 | BR_D_7 | 47° 34´ 04 | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34 | BR_D_8 | 47° 33´ 58 | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33 | PS_A_17 | 47° 34´ 32 | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34 | PS_D_8 | 47° 35´ 55 | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35 | PS_D_9 | 47° 37´ 02 | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37 | PS_D_10 | 47° 39´ 42 | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39 | PS_D_11 | 47° 41´ 54 | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41 | PS_D_12 | 47° 45´ 52 | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45 | PS_D_13 | 47° 46´ 40 | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46 | PS_D_14 | 47° 48´ 06 | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48 | PS_D_15 | 47° 52´ 36 | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52 | PS_D_16 | 47° 55´ 34 | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55 | PS_D_17 | 47° 57´ 01 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57 | PS_D_18 | 47° 58´ 07 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58 | PS_D_19 | 48° 02´ 01 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02 | PS_D_20 | 48° 04´ 48 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04 | PS_D_21 | 48° 06´ 58 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06 | PS_D_22 | 48° 07´ 51 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07 | PS_D_23 | 48° 11´ 20 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11 | PS_D_24 | 48° 11´ 44 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 11 | AA_A_1 | 48° 13´ 14 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | N | L1 | AA_A_1 | 48° 13 | AA_A_2 | 48° 24´ 06 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | T | N | L2 | AA_A_2 | 48° 24 | AA_A_3 | 48° 24´ 50 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | T | N | L3a | AA_A_3 | 48° 24 | RS_A_6 | 48° 28´ 00 | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | X | Y | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 30´ 01 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L1a | RS_A_7 | 48° 30 | MP_A_2 | 48° 31´ 00 | 1.6 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 31´ 04 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | M | Y | L3 | MP_A_3 | 48° 31 | MP_A_4 | 48° 31´ 34 | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31 | MP_A_5 | 48° 31´ 23 | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance 73.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: BLAKE ISLAND (ANCHORAGE) to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | | **End WP** | **Ending Waypoint Lat/Lon** | | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** |
| BlakeIsland_PS | Departure | M | Y | L1a | BI_AN_1 | 47° 33´ 42´´ N | 122° 32´ 10´´ W | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | 0.7 | Kitsap | 0 | 0 | 6 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N | 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 0 | 15 |

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | | End WP | Ending Waypoint Lat/Lon | | Dist. | County | Fast<br>Cruise | Fast<br>Containe<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BlakeIsland_PS | Departure | M | Y | L1a | BI_AN_1 | 47° 33´ 42´´ N | 122° 32´ 10´´ W | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | 0.7 | Kitsap | 0 | 0 | 6 | 3 | 3 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33´ 58´´ N | 122° 30´ 31´´ W | PS_A_17 | 47° 34´ 32´´ N | 122° 27´ 32´´ W | 2.1 | Kitsap | 0 | 0 | 15 | 9 | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34´ 32´´ N | 122° 27´ 32´´ W | PS_D_8 | 47° 35´ 55´´ N | 122° 26´ 45´´ W | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35´ 55´´ N | 122° 26´ 45´´ W | PS_D_9 | 47° 37´ 02´´ N | 122° 26´ 56´´ W | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37´ 02´´ N | 122° 26´ 56´´ W | PS_D_10 | 47° 39´ 42´´ N | 122° 27´ 25´´ W | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39´ 42´´ N | 122° 27´ 25´´ W | PS_D_11 | 47° 41´ 54´´ N | 122° 26´ 47´´ W | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41´ 54´´ N | 122° 26´ 47´´ W | PS_D_12 | 47° 45´ 52´´ N | 122° 25´ 49´´ W | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45´ 52´´ N | 122° 25´ 49´´ W | PS_D_13 | 47° 46´ 40´´ N | 122° 26´ 04´´ W | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46´ 40´´ N | 122° 26´ 04´´ W | PS_D_14 | 47° 48´ 06´´ N | 122° 26´ 29´´ W | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48´ 06´´ N | 122° 26´ 29´´ W | PS_D_15 | 47° 52´ 36´´ N | 122° 28´ 08´´ W | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52´ 36´´ N | 122° 28´ 08´´ W | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55´ 34´´ N | 122° 29´ 11´´ W | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57´ 01´´ N | 122° 32´ 03´´ W | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58´ 07´´ N | 122° 34´ 19´´ W | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02´ 01´´ N | 122° 37´ 40´´ W | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04´ 48´´ N | 122° 38´ 31´´ W | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06´ 58´´ N | 122° 39´ 13´´ W | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07´ 51´´ N | 122° 40´ 43´´ W | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11´ 20´´ N | 122° 46´ 47´´ W | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11´ 44´´ N | 122° 48´ 45´´ W | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | 2.4 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11´ 57´´ N | 122° 52´ 19´´ W | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L26 | PS_D_26 | 48° 12´ 45´´ N | 123° 06´ 35´´ W | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | 11.2 | Calallam | 0 | 0 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | Y | L27a | PS_D_27 | 48° 10´ 33´´ N | 123° 23´ 03´´ W | PA_A_2 | 48° 09´ 45´´ N | 123° 23´ 25´´ W | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ 45´´ N | 123° 23´ 25´´ W | PA_A_3 | 48° 08´ 21´´ N | 123° 22´ 25´´ W | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ 21´´ N | 123° 22´ 25´´ W | PA_A_4 | 48° 08´ 00´´ N | 123° 23´ 48´´ W | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |
| | | | | | | | | | | Total Distance | 72.5 | nm | | Note: SS - Service Speed | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: MANCHESTER to PORT ANGELES

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Manchester_Brem | Departure | M | Y | L1 | MU_D_1 | 47° 33 | MU_D_2 | 47° | 0.2 | Kitsap | 0 | 0 | 11 | 8 | 8 |
| Manchester_Brem | Departure | X | Y | L2a | MU_D_2 | 47° 33 | BR_D_7 | 47° | 1.0 | Kitsap | 0 | 0 | 12 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L8 | BR_D_7 | 47° 34 | BR_D_8 | 47° | 0.6 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| Bremerton_PS | Departure | X | Y | L9a | BR_D_8 | 47° 33 | PS_A_17 | 47° | 2.1 | Kitsap | 0 | 0 | 15 | SS | SS |
| PSCross_Brem | Departure | X | Y | L10a | PS_A_17 | 47° 34 | PS_D_8 | 47° | 1.5 | Kitsap | 0 | 0 | 17 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 35 | PS_D_9 | 47° | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 37 | PS_D_10 | 47° | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 39 | PS_D_11 | 47° | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 41 | PS_D_12 | 47° | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 45 | PS_D_13 | 47° | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 46 | PS_D_14 | 47° | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 48 | PS_D_15 | 47° | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 52 | PS_D_16 | 47° | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 55 | PS_D_17 | 47° | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 57 | PS_D_18 | 47° | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 58 | PS_D_19 | 48° | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 02 | PS_D_20 | 48° | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 04 | PS_D_21 | 48° | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 06 | PS_D_22 | 48° | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 07 | PS_D_23 | 48° | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 11 | PS_D_24 | 48° | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24 | PS_D_24 | 48° 11 | PS_D_25 | 48° | 2.4 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L25 | PS_D_25 | 48° 11 | PS_D_26 | 48° | 9.5 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | X | Y | L26 | PS_D_26 | 48° 12 | PS_D_27 | 48° | 11.2 | Calallam | 0 | 0 | 16 | 12 | SS |
| Tacoma_Sea | Departure | M | Y | L27a | PS_D_27 | 48° 10 | PA_A_2 | 48° | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09 | PA_A_3 | 48° | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08 | PA_A_4 | 48° | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |

Total Distance 73.5 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEA to CHERRY POINT/FERNDALE

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **Waypoint I** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 28´ 38´ | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 13´ 22´ | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 13´ 20´ | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | M | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° 09´ 20´ | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | X | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° 09´ 58´ | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | N | L1a | PS_A_6 | 48° 09 | RS_A_2 | 48° 16´ 08´ | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16 | RS_A_3 | 48° 19´ 40´ | 6.6 | San Juan | 0 | 0 | 13 | 13 | SS |
| PA_CherryPT | Arrival | X | N | L3 | RS_A_3 | 48° 19 | RS_A_4 | 48° 24´ 06´ | 8.3 | San Juan | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24 | RS_A_5 | 48° 26´ 13´ | 2.7 | San Juan | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26 | RS_A_6 | 48° 28´ 00´ | 1.9 | Skagit | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 30´ 01´ | 2.0 | Skagit | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° 30 | RS_A_8 | 48° 31´ 00´ | 1.0 | San Juan | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° 31 | RS_A_9 | 48° 36´ 04´ | 5.1 | Skagit | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° 36 | RS_A_10 | 48° 37´ 59´ | 2.1 | Skagit | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° 37 | RS_A_11 | 48° 40´ 15´ | 2.5 | San Juan | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° 40 | RS_A_12 | 48° 40´ 35´ | 0.4 | Whatcom | 0 | 0 | 11 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° 40 | RS_A_13 | 48° 45´ 17´ | 5.3 | Whatcom | 0 | 0 | 11 | 11 | SS |

Total Distance 120.3 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE HARBOR

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Link ID** | **Start WP** | **ng WP Lat** | | **End WP** | **/aypoint** | | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| PA_CherryPT | Arrival | | | | | RS_A_13 | ´ N | 122° 45´ 5 | | Whatcom | | | | | |
| CherryPT_PT | Departure | | RS_D_2 | ´´ N | 122° 47´ 14´´ W | | | | | Whatcom | | | | | |

NOTE: All ARRIVAL harbor transits branch from RS_A_13

NOTE: All DEPARTURE harbor transits goto RS_D_1

| Route | Arr/Dep | Link ID | Start WP | | | End WP | | | Dist. | County | Cruise | Container Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ferndale Route to Ferndale_Intalco | | | | | | | | | | | | | | | |
| Ferndale_Intalco | Arrival | L1a | RS_A_13 | ´´ N | 122° | FI_B_1 | ´ N | 122° | 5.38 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| Ferndale_Intalco | Departure | L1a | FI_B_1 | ´´ N | 122° | RS_D_2 | ´ N | 122° | 5.76 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| Ferndale_Intalco to SandyPoint Anchorage | | | | | | | | | | | | | | | |
| Ferndale_Intalco_SandyPoint | Arrival | L1a | FI_B_1 | ´´ N | 122° | FA_AN_3 | ´ N | 122° | 2.59 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| SandyPoint_Ferndale_Intalco | Departure | L1a | FA_AN_3 | ´´ N | 122° | FI_B_1 | ´ N | 122° | 2.59 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| Ferndale_Phillips | Arrival | L1a | RS_A_13 | ´´ N | 122° | FP_B_2 | ´ N | 122° | 4.61 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| Ferndale_Phillips | Departure | L1a | FP_B_2 | ´´ N | 122° | RS_D_2 | ´ N | 122° | 5.04 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| Ferndale_Phillips to SandyPoint Anchorage | | | | | | | | | | | | | | | |
| Ferndale_Phillips_SandyPoint | Arrival | L1a | FP_B_2 | ´´ N | 122° | FA_AN_3 | ´ N | 122° | 2.19 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| SandyPoint_Ferndale_Phillips | Departure | L1a | FA_AN_3 | ´´ N | 122° | FP_B_2 | ´ N | 122° | 2.19 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| CherryPT_BP | Arrival | L1a | RS_A_13 | ´´ N | 122° | FC_A_1 | ´ N | 122° | 3.28 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| CherryPT_BP | Arrival | L2 | FC_A_1 | ´´ N | 122° | FC_B_3 | ´ N | 122° | 3.23 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| | | | | | | | Total Distance | | 6.51 | nm | | | | | |
| CherryPT_BP | Departure | L1 | FC_B_3 | ´´ N | 122° | FC_D_2 | ´ N | 122° | 3.23 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| CherryPT_BP | Departure | L2a | FC_D_2 | ´´ N | 122° | RS_D_2 | ´ N | 122° | 3.39 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| | | | | | | | Total Distance | | 6.62 | nm | | | | | |
| CherryPT_BP to SandyPoint Anchorage | | | | | | | | | | | | | | | |
| CherryPT_BP_SandyPoint | Departure | L1a | FC_B_3 | ´´ N | 122° | FA_AN_3 | ´ N | 122° | 3.14 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| SandyPoint_CherryPT_BP | Arrival | L1a | FA_AN_3 | ´´ N | 122° | FC_B_3 | ´ N | 122° | 3.14 | Whatcom | 0 | 0 | 6 | 6 | 6 |
| PA_CherryPT_SandyPoint Anchorage | | | | | | | | | | | | | | | |
| PA_CherryPT_SandyPoint | Arrival | L1a | RS_A_13 | ´´ N | 122° | FA_AN_3 | ´ N | 122° | 3.24 | Whatcom | 0 | 0 | 4 | 4 | 4 |
| SandyPT_CherryPT_PA | Departure | L1a | FA_AN_3 | ´´ N | 122° | RS_D_2 | ´ N | 122° | 3.24 | Whatcom | 0 | 0 | 6 | 6 | 6 |

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE to SEA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | End WP | Ending Waypoint Lat/Lon | Dist. | County | Cruise | Containe Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L8 | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 2.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L9 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10 | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11 | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L14a | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N 125° 00´ 00´´ W | 10.9 | Calallam | 0 | 0 | SS | SS | SS |

Total Distance 118.6 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE to VENDOVI ISLAND (ANCHORAGE)

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | Y | L2a | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | SG_A_1 | 48° 39´ 27´´ N 122° 41´ 37´´ W | 1.7 | San Juan | 0 | 0 | 13 | 9 | SS |
| GStght_Vendovi | Arrival | X | Y | L1 | SG_A_1 | 48° 39´ 27´´ N 122° 41´ 37´´ W | SG_A_2 | 48° 38´ 43´´ N 122° 40´ 24´´ W | 1.1 | Whatcom | 0 | 0 | 12 | 8 | SS |
| GStght_Vendovi | Arrival | M | Y | L2 | SG_A_2 | 48° 38´ 43´´ N 122° 40´ 24´´ W | VI_AN_3 | 48° 37´ 16´´ N 122° 37´ 59´´ W | 2.2 | Skagit | 0 | 0 | 6 | 4 | SS |

Total Distance 10.2 nm

# Puget Sound Emissions Inventory

**OGV-Routing: VENDOVI ISLAND (ANCHORAGE) to CHERRY POINT/FERNDALE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **g Waypoint La** | **Dist.** | **County** | **Cruise** | **Container<br>Auto** | **Reefer<br>RO/RO<br>Fishing** | **Bulkers<br>Tankers<br>Log<br>Fishing** | **Fishing** |
| Vendovi_GStght | Departure | M | Y | L1 | VI_AN_3 | 48° 3 | LI_D_2 | 48° 38´ 43´´ N | 1.9 | Skagit | 0 | 0 | 10 | 8 | SS |
| Vendovi_GStght | Departure | X | Y | L2a | LI_D_2 | 48° 3 | RS_A_12 | 48° 40´ 35´´ N | 2.4 | Whatcom | 0 | 0 | 12 | 10 | SS |
| PA_CherryPT | Arrival | X | Y | L12a | RS_A_12 | 48° 4 | RS_A_13 | 48° 45´ 17´´ N | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |

Total Distance 9.6 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to VENDOVI ISLAND (ANCHORAGE)**

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| **DRAFT** | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| ElliottB_PS | Departure | X | Y | L1 | EB_D_1 | 47° 3 | EB_D_2 | 47° 3 | 2.6 | King | 0 | 0 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 3 | PS_D_10 | 47° 3 | 1.5 | King | 0 | 0 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 4 | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 4 | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 4 | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 4 | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 5 | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 5 | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 5 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 5 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 0 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 0 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 0 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 0 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 1 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 1 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 1 | AA_A_1 | 48° 1 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | Y | L1 | AA_A_1 | 48° 1 | AA_A_2 | 48° 2 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | Y | L2 | AA_A_2 | 48° 2 | AA_A_3 | 48° 2 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | X | Y | L3a | AA_A_3 | 48° 2 | RS_A_6 | 48° 2 | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_Bellingham | Arrival | X | Y | L1a | RS_A_6 | 48° 2 | BH_A_2 | 48° 3 | 2.2 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_Bellingham | Arrival | X | Y | L2 | BH_A_2 | 48° 3 | BH_A_3 | 48° 3 | 3.7 | Skagit | 0 | 0 | 12 | 10 | SS |
| RS_Bellingham | Arrival | M | Y | L3 | BH_A_3 | 48° 3 | BH_A_4 | 48° 3 | 2.9 | Skagit | 0 | 0 | 8 | 6 | 6 |
| RS_Bellingham | Arrival | M | Y | L4 | BH_A_4 | 48° 3 | VI_AN_3 | 48° 3 | 1.5 | Skagit | 0 | 0 | 4 | 3 | 3 |
| | | | | | | | Total Distance | | 69.9 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | Starting WP Lat/Lon | End WP | Ending Waypoint Lat/Lon | Dist. | County | Cruise | Containe Auto | Reefer RO/RO Fishing | Bulkers Tankers Log Fishing | Fishing |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L8 | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 2.1 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L9 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 16 | 12 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° 28´ 53´´ N 122° 44´ 31´´ W | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | 2.8 | Skagit | 0 | 0 | 15 | 11 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | 1.9 | San Juan | 0 | 0 | 15 | 11 | SS |
| Anacortes_Admr | Departure | X | N | L2 | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | 1.8 | San Juan | 0 | 0 | 16 | 12 | SS |
| Anacortes_Admr | Departure | X | N | L3 | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | 0 | 13 | SS | SS |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | 0.4 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | 1.5 | King | 0 | 0 | 12 | 8 | 7 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | EB_A_4 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.6 | King | 0 | 0 | 11 | 6 | 6 |

Total Distance 76.8 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing:  SEATTLE to CHERRY POINT/FERNDALE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Speed by Link (knots)** | | | | |
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| ElliottB_PS | Departure | X | Y | L1 | EB_D_1 | 47° | EB_D_2 | 47° 38´ | 2.6 | King | 0 | 0 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° | PS_D_10 | 47° 39´ | 1.5 | King | 0 | 0 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41´ | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° | PS_D_13 | 47° 46´ | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° | PS_D_14 | 47° 48´ | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° | PS_D_23 | 48° 11´ | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° | PS_D_24 | 48° 11´ | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° | AA_A_1 | 48° 13´ | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | N | L1 | AA_A_1 | 48° | AA_A_2 | 48° 24´ | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | N | L2 | AA_A_2 | 48° | AA_A_3 | 48° 24´ | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | X | N | L3a | AA_A_3 | 48° | RS_A_6 | 48° 28´ | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° | RS_A_7 | 48° 30´ | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° | RS_A_8 | 48° 31´ | 1.0 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° | RS_A_9 | 48° 36´ | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° | RS_A_10 | 48° 37´ | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° | RS_A_11 | 48° 40´ | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° | RS_A_12 | 48° 40´ | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° | RS_A_13 | 48° 45´ | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |
| | | | | | | | Total Distance | | 77.9 | nm | Note:  SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: CHERRY POINT/FERNDALE to TACOMA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L8 | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 2.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L9 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° 28´ 53´´ N 122° 44´ 31´´ W | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | 2.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | X | N | L3 | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 5.2 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | 2.8 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L18 | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | 5.3 | King | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L19 | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | 4.1 | King | 0 | 0 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | 5.3 | King | 0 | 0 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | 0.5 | King | 0 | 0 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | PS_A_23 | 47° 18´ 07´´ N 122° 27´ 41´´ W | 1.1 | Pierce | 0 | 0 | 10 | 10 | 8 |
| | | | | | | | | Total Distance | 96.5 nm | | Note: SS - Service Speed | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: TACOMA to CHERRY POINT/FERNDALE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | **Speed by Link (knots)** | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Tacoma_Sea | Departure | M | Y | L2 | PS_D_2 | 47° 1 | PS_D_3 | 47° 19´ 20 | 1.3 | Pierce | 0 | 0 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° 1 | PS_D_4 | 47° 19´ 54 | 0.9 | Pierce | 0 | 0 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° 1 | PS_D_5 | 47° 23´ 04 | 4.8 | King | 0 | 0 | 14 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L5 | PS_D_5 | 47° 2 | PS_D_6 | 47° 26´ 56 | 4.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L6 | PS_D_6 | 47° 2 | PS_D_7 | 47° 34´ 32 | 7.8 | King | 0 | 0 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 3 | PS_D_8 | 47° 35´ 55 | 1.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 3 | PS_D_9 | 47° 37´ 02 | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 3 | PS_D_10 | 47° 39´ 42 | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 41´ 54 | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 45´ 52 | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 46´ 40 | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 48´ 06 | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 52´ 36 | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 55´ 34 | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 57´ 01 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 58´ 07 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 02´ 01 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 04´ 48 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 06´ 58 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 07´ 51 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 11´ 20 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 11´ 44 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 1 | AA_A_1 | 48° 13´ 14 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | N | L1 | AA_A_1 | 48° 1 | AA_A_2 | 48° 24´ 06 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | N | L2 | AA_A_2 | 48° 2 | AA_A_3 | 48° 24´ 50 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | T | N | L3a | AA_A_3 | 48° 2 | RS_A_6 | 48° 28´ 00 | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 2 | RS_A_7 | 48° 30´ 01 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° 3 | RS_A_8 | 48° 31´ 00 | 1.0 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° 3 | RS_A_9 | 48° 36´ 04 | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° 3 | RS_A_10 | 48° 37´ 59 | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° 3 | RS_A_11 | 48° 40´ 15 | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° 4 | RS_A_12 | 48° 40´ 35 | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° 4 | RS_A_13 | 48° 45´ 17 | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |
| | | | | | | | | Total Distance | 98.2 | nm | | Note: SS - Service Speed | | | |

# Puget Sound Emissions Inventory

## OGV-Routing:  CHERRY POINT/FERNDALE to MARCH POINT

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_MP | Arrival | X | Y | L1a | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | MP_A_2 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 1.8 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31´ 00´´ N 122° 42´ 20´´ W | MP_A_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L3 | MP_A_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | MP_A_4 | 48° 31´ 34´´ N 122° 36´ 40´´ W | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31´ 34´´ N 122° 36´ 40´´ W | MP_A_5 | 48° 31´ 23´´ N 122° 35´ 00´´ W | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance 21.3 nm

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to CHERRY POINT/FERNDALE

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Containe**<br>**Auto** | **Reefer**<br>**RO/RO**<br>**Fishing** | **Bulkers**<br>**Tankers**<br>**Log**<br>**Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° | MP_D_2 | 48° 31 | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | M | Y | L2 | MP_D_2 | 48° | MP_D_3 | 48° 31 | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° | MP_D_4 | 48° 31 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| March PT_CPFrn | Departure | T | N | L1a | MP_D_4 | 48° | RS_A_8 | 48° 31 | 1.3 | Skagit | 0 | 0 | 14 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° | RS_A_9 | 48° 36 | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° | RS_A_10 | 48° 37 | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° | RS_A_11 | 48° 40 | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° | RS_A_12 | 48° 40 | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° | RS_A_13 | 48° 45 | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |
| | | | | | | | | Total Distance | 21.6 | nm | Note: SS - Service Speed | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: CHERRY POINT/FERNDALE to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L8 | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 2.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | N | L9 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | N | L10 | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | N | L11 | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | Y | L14a | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| CPFern_PA | Arrival | M | Y | L1a | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | PA_A_4 | 48° 08´ 00´´ N 123° 23´ 48´´ W | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |
| | | | | | | | | Total Distance | 52.8 | nm | | | | | |

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: PORT ANGELES to CHERRY POINT/FERNDALE

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° | PA_D_2 | 48° 0 | 1.2 | Calallam | 0 | 0 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° | PA_D_3 | 48° 0 | 1.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° | PS_A_6 | 48° 0 | 0.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | Y | L1a | PS_A_6 | 48° | RS_A_2 | 48° 1 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° | RS_A_3 | 48° 1 | 6.6 | San Juan | 0 | 0 | 13 | 13 | SS |
| PA_CherryPT | Arrival | X | N | L3 | RS_A_3 | 48° | RS_A_4 | 48° 2 | 8.3 | San Juan | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° | RS_A_5 | 48° 2 | 2.7 | San Juan | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° | RS_A_6 | 48° 2 | 1.9 | Skagit | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° | RS_A_7 | 48° 3 | 2.0 | Skagit | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° | RS_A_8 | 48° 3 | 1.0 | San Juan | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° | RS_A_9 | 48° 3 | 5.1 | Skagit | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° | RS_A_10 | 48° 3 | 2.1 | Skagit | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° | RS_A_11 | 48° 4 | 2.5 | San Juan | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° | RS_A_12 | 48° 4 | 0.4 | Whatcom | 0 | 0 | 13 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° | RS_A_13 | 48° 4 | 5.3 | Whatcom | 0 | 0 | 13 | 11 | SS |

Total Distance 54.0 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE to VANCOUVER (NB3)

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| CherryPT_PA | Departure | X | Y | L1a | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | SG_D_1 | 48° 47´ 27´´ N 122° 51´ 18´´ W | 3.45 | San Juan | 0 | 0 | 15 | 13 | SS |
| BuoyYCA_NB3 | Departure | T | N | L2 | SG_D_1 | 48° 47´ 27´´ N 122° 51´ 18´´ W | SG_D_2 | 49° 00´ 09´´ N 123° 14´ 09´´ W | 19.67 | Whatcom | 0 | 0 | SS | SS | SS |
| | | | | | | | | Total Distance | 23.12 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB3) to CHERRY POINT/FERNDALE**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ing WP Lat/** | **End WP** | **ing Waypoint Lat/** | **Dist.** | **County** | **Cruise** | **Containe<br>Auto** | **Reefer<br>RO/RO<br>Fishing** | **Bulkers<br>Tankers<br>Log<br>Fishing** | **Fishing** |
| NB3_CherryPT | Arrival | T | N | L1 | NB3_A_1 | 49° 00´ 09´´ | NB3_A_2 | 48° 49´ 10´´ N 12 | 17.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | T | N | L2 | NB3_A_2 | 48° 49´ 10´´ | NB3_A_3 | 48° 45´ 54´´ N 12 | 6.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | X | Y | L3a | NB3_A_3 | 48° 45´ 54´´ | RS_D_2 | 48° 45´ 16´´ N 12 | 2.0 | San Juan | 0 | 0 | 17 | 13 | SS |
| CherryPT_Cross | Arrival | X | Y | L1a | RS_D_2 | 48° 45´ 16´´ | RS_A_13 | 48° 45´ 17´´ N 12 | 1.0 | Whatcom | 0 | 0 | 15 | 11 | SS |
| | | | | | | | | Total Distance | 26.4 nm | | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB3) to VENDOVI ISLAND (ANCHORAGE)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **VP** | **End WP** | **po** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| NB3_CherryPT | Arrival | T | N | L1 | NB3_A_1 | 49 | NB3_A_2 | 48 | 17.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | T | N | L2 | NB3_A_2 | 48 | NB3_A_3 | 48 | 6.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | X | Y | L3a | NB3_A_3 | 48 | RS_D_2 | 48 | 2.0 | San Juan | 0 | 0 | 17 | 13 | SS |
| CherryPT_Cross | Arrival | X | Y | L1 | RS_D_2 | 48 | RS_D_3 | 48 | 5.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | X | Y | L2a | RS_D_3 | 48 | SG_A_1 | 48 | 1.7 | San Juan | 0 | 0 | 13 | 9 | SS |
| GStght_Vendovi | Arrival | X | Y | L1 | SG_A_1 | 48 | SG_A_2 | 48 | 1.1 | Whatcom | 0 | 0 | 12 | 8 | SS |
| GStght_Vendovi | Arrival | M | Y | L2 | SG_A_2 | 48 | VI_AN_3 | 48 | 2.2 | Skagit | 0 | 0 | 6 | 4 | SS |
| | | | | | | | Total Distance | | 35.6 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing:  SEA to MARCH POINT

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | Other |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ng WP Lat** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28´ 30 | PS_A_2 | 48° 28´ 3 | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28´ 38 | PS_A_3 | 48° 13´ 2 | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13´ 22 | PS_A_4 | 48° 13´ 2 | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13´ 20 | PS_A_5 | 48° 09´ 2 | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09´ 20 | PS_A_6 | 48° 09´ 5 | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | N | L1a | PS_A_6 | 48° 09´ 58 | RS_A_2 | 48° 16´ 0 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16´ 08 | RS_A_3 | 48° 19´ 4 | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | X | N | L3 | RS_A_3 | 48° 19´ 40 | RS_A_4 | 48° 24´ 0 | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24´ 06 | RS_A_5 | 48° 26´ 1 | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26´ 13 | RS_A_6 | 48° 28´ 0 | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28´ 00 | RS_A_7 | 48° 30´ 0 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | T | N | L1a | RS_A_7 | 48° 30´ 01 | MP_A_2 | 48° 31´ 0 | 1.6 | Skagit | 0 | 0 | 13 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31´ 00 | MP_A_3 | 48° 31´ 0 | 0.7 | Skagit | 0 | 0 | 13 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L3 | MP_A_3 | 48° 31´ 04 | MP_A_4 | 48° 31´ 3 | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31´ 34 | MP_A_5 | 48° 31´ 2 | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |
| | | | | | | | | Total Distance | 110.5 | nm | | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: MARCH POINT HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Link ID** | **Start WP** | **ng WP La** | **End WP** | **g Waypoint La** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| RS_MarchPT | Arrival | L4 | MP_A_5 | 48° 31´ 2 | Mode: | M | | Skagit | | | | | |
| MarchPT_RS | Departure | L5 | MP_D_5 | 48° 30´ 3 | NPE: | Y | | Skagit | | | | | |
| NOTE: All ARRIVAL harbor transits branch from MP_A_5 | | | | | | | | | | | | | |
| NOTE: All DEPARTURE harbor transits goto MP_D_5 | | | | | | | | | | | | | |
| MP_Shell | Arrival | L1a | MP_A_5 | 48° 31´ 2 | MP_B_1 | 23´´ N 122° 35 | 0.81 | Skagit | 0 | 0 | 3 | 3 | 3 |
| MP_Shell | Departure | L1a | MP_B_1 | ´´ N 122° | MP_D_5 | 48° 30´ 33´´ N | 0.81 | Skagit | 0 | 0 | 4 | 4 | 4 |
| MP_Tosoro | Arrival | L1a | MP_A_5 | 48° 31´ 2 | MP_B_2 | 32´´ N 122° 34 | 1.02 | Skagit | 0 | 0 | 3 | 3 | 3 |
| MP_Tosoro | Departure | L1a | MP_B_2 | ´´ N 122° | MP_D_5 | 48° 30´ 33´´ N | 1.02 | Skagit | 0 | 0 | 4 | 4 | 4 |
| MP_Anchorage | Arrival | L1a | MP_A_5 | 48° 31´ 2 | MP_AN_1 | 26´´ N 122° 33 | 0.69 | Skagit | 0 | 0 | 2 | 2 | 2 |
| MP_Anchroage | Departure | L1a | MP_AN_1 | ´´ N 122° | MP_D_5 | 48° 30´ 33´´ N | 0.69 | Skagit | 0 | 0 | 3 | 3 | 3 |

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to SEA

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° 31´ | MP_D_2 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_2 | 48° 31´ | MP_D_3 | 48° 31´ | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° 31´ | MP_D_4 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | T | N | L4a | MP_D_4 | 48° 31´ | RS_A_7 | 48° 30´ | 1.6 | Skagit | 0 | 0 | 15 | 13 | SS |
| MarchPT_RS | Departure | T | N | L5a | RS_A_7 | 48° 30´ | RS_D_10 | 48° 29´ | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10 | RS_D_10 | 48° 29´ | RS_D_11 | 48° 28´ | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11 | RS_D_11 | 48° 28´ | RS_D_12 | 48° 27´ | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_12 | 48° 27´ | RS_D_13 | 48° 26´ | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_13 | 48° 26´ | RS_D_14 | 48° 24´ | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L14 | RS_D_14 | 48° 24´ | RS_D_15 | 48° 20´ | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L15a | RS_D_15 | 48° 20´ | PS_D_27 | 48° 10´ | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ | PS_D_28 | 48° 11´ | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ | PS_D_29 | 48° 14´ | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ | PS_D_30 | 48° 15´ | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ | PS_D_31 | 48° 17´ | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ | PS_D_32 | 48° 30´ | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ | PS_D_33 | 48° 30´ | 10.9 | Calallam | 0 | 0 | SS | SS | SS |

Total Distance 109.2 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to VANCOUVER (NB3)

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **ypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° | MP_D_2 | 48° | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_2 | 48° | MP_D_3 | 48° | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° | MP_D_4 | 48° | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| March PT_CPFrn | Departure | T | N | L1a | MP_D_4 | 48° | RS_A_8 | 48° | 1.3 | Skagit | 0 | 0 | 14 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° | RS_A_9 | 48° | 5.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° | RS_A_10 | 48° | 2.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° | RS_A_11 | 48° | 2.5 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° | RS_A_12 | 48° | 0.4 | Whatcom | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° | RS_A_13 | 48° | 5.3 | Whatcom | 0 | 0 | 15 | 13 | SS |
| BuoyYCA_NB3 | Departure | T | N | L1a | RS_A_13 | 48° | SG_D_1 | 48° | 4.2 | Whatcom | 0 | 0 | 17 | 13 | SS |
| BuoyYCA_NB3 | Departure | T | N | L2 | SG_D_1 | 48° | SG_D_2 | 49° | 19.7 | Whatcom | 0 | 0 | SS | SS | SS |
| | | | | | | | Total Distance | | 45.4 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: VANCOUVER (NB3) to MARCH POINT

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP L | End WP | Vaypoint | Dist. | County | Fast Cruise | Fast Containe Auto | Medium Reefer RO/RO Fishing | Slow Bulkers Tankers Log Fishing | Very Slow Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NB3_CherryPT | Arrival | T | N | L1 | NB3_A_1 | 49° 00 | NB3_A_2 | 48° 49´ | 17.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | T | N | L2 | NB3_A_2 | 48° 49 | NB3_A_3 | 48° 45´ | 6.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | X | N | L3a | NB3_A_3 | 48° 45 | RS_D_2 | 48° 45´ | 2.0 | San Juan | 0 | 0 | 17 | 13 | SS |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45 | RS_D_3 | 48° 40´ | 5.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40 | RS_D_4 | 48° 38´ | 2.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38 | RS_D_5 | 48° 37´ | 0.7 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37 | RS_D_6 | 48° 36´ | 1.8 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36 | RS_D_7 | 48° 33´ | 2.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33 | RS_D_8 | 48° 32´ | 1.2 | San Juan | 0 | 0 | 15 | 11 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32 | RS_D_9 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| CherryPT_MP | Arrival | T | N | L1a | RS_D_9 | 48° 31 | MP_A_2 | 48° 31´ | 1.8 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L3 | MP_A_3 | 48° 31 | MP_A_4 | 48° 31´ | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31 | MP_A_5 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |
| | | | | | | | Total Distance | | 46.6 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to VENDOVI ISLAND (ANCHORAGE)

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Waypoint L** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| MarchPT_Vendovi | Departure | M | Y | L1 | MP_D_1 | 48° 31´ | VI_D_1 | 48° 31´ 33´´ | 1.0 | Skagit | 0 | 0 | 9 | 7 | SS |
| MarchPT_Vendovi | Departure | M | Y | L2 | VI_D_1 | 48° 31´ | VI_D_2 | 48° 34´ 57´´ | 3.6 | Skagit | 0 | 0 | 10 | 8 | SS |
| MarchPT_Vendovi | Departure | M | Y | L3 | VI_D_2 | 48° 34´ | VI_AN_3 | 48° 37´ 16´´ | 3.0 | Skagit | 0 | 0 | 6 | 5 | 4 |
| | | | | | | | | Total Distance | 7.6 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: VENDOVI ISLAND (ANCHORAGE) to MARCH POINT

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Waypoint L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Vendovi_MarchPT | Arrival | M | Y | L1 | VI_AN_3 | 48° 37´ | VI_A_2 | 48° 34´ 57´´ | 3.0 | Skagit | 0 | 0 | 6 | 5 | 4 |
| Vendovi_MarchPT | Arrival | X | Y | L2 | VI_A_2 | 48° 34´ | VI_A_1 | 48° 31´ 33´´ | 3.6 | Skagit | 0 | 0 | 12 | 9 | SS |
| Vendovi_MarchPT | Arrival | M | Y | L3 | VI_A_1 | 48° 31´ | MP_A_5 | 48° 31´ 23´´ | 1.0 | Skagit | 0 | 0 | 9 | 7 | SS |
| | | | | | | | | Total Distance | 7.6 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing:  VENDOVI ISLAND (ANCHORAGE) to ANACORTES

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ing WP Lat/** | **End WP** | **Waypoint L** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Vendovi_MarchPT | Arrival | M | Y | L1 | VI_AN_3 | 48° 37´ 16´´ | VI_A_2 | 48° 34´ 57´´ | 3.0 | Skagit | 0 | 0 | 6 | 5 | 4 |
| Vendovi_MarchPT | Arrival | X | Y | L2 | VI_A_2 | 48° 34´ 57´´ | VI_A_1 | 48° 31´ 33´´ | 3.6 | Skagit | 0 | 0 | 12 | 9 | SS |
| Vendovi_MarchPT | Arrival | M | Y | L3 | VI_A_1 | 48° 31´ 33´´ | MP_D_1 | 48° 31´ 23´´ | 1.0 | Skagit | 0 | 0 | 9 | 7 | SS |
| MarchPT_RS | Departure | X | Y | L1 | MP_D_1 | 48° 31´ 23´´ | MP_D_2 | 48° 31´ 34´´ | 1.1 | Skagit | 0 | 0 | 12 | 9 | SS |
| | | | | | | | Total Distance | | 8.7 | nm | Note:  SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VENDOVI ISLAND to TACOMA**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP La | End WP | p | Dist. | County | Fast<br>Cruise | Fast<br>Containe<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Vendovi_RS | Departure | M | Y | L1a | VI_AN_3 | 48° 37´ 1 | BH_D_4 | 4 | 1.5 | Skagit | 0 | 0 | 6 | 4 | SS |
| Bellingham_RS | Departure | X | Y | L3 | BH_D_4 | 48° 36´ 0 | BH_D_3 | 4 | 2.9 | Skagit | 0 | 0 | 12 | 10 | SS |
| Bellingham_RS | Departure | X | Y | L2 | BH_D_3 | 48° 33´ 1 | BH_D_2 | 4 | 3.7 | Skagit | 0 | 0 | 12 | 10 | SS |
| Bellingham_RS | Departure | X | Y | L1a | BH_D_2 | 48° 30´ 0 | RS_A_6 | 4 | 2.2 | Skagit | 0 | 0 | 14 | 11 | SS |
| Bellingham_RS | Departure | X | Y | L0a | RS_A_6 | 48° 28´ 0 | AA_D_2 | 4 | 1.9 | San Juan | 0 | 0 | 15 | 11 | SS |
| Anacortes_Admr | Departure | X | N | L2 | AA_D_2 | 48° 24´ 0 | AA_D_3 | 4 | 1.8 | San Juan | 0 | 0 | 16 | 12 | SS |
| Anacortes_Admr | Departure | X | N | L3 | AA_D_3 | 48° 22´ 2 | AA_D_4 | 4 | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 2 | AA_D_5 | 4 | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 3 | PS_A_9 | 4 | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 5 | PS_A_10 | 4 | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 3 | PS_A_11 | 4 | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 0 | PS_A_12 | 4 | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 4 | PS_A_13 | 4 | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 3 | PS_A_14 | 4 | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 1 | PS_A_15 | 4 | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 5 | PS_A_16 | 4 | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 4 | PS_A_17 | 4 | 5.2 | Kitsap | 0 | 18 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 3 | PS_A_18 | 4 | 2.8 | Kitsap | 0 | 17 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L18 | PS_A_18 | 47° 31´ 5 | PS_A_19 | 4 | 5.3 | King | 0 | 16 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L19 | PS_A_19 | 47° 26´ 4 | PS_A_20 | 4 | 4.1 | King | 0 | 17 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 0 | PS_A_21 | 4 | 5.3 | King | 0 | 14 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 3 | PS_A_22 | 4 | 0.5 | King | 0 | 10 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 1 | PS_A_23 | 4 | 1.1 | Pierce | 0 | 10 | 10 | 10 | 8 |

Total Distance 86.8 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: MARCH POINT to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° 3 | MP_D_2 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_2 | 48° 3 | MP_D_3 | 48° 31´ | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° 3 | MP_D_4 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | X | Y | L4a | MP_D_4 | 48° 3 | RS_A_7 | 48° 30´ | 1.6 | Skagit | 0 | 0 | 15 | 13 | SS |
| MarchPT_RS | Departure | X | Y | L5a | RS_A_7 | 48° 3 | RS_D_10 | 48° 29´ | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | Y | L10 | RS_D_10 | 48° 2 | RS_D_11 | 48° 28´ | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11 | RS_D_12 | 48° 2 | RS_D_13 | 48° 26´ | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_13 | 48° 2 | RS_D_14 | 48° 24´ | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_14 | 48° 2 | RS_D_15 | 48° 20´ | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L14a | RS_D_15 | 48° 2 | PS_D_27 | 48° 10´ | 19.0 | Calallam | 0 | 0 | SS | SS | 13 |
| CPFern_PA | Arrival | X | Y | L1a | PS_D_27 | 48° 1 | PA_A_2 | 48° 09´ | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 0 | PA_A_3 | 48° 08´ | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 0 | PA_A_4 | 48° 08´ | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |

Total Distance 41.7 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: PORT ANGELES to MARCH POINT**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08 | PA_D_2 | 48° 08´ 1 | 1.2 | Calallam | 0 | 0 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08 | PA_D_3 | 48° 09´ 3 | 1.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 09 | PS_A_6 | 48° 09´ 5 | 0.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | Y | L1a | PS_A_6 | 48° 09 | RS_A_2 | 48° 16´ 0 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16 | RS_A_3 | 48° 19´ 4 | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L3 | RS_A_3 | 48° 19 | RS_A_4 | 48° 24´ 0 | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24 | RS_A_5 | 48° 26´ 1 | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26 | RS_A_6 | 48° 28´ 0 | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 30´ 01 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | T | N | L1a | RS_A_7 | 48° 30 | MP_A_2 | 48° 31´ 0 | 1.6 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 31´ 0 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L3 | MP_A_3 | 48° 31 | MP_A_4 | 48° 31´ 3 | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31 | MP_A_5 | 48° 31´ 2 | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |
| | | | | | | | | Total Distance | 44.2 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to SEATTLE

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° 31 | MP_D_2 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_2 | 48° 31 | MP_D_3 | 48° 31´ | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_3 | 48° 31 | MP_D_4 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | X | Y | L4a | MP_D_4 | 48° 31 | RS_A_7 | 48° 30´ | 1.6 | Skagit | 0 | 0 | 15 | 13 | SS |
| MarchPT_RS | Departure | X | Y | L5a | RS_A_7 | 48° 30 | RS_D_10 | 48° 29´ | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | Y | L9 | RS_D_10 | 48° 29 | RS_D_11 | 48° 28´ | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° 28 | AA_D_1 | 48° 26´ | 2.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26 | AA_D_2 | 48° 24´ | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° 24 | AA_D_3 | 48° 22´ | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L3 | AA_D_3 | 48° 22 | AA_D_4 | 48° 13´ | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13 | AA_D_5 | 48° 11´ | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11 | PS_A_9 | 48° 10´ | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10 | PS_A_10 | 48° 06´ | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06 | PS_A_11 | 48° 01´ | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01 | PS_A_12 | 47° 57´ | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57 | PS_A_13 | 47° 56´ | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56 | PS_A_14 | 47° 55´ | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55 | PS_A_15 | 47° 45´ | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45 | PS_A_16 | 47° 39´ | 6.3 | Kitsap | 0 | 0 | 13 | SS | SS |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 39 | EB_A_2 | 47° 39´ | 0.4 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 39 | EB_A_3 | 47° 38´ | 1.5 | King | 0 | 0 | 12 | 8 | 7 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 38 | EB_A_4 | 47° 36´ | 2.6 | King | 0 | 0 | 11 | 6 | 6 |

Total Distance 67.5 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: SEATTLE to MARCH POINT

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Containe | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| ElliottB_PS | Departure | X | Y | L1 | EB_D_1 | 47° 3 | EB_D_2 | 47° 38 | 2.6 | King | 0 | 0 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° 3 | PS_D_10 | 47° 39 | 1.5 | King | 0 | 0 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 41 | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 46 | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 48 | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 55 | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 57 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 58 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 02 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 04 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 11 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 11 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 1 | AA_A_1 | 48° 13 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | T | N | L1 | AA_A_1 | 48° 1 | AA_A_2 | 48° 24 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | N | L2 | AA_A_2 | 48° 2 | AA_A_3 | 48° 24 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | T | N | L3a | AA_A_3 | 48° 2 | RS_A_6 | 48° 28 | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 2 | RS_A_7 | 48° 30 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | T | N | L1a | RS_A_7 | 48° 3 | MP_A_2 | 48° 31 | 1.6 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 3 | MP_A_3 | 48° 31 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | M | Y | L3 | MP_A_3 | 48° 3 | MP_A_4 | 48° 31 | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 3 | MP_A_5 | 48° 31 | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance 68.1 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: MARCH POINT to TACOMA

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| MarchPT_RS | Departure | M | Y | L1 | MP_D_1 | 48° | MP_D_2 | 48° 31 | 1.1 | Skagit | 0 | 0 | 9 | 8 | 6 |
| MarchPT_RS | Departure | M | Y | L2 | MP_D_2 | 48° | MP_D_3 | 48° 31 | 3.1 | Skagit | 0 | 0 | 12 | 10 | SS |
| MarchPT_RS | Departure | M | Y | L3 | MP_D_3 | 48° | MP_D_4 | 48° 31 | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | M | Y | L4a | MP_D_4 | 48° | RS_A_7 | 48° 3 | 1.6 | Skagit | 0 | 0 | 15 | 13 | SS |
| MarchPT_RS | Departure | M | Y | L5a | RS_A_7 | 48° | RS_D_10 | 48° 2 | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | X | Y | L9 | RS_D_10 | 48° | RS_D_11 | 48° 2 | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10a | RS_D_14 | 48° | AA_D_1 | 48° 2 | 2.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° | AA_D_2 | 48° 2 | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° | AA_D_3 | 48° 2 | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L3 | AA_D_3 | 48° | AA_D_4 | 48° 1 | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 1 | AA_D_5 | 48° 11 | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 1 | PS_A_9 | 48° 1 | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 1 | PS_A_10 | 48° 0 | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° | PS_A_11 | 48° 01 | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° | PS_A_12 | 47° 5 | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° | PS_A_13 | 47° 5 | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° | PS_A_14 | 47° 5 | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° | PS_A_15 | 47° 4 | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° | PS_A_16 | 47° 3 | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° | PS_A_16 | 47° 3 | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° | PS_A_17 | 47° 3 | 5.2 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° | PS_A_18 | 47° 31 | 2.8 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° | PS_A_19 | 47° 2 | 5.3 | King | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L19 | PS_A_19 | 47° | PS_A_20 | 47° 2 | 4.1 | King | 0 | 0 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° | PS_A_21 | 47° 1 | 5.3 | King | 0 | 0 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 1 | PS_A_22 | 47° 1 | 0.5 | King | 0 | 0 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 1 | PS_A_23 | 47° 1 | 1.1 | Pierce | 0 | 0 | 10 | 10 | 8 |
| | | | | | | | Total Distance | | 93.5 | nm | Note: SS - Service Speed | | | | |
| | | | | | | | | | | | Note: Red numbers - engines off | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: TACOMA to MARCH POINT

Lat/Long in WGS84 Datum

DRAFT

Speed by Link (knots)

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP | End WP | aypoint | Dist. | County | Fast<br>Cruise | Fast<br>Containe<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tacoma_Sea | Departure | M | Y | L2 | PS_D_2 | 47° | PS_D_3 | 47° 19´ | 1.3 | Pierce | 0 | 0 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° | PS_D_4 | 47° 19´ | 0.9 | Pierce | 0 | 0 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° | PS_D_5 | 47° 23´ | 4.8 | King | 0 | 0 | 14 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L5 | PS_D_5 | 47° | PS_D_6 | 47° 26´ | 4.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° | PS_D_7 | 47° 34´ | 7.8 | King | 0 | 0 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° | PS_D_8 | 47° 35´ | 1.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° | PS_D_9 | 47° 37´ | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° | PS_D_10 | 47° 39´ | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41´ | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° | PS_D_13 | 47° 46´ | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° | PS_D_14 | 47° 48´ | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° | PS_D_23 | 48° 11´ | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° | PS_D_24 | 48° 11´ | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° | AA_A_1 | 48° 13´ | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacorte | Arrival | X | Y | L1 | AA_A_1 | 48° | AA_A_2 | 48° 24´ | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacorte | Arrival | X | Y | L2 | AA_A_2 | 48° | AA_A_3 | 48° 24´ | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacorte | Arrival | X | Y | L3a | AA_A_3 | 48° | RS_A_6 | 48° 28´ | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | X | Y | L6 | RS_A_6 | 48° | RS_A_7 | 48° 30´ | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L1a | RS_A_7 | 48° | MP_A_2 | 48° 31´ | 1.6 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° | MP_A_3 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | M | Y | L3 | MP_A_3 | 48° | MP_A_4 | 48° 31´ | 3.1 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° | MP_A_5 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance 88.4 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing:  SEA to ANACORTES

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | Fast | Fast | Medium | Slow | Very Slow |
| **DRAFT**<br>**Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **Waypoint L** | **Dist.** | **County** | **Cruise** | **Container**<br>**Auto** | **Reefer**<br>**RO/RO**<br>**Fishing** | **Bulkers**<br>**Tankers**<br>**Log**<br>**Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 28´ 38´´ | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 13´ 22´´ | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 13´ 20´´ | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° 09´ 20´´ | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° 09´ 58´´ | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | Y | L1a | PS_A_6 | 48° 09 | RS_A_2 | 48° 16´ 08´´ | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16 | RS_A_3 | 48° 19´ 40´´ | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | X | N | L3 | RS_A_3 | 48° 19 | RS_A_4 | 48° 24´ 06´´ | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24 | RS_A_5 | 48° 26´ 13´´ | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26 | RS_A_6 | 48° 28´ 00´´ | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 30´ 01´´ | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L1a | RS_A_7 | 48° 30 | MP_A_2 | 48° 31´ 00´´ | 1.6 | Skagit | 0 | 0 | 13 | 11 | SS |
| RS_MarchPT | Arrival | M | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 31´ 04´´ | 0.7 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° 31 | AC_A_2 | 48° 31´ 24´´ | 2.6 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance  108.9  nm

# Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES HARBOR**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| RS_Anacortes | Arrival | L1 | AC_A_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | Mode: | M | | Skagit | | | | | |
| Anacortes_RS | Departure | L1 | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | NPE: | Y | | Skagit | | | | | |
| NOTE: All ARRIVAL harbor transits branch from AC_A_2 | | | | | | | | | | | | | |
| NOTE: All DEPARTURE harbor transits goto AC_D_2 | | | | | | | | | | | | | |
| Anacortes_PortDock1 | Arrival | L1a | AC_A_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | AC_B_1 | 48° 31´ 20´´ N 122° 36´ 29´´ W | 0.63 | Skagit | 0 | 3 | 3 | 3 | 3 |
| Anacortes_PortDock1 | Departure | L1a | AC_B_1 | 48° 31´ 20´´ N 122° 36´ 29´´ W | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | 0.63 | Skagit | 0 | 3 | 3 | 3 | 3 |
| Anacortes_PortDock2 | Arrival | L1a | AC_A_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | AC_B_2 | 48° 31´ 20´´ N 122° 36´ 42´´ W | 0.49 | Skagit | 0 | 3 | 3 | 3 | 3 |
| Anacortes_PortDock2 | Departure | L1a | AC_B_2 | 48° 31´ 20´´ N 122° 36´ 42´´ W | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | 0.49 | Skagit | 0 | 3 | 3 | 3 | 3 |
| Anacortes_CurtisWharf | Arrival | L1a | AC_A_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | AC_B_3 | 48° 31´ 19´´ N 122° 36´ 54´´ W | 0.36 | Skagit | 0 | 3 | 3 | 3 | 3 |
| Anacortes_CurtisWharf | Departure | L1a | AC_B_3 | 48° 31´ 19´´ N 122° 36´ 54´´ W | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | 0.36 | Skagit | 0 | 3 | 3 | 3 | 3 |

# Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | Speed by Link (knots) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Anacortes_RS | Departure | M | Y | L1 | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 2.6 | Skagit | 0 | 0 | 11 | 9 | 8 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 0.7 | Skagit | 0 | 0 | 12 | 11 | SS |
| MarchPT_RS | Departure | X | Y | L3 | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | 1.6 | Skagit | 0 | 0 | 14 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L4a | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 0.8 | San Juan | 0 | 0 | 14 | 11 | SS |
| CherryPT_PA | Departure | T | N | L10 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11 | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L14 | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L15 | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | 0.8 | Calallam | 8 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N 125° 00´ 00´´ W | 10.9 | Calallam | 0 | 0 | SS | SS | SS |
| | | | | | | | | Total Distance | 107.6 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB3) to ANACORTES**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | **Bulkers** |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | **Reefer** | **Tankers** |  |
| **DRAFT** |  |  |  |  |  |  |  |  |  |  |  | **Containe** | **RO/RO** | **Log** |  |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **Vaypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| NB3_CherryPT | Arrival | T | N | L1 | NB3_A_1 | 49° | NB3_A_2 | 48° 49´ | 17.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | T | N | L2 | NB3_A_2 | 48° | NB3_A_3 | 48° 45´ | 6.2 | Whatcom | 0 | 0 | SS | SS | SS |
| NB3_CherryPT | Arrival | T | N | L3a | NB3_A_3 | 48° | RS_D_2 | 48° 45´ | 2.0 | San Juan | 0 | 0 | 17 | 13 | SS |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° | RS_D_3 | 48° 40´ | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° | RS_D_4 | 48° 38´ | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° | RS_D_5 | 48° 37´ | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° | RS_D_6 | 48° 36´ | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° | RS_D_7 | 48° 33´ | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° | RS_D_8 | 48° 32´ | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° | RS_D_9 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° | RS_D_9 | 48° 31´ | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_MP | Arrival | X | Y | L1a | RS_D_9 | 48° | MP_A_2 | 48° 31´ | 1.8 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | M | Y | L2 | MP_A_2 | 48° | MP_A_3 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 11 | 8 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° | AC_A_2 | 48° 31´ | 2.6 | Skagit | 0 | 0 | 9 | 7 | 6 |

Total Distance 46.1 nm

# Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES to MARCH POINT**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| RS_MarchPT | Arrival | M | Y | L4 | MP_A_4 | 48° 31´ 34´´ N 122° 36´ 40´´ W | MP_A_5 | 48° 31´ 23´´ N 122° 35´ 00´´ W | 1.1 | Skagit | 0 | 0 | 11 | 9 | SS |
| | | | | | | | | Total Distance | 1.1 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: MARCH POINT to ANACORTES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| MarchPT_RS | Departure | X | Y | L1 | MP_D_1 | 48° 31´ 23´´ N 122° 35´ 00´´ W | MP_D_2 | 48° 31´ 34´´ N 122° 36´ 40´´ W | 1.1 | Skagit | 0 | 0 | 12 | 9 | SS |
| | | | | | | | | Total Distance | 1.1 | nm | Note: SS - Service Speed | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Anacortes_RS | Departure | M | Y | L1a | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 2.6 | Skagit | 0 | 0 | 11 | 9 | 8 |
| MarchPT_RS | Departure | X | Y | L2 | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| MarchPT_RS | Departure | T | N | L1 | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | 1.6 | Skagit | 0 | 0 | 15 | 13 | SS |
| MarchPT_RS | Departure | T | N | L0a | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 0.8 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L10 | RS_D_10 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_11 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11 | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | T | N | L14a | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| CPFern_PA | Arrival | X | Y | L1a | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | 0.8 | Calallam | 0 | 0 | 10 | 10 | 10 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ 45´´ N 123° 23´ 25´´ W | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | 1.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ 21´´ N 123° 22´ 25´´ W | PA_A_4 | 48° 08´ 00´´ N 123° 23´ 48´´ W | 1.0 | Calallam | 0 | 0 | 6 | 6 | 6 |

Total Distance 40.1 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES to SEATTLE**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Anacortes_RS | Departure | M | Y | L1a | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 2.6 | Skagit | 0 | 0 | 10 | 7 | 7 |
| MarchPT_RS | Departure | M | Y | L5 | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 0.7 | Skagit | 0 | 0 | 11 | 9 | 8 |
| MarchPT_RS | Departure | X | Y | L4 | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | 1.6 | Skagit | 0 | 0 | 13 | 10 | SS |
| MarchPT_RS | Departure | X | Y | L3a | RS_A_7 | 48° 30´ 01´´ N 122° 44´ 12´´ W | RS_D_15 | 48° 29´ 33´´ N 122° 44´ 36´´ W | 0.8 | San Juan | 0 | 0 | 14 | 11 | SS |
| CherryPT_PA | Departure | X | Y | L10 | RS_D_15 | 48° 29´ 33´´ N 122° 44´ 36´´ W | RS_D_14 | 48° 28´ 53´´ N 122° 44´ 31´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L11a | RS_D_14 | 48° 28´ 53´´ N 122° 44´ 31´´ W | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | 2.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L1 | AA_D_1 | 48° 26´ 04´´ N 122° 44´ 43´´ W | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L3 | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| PS_ElliottB | Arrival | X | Y | L1a | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | 0.4 | Kitsap | 0 | 0 | 13 | 9 | 8 |
| PS_ElliottB | Arrival | X | Y | L2 | EB_A_2 | 47° 39´ 21´´ N 122° 28´ 02´´ W | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | 1.5 | King | 0 | 0 | 12 | 8 | 7 |
| PS_ElliottB | Arrival | M | Y | L3 | EB_A_3 | 47° 38´ 16´´ N 122° 26´ 36´´ W | EB_A_4 | 47° 36´ 52´´ N 122° 23´ 21´´ W | 2.6 | King | 0 | 0 | 11 | 6 | 6 |

Total Distance 65.8 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: SEATTLE to ANACORTES**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **Waypoint** | **Dist.** | **County** | **Fast**<br>**Cruise** | **Fast**<br>**Container**<br>**Auto** | **Medium**<br>**Reefer**<br>**RO/RO**<br>**Fishing** | **Slow**<br>**Bulkers**<br>**Tankers**<br>**Log**<br>**Fishing** | **Very Slow**<br>**Fishing** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ElliottB_PS | Departure | X | Y | L1 | EB_D_1 | 47° | EB_D_2 | 47° 38´ | 2.6 | King | 0 | 0 | 9 | 8 | 6 |
| ElliottB_PS | Departure | X | Y | L2a | EB_D_2 | 47° | PS_D_10 | 47° 39´ | 1.5 | King | 0 | 0 | SS | SS | 7 |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° | PS_D_11 | 47° 41´ | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° | PS_D_12 | 47° 45´ | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° | PS_D_13 | 47° 46´ | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° | PS_D_14 | 47° 48´ | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° | PS_D_15 | 47° 52´ | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° | PS_D_16 | 47° 55´ | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° | PS_D_17 | 47° 57´ | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° | PS_D_18 | 47° 58´ | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° | PS_D_19 | 48° 02´ | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° | PS_D_20 | 48° 04´ | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° | PS_D_21 | 48° 06´ | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° | PS_D_22 | 48° 07´ | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° | PS_D_23 | 48° 11´ | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° | PS_D_24 | 48° 11´ | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° | AA_A_1 | 48° 13´ | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | T | N | L1 | AA_A_1 | 48° | AA_A_2 | 48° 24´ | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | X | Y | L2 | AA_A_2 | 48° | AA_A_3 | 48° 24´ | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | X | Y | L3a | AA_A_3 | 48° | RS_A_6 | 48° 28´ | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | X | Y | L6 | RS_A_6 | 48° | RS_A_7 | 48° 30´ | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L1a | RS_A_7 | 48° | MP_A_2 | 48° 31´ | 1.6 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° | MP_A_3 | 48° 31´ | 0.7 | Skagit | 0 | 0 | 13 | 10 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° | AC_A_2 | 48° 31´ | 2.6 | Skagit | 0 | 0 | 11 | 9 | SS |

Total Distance 66.4 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: PORT ANGELES to ANACORTES

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | g WP L | End WP | aypoin | Dist. | County | Fast<br>Cruise | Fast<br>Container<br>Auto | Medium<br>Reefer<br>RO/RO<br>Fishing | Slow<br>Bulkers<br>Tankers<br>Log<br>Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08 | PA_D_2 | 48° 08 | 1.2 | Calallam | 0 | 0 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08 | PA_D_3 | 48° 09 | 1.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 09 | PS_A_6 | 48° 09 | 0.5 | Calallam | 0 | 0 | 10 | 10 | 10 |
| PA_CherryPT | Arrival | T | N | L1a | PS_A_6 | 48° 09 | RS_A_2 | 48° 16 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16 | RS_A_3 | 48° 19 | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | X | N | L3 | RS_A_3 | 48° 19 | RS_A_4 | 48° 24 | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24 | RS_A_5 | 48° 26 | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26 | RS_A_6 | 48° 28 | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 28 | RS_A_7 | 48° 30 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L1a | RS_A_7 | 48° 30 | MP_A_2 | 48° 31 | 1.6 | Skagit | 0 | 0 | 13 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° 31 | 0.7 | Skagit | 0 | 0 | 13 | 11 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° 31 | AC_A_2 | 48° 31 | 2.6 | Skagit | 0 | 0 | 10 | 8 | 8 |
|  |  |  |  |  |  |  | Total Distance |  | 42.5 | nm |  |  |  |  |  |

## Puget Sound Emissions Inventory

**OGV-Routing: ANACORTES to CHERRY POINT/FERNDALE**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Anacortes_RS | Departure | M | Y | L1a | AC_D_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 2.6 | Skagit | 0 | 0 | 11 | 9 | 8 |
| MarchPT_RS | Departure | X | Y | L5 | MP_D_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 0.7 | Skagit | 0 | 0 | 12 | 9 | 8 |
| Anacortes_CPFrn | Departure | X | Y | L1a | MP_D_4 | 48° 31´ 00´´ N 122° 42´ 20´´ W | RS_A_8 | 48° 31´ 00´´ N 122° 44´ 21´´ W | 1.3 | Skagit | 0 | 0 | 13 | 10 | 8 |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° 31´ 00´´ N 122° 44´ 21´´ W | RS_A_9 | 48° 36´ 04´´ N 122° 45´ 07´´ W | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° 36´ 04´´ N 122° 45´ 07´´ W | RS_A_10 | 48° 37´ 59´´ N 122° 43´ 52´´ W | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° 37´ 59´´ N 122° 43´ 52´´ W | RS_A_11 | 48° 40´ 15´´ N 122° 42´ 24´´ W | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° 40´ 15´´ N 122° 42´ 24´´ W | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | RS_A_13 | 48° 45´ 17´´ N 122° 45´ 50´´ W | 5.3 | Whatcom | 0 | 0 | 15 | 11 | SS |

Total Distance 19.9 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: CHERRY POINT/FERNDALE to ANACORTES

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| CherryPT_PA | Departure | T | N | L1 | RS_D_2 | 48° 45´ 16´´ N 122° 47´ 14´´ W | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40´ 34´´ N 122° 43´ 28´´ W | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38´ 22´´ N 122° 43´ 58´´ W | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37´ 43´´ N 122° 44´ 25´´ W | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36´ 06´´ N 122° 45´ 32´´ W | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33´ 58´´ N 122° 45´ 14´´ W | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32´ 48´´ N 122° 45´ 04´´ W | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_MP | Arrival | X | Y | L1a | RS_D_9 | 48° 31´ 41´´ N 122° 44´ 54´´ W | MP_A_2 | 48° 31´ 00´´ N 122° 42´ 20´´ W | 1.8 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31´ 00´´ N 122° 42´ 20´´ W | MP_A_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° 31´ 04´´ N 122° 41´ 17´´ W | AC_A_2 | 48° 31´ 24´´ N 122° 37´ 26´´ W | 2.6 | Skagit | 0 | 0 | 10 | 8 | 8 |
| | | | | | | | | Total Distance | 19.6 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: PORT ANGELES to ORCAS ISLAND (ANCHORAGE)

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP I** | **End WP** | **'aypoin** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 0 | PA_D_2 | 48° 08 | 1.2 | Calallam | 0 | 0 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 0 | PA_D_3 | 48° 09 | 1.5 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 0 | PS_A_6 | 48° 09 | 0.5 | Calallam | 0 | 0 | 10 | 10 | 10 |
| PA_CherryPT | Arrival | X | N | L1a | PS_A_6 | 48° 0 | RS_A_2 | 48° 16 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 1 | RS_A_3 | 48° 19 | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L3 | RS_A_3 | 48° 1 | RS_A_4 | 48° 24 | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 2 | RS_A_5 | 48° 26 | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 2 | RS_A_6 | 48° 28 | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L6 | RS_A_6 | 48° 2 | RS_A_7 | 48° 30 | 2.0 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L7 | RS_A_7 | 48° 3 | RS_A_8 | 48° 31 | 1.0 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L8 | RS_A_8 | 48° 3 | RS_A_9 | 48° 36 | 5.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L9 | RS_A_9 | 48° 3 | RS_A_10 | 48° 37 | 2.1 | Skagit | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L10 | RS_A_10 | 48° 3 | RS_A_11 | 48° 40 | 2.5 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L11 | RS_A_11 | 48° 4 | RS_A_12 | 48° 40 | 0.4 | Whatcom | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | X | Y | L12 | RS_A_12 | 48° 4 | RS_A_13 | 48° 45 | 5.3 | Whatcom | 0 | 0 | 12 | 9 | SS |
| OrcasIS_BuoyYC | Departure | M | Y | L1a | RS_A_13 | 48° 4 | OC_A_1 | 48° 44 | 0.6 | Whatcom | 0 | 0 | 8 | 6 | 5 |
| OrcasIS_BuoyYC | Departure | M | Y | L2 | OC_A_1 | 48° 4 | OC_AN_1 | 48° 43 | 2.4 | San Juan | 0 | 0 | 6 | 4 | 4 |

Total Distance 56.9 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: ORCAS ISLAND to ANACORTES**

Lat/Long in WGS84 Datum

**DRAFT**

**Speed by Link (knots)**

| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **ıypoi** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| OrcasIS_BuoyYCA | Departure | M | Y | L1a | OC_AN_1 | 48° 43 | RS_D_2 | 48° | 2.4 | San Juan | 0 | 0 | 8 | 6 | 6 |
| CherryPT_PA | Departure | X | Y | L1 | RS_D_2 | 48° 45 | RS_D_3 | 48° | 5.3 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L2 | RS_D_3 | 48° 40 | RS_D_4 | 48° | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L3 | RS_D_4 | 48° 38 | RS_D_5 | 48° | 0.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L4 | RS_D_5 | 48° 37 | RS_D_6 | 48° | 1.8 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L5 | RS_D_6 | 48° 36 | RS_D_7 | 48° | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L6 | RS_D_7 | 48° 33 | RS_D_8 | 48° | 1.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L7 | RS_D_8 | 48° 32 | RS_D_9 | 48° | 1.1 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_MP | Arrival | X | Y | L1a | RS_D_9 | 48° 31 | MP_A_2 | 48° | 1.8 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_MarchPT | Arrival | X | Y | L2 | MP_A_2 | 48° 31 | MP_A_3 | 48° | 0.7 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_Anacortes | Arrival | M | Y | L1a | MP_A_3 | 48° 31 | AC_A_2 | 48° | 2.6 | Skagit | 0 | 0 | 10 | 8 | 8 |
| | | | | | | | Total Distance | | 22.0 | nm | | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: SEA to VENDOVI ISLAND (ANCHORAGE)

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **aypoi** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28 | PS_A_2 | 48° 2 | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28 | PS_A_3 | 48° 1 | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13 | PS_A_4 | 48° 1 | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° 13 | PS_A_5 | 48° ( | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | X | N | L5 | PS_A_5 | 48° 09 | PS_A_6 | 48° ( | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | T | N | L1a | PS_A_6 | 48° 09 | RS_A_2 | 48° 1 | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16 | RS_A_3 | 48° 1 | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L3 | RS_A_3 | 48° 19 | RS_A_4 | 48° 2 | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° 24 | RS_A_5 | 48° 2 | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° 26 | RS_A_6 | 48° 2 | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_Bellingham | Arrival | X | Y | L1a | RS_A_6 | 48° 28 | BH_A_2 | 48° 3 | 2.2 | Skagit | 0 | 0 | 12 | 11 | SS |
| RS_Bellingham | Arrival | X | Y | L2 | BH_A_2 | 48° 30 | BH_A_3 | 48° 3 | 3.7 | Skagit | 0 | 0 | 10 | 10 | SS |
| RS_Bellingham | Arrival | M | Y | L3 | BH_A_3 | 48° 33 | BH_A_4 | 48° 3 | 2.9 | Skagit | 0 | 0 | 8 | 6 | 6 |
| RS_Bellingham | Arrival | M | Y | L4 | BH_A_4 | 48° 36 | VI_AN_3 | 48° 3 | 1.5 | Skagit | 0 | 0 | 4 | 3 | 3 |
| | | | | | | | Total Distance | | 112.4 | nm | | Note: SS - Service Speed | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: VENDOVI (ANCHORAGE) to SEA**

Lat/Long in WGS84 Datum

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| **DRAFT** | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ıg WP La** | **End WP** | **/aypoin** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Vendovi_RS | Departure | M | Y | L1a | VI_AN_3 | 48° 37´ 1 | BH_D_4 | 48° 36´ | 1.5 | Skagit | 0 | 0 | 6 | 4 | SS |
| Bellingham_RS | Departure | M | Y | L3 | BH_D_4 | 48° 36´ ( | BH_D_3 | 48° 33´ | 2.9 | Skagit | 0 | 0 | 10 | 9 | SS |
| Bellingham_RS | Departure | X | Y | L2 | BH_D_3 | 48° 33´ 1 | BH_D_2 | 48° 30´ | 3.7 | Skagit | 0 | 0 | 12 | 10 | SS |
| Bellingham_RS | Departure | X | Y | L1 | BH_D_2 | 48° 30´ ( | RS_A_6 | 48° 28´ | 2.2 | Skagit | 0 | 0 | 14 | 11 | SS |
| Bellingham_RS | Departure | T | N | L0a | RS_A_6 | 48° 28´ ( | RS_D_12 | 48° 27´ | 1.3 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_12 | 48° 27´ 1 | RS_D_13 | 48° 26´ | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | Y | L13 | RS_D_13 | 48° 26´ 1 | RS_D_14 | 48° 24´ | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L14 | RS_D_14 | 48° 24´ 3 | RS_D_15 | 48° 20´ | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L15a | RS_D_15 | 48° 20´ 1 | PS_D_27 | 48° 10´ | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 3 | PS_D_28 | 48° 11´ | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 2 | PS_D_29 | 48° 14´ | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 1 | PS_D_30 | 48° 15´ | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 2 | PS_D_31 | 48° 17´ | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 3 | PS_D_32 | 48° 30´ | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 3 | PS_D_33 | 48° 30´ | 10.9 | Calallam | 0 | 0 | SS | SS | SS |
| | | | | | | | | Total Distance | 111.1 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing:  SEA to BELLINGHAM**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP** | **End WP** | **aypoint** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° | PS_A_2 | 48° 28´ | 10.7 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° | PS_A_3 | 48° 13´ | 35.9 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° | PS_A_4 | 48° 13´ | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | N | L4 | PS_A_4 | 48° | PS_A_5 | 48° 09´ | 6.9 | Calallam | 0 | 0 | 15 | 12 | SS |
| Sea_Tacoma | Arrival | M | N | L5 | PS_A_5 | 48° | PS_A_6 | 48° 09´ | 0.6 | Calallam | 0 | 0 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | N | L1a | PS_A_6 | 48° | RS_A_2 | 48° 16´ | 13.1 | Calallam | 0 | 0 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° | RS_A_3 | 48° 19´ | 6.6 | San Juan | 0 | 0 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L3 | RS_A_3 | 48° | RS_A_4 | 48° 24´ | 8.3 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L4 | RS_A_4 | 48° | RS_A_5 | 48° 26´ | 2.7 | San Juan | 0 | 0 | 15 | 11 | SS |
| PA_CherryPT | Arrival | T | N | L5 | RS_A_5 | 48° | RS_A_6 | 48° 28´ | 1.9 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_Bellingham | Arrival | T | N | L1a | RS_A_6 | 48° | BH_A_2 | 48° 30´ | 2.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_Bellingham | Arrival | T | N | L2 | BH_A_2 | 48° | BH_A_3 | 48° 33´ | 3.7 | Skagit | 0 | 0 | 15 | 10 | SS |
| RS_Bellingham | Arrival | T | N | L3 | BH_A_3 | 48° | BH_A_4 | 48° 36´ | 2.9 | Skagit | 0 | 0 | 15 | 10 | SS |
| RS_Bellingham | Arrival | T | N | L4 | BH_A_4 | 48° | BH_A_5 | 48° 38´ | 4.1 | Skagit | 0 | 0 | 13 | 10 | SS |
| RS_Bellingham | Arrival | X | Y | L5 | BH_A_5 | 48° | BH_A_6 | 48° 38´ | 0.4 | Skagit | 0 | 0 | 13 | 10 | SS |
| RS_Bellingham | Arrival | M | Y | L6 | BH_A_6 | 48° | BH_A_7 | 48° 42´ | 4.2 | Whatcom | 0 | 0 | 10 | 8 | 6 |

Total Distance   119.5 nm

Note:  SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: BELLINGHAM HARBOR

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| RS_Bellingham | Arrival | | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | Mode: | M | | Whatcom | | | | | |
| Bellingham_RS | Departure | | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | NPE: | Y | | Whatcom | | | | | |

NOTE: All ARRIVAL harbor transits branch from BH_A_7

NOTE: All DEPARTURE harbor transits goto BH_D_7

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bellingham_PortDock1 | Arrival | L1a | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BP_B_1 | 48° 42´ 46´´ N 122° 32´ 44´´ W | 2.88 | Whatcom | 0 | 3 | 3 | 3 | 3 |
| Bellingham_PortDock1 | Departure | L1a | BP_B_1 | 48° 42´ 46´´ N 122° 32´ 44´´ W | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | 2.88 | Whatcom | 0 | 5 | 5 | 5 | 5 |
| | | | | | | | | | | | | | |
| Bellingham_PortDock2 | Arrival | L1a | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BP_B_2 | 48° 42´ 46´´ N 122° 32´ 43´´ W | 3.24 | Whatcom | 0 | 3.5 | 3.5 | 3.5 | 3.5 |
| Bellingham_PortDock2 | Departure | L1a | BP_B_2 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | 3.24 | Whatcom | 0 | 6 | 6 | 6 | 6 |
| | | | | | | | | | | | | | |
| Bellingham_ColdStorage | Arrival | L1a | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BH_A_8 | 48° 44´ 45´´ N 122° 31´ 16´´ W | 2.21 | Whatcom | 0 | 4 | 4 | 4 | 4 |
| Bellingham_ColdStorage | Arrival | L2 | BH_A_8 | 48° 44´ 45´´ N 122° 31´ 16´´ W | BH_B_3 | 48° 45´ 32´´ N 122° 30´ 42´´ W | 0.86 | Whatcom | 0 | 3 | 3 | 3 | 3 |
| Bellingham_ColdStorage | Departure | L2 | BH_B_3 | 48° 45´ 32´´ N 122° 30´ 42´´ W | BH_A_8 | 48° 44´ 45´´ N 122° 31´ 16´´ W | 0.86 | Whatcom | 0 | 3 | 3 | 3 | 3 |
| Bellingham_ColdStorage | Departure | L1a | BH_A_8 | 48° 44´ 45´´ N 122° 31´ 16´´ W | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | 2.21 | Whatcom | 0 | 6 | 6 | 6 | 6 |
| | | | | | | | | | | | | | |
| Bellingham_Anchorage | Arrival | L1a | BH_A_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BP_B_4 | 48° 44´ 18´´ N 122° 32´ 27´´ W | 1.53 | Whatcom | 0 | 3 | 3 | 3 | 3 |
| Bellingham_Anchorage | Departure | L1a | BP_B_4 | 48° 44´ 18´´ N 122° 32´ 27´´ W | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | 1.53 | Whatcom | 0 | 4 | 4 | 4 | 4 |

# Puget Sound Emissions Inventory

**OGV-Routing: BELLINGHAM to SEA**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Bellingham_RS | Departure | M | Y | L6 | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | 4.2 | Whatcom | 0 | 0 | 10 | 8 | 6 |
| Bellingham_RS | Departure | X | Y | L5 | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | 0.4 | Skagit | 0 | 0 | 11 | 9 | SS |
| Bellingham_RS | Departure | X | Y | L4 | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | BH_D_4 | 48° 36´ 07´´ N 122° 39´ 29´´ W | 4.1 | Skagit | 0 | 0 | 14 | 12 | SS |
| Bellingham_RS | Departure | T | N | L3 | BH_D_4 | 48° 36´ 07´´ N 122° 39´ 29´´ W | BH_D_3 | 48° 33´ 12´´ N 122° 39´ 48´´ W | 2.9 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L2 | BH_D_3 | 48° 33´ 12´´ N 122° 39´ 48´´ W | BH_D_2 | 48° 30´ 09´´ N 122° 43´ 05´´ W | 3.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L1a | BH_D_2 | 48° 30´ 09´´ N 122° 43´ 05´´ W | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L0a | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | 1.3 | Skagit | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L12 | RS_D_12 | 48° 27´ 12´´ N 122° 45´ 18´´ W | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | 1.1 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L13 | RS_D_13 | 48° 26´ 10´´ N 122° 45´ 48´´ W | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | 2.2 | San Juan | 0 | 0 | 15 | 13 | SS |
| CherryPT_PA | Departure | T | N | L14 | RS_D_14 | 48° 24´ 37´´ N 122° 48´ 09´´ W | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | 8.1 | San Juan | 0 | 0 | SS | SS | SS |
| CherryPT_PA | Departure | X | N | L15a | RS_D_15 | 48° 20´ 13´´ N 122° 58´ 21´´ W | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | 19.0 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | M | N | L27 | PS_D_27 | 48° 10´ 33´´ N 123° 23´ 03´´ W | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | 0.8 | Calallam | 0 | 0 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | N | L28 | PS_D_28 | 48° 11´ 21´´ N 123° 23´ 02´´ W | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | 4.9 | Calallam | 0 | 0 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14´ 13´´ N 123° 28´ 57´´ W | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | 3.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15´ 21´´ N 123° 33´ 17´´ W | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | 15.4 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17´ 36´´ N 123° 56´ 06´´ W | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | 34.1 | Calallam | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30´ 38´´ N 124° 43´ 36´´ W | PS_D_33 | 48° 30´ 43´´ N 125° 00´ 00´´ W | 10.9 | Calallam | 0 | 0 | SS | SS | SS |

Total Distance 118.2 nm

Note: SS - Service Speed

## Puget Sound Emissions Inventory

**OGV-Routing: BELLINGHAM to VANCOUVER (NB3)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Container Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Bellingham_RS | Departure | M | Y | L6 | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | 4.2 | Whatcom | 0 | 0 | 10 | 8 | 6 |
| Bellingham_RS | Departure | M | Y | L5 | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | 0.4 | Skagit | 0 | 0 | 11 | 9 | SS |
| Bellingham_RS | Departure | X | Y | L4a | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | LI_D_1 | 48° 37´ 15´´ N 122° 38´ 00´´ W | 2.7 | Skagit | 0 | 0 | 14 | 12 | SS |
| Vendovi_GStght | Departure | T | N | L1 | LI_D_1 | 48° 37´ 15´´ N 122° 38´ 00´´ W | LI_D_2 | 48° 38´ 43´´ N 122° 39´ 49´´ W | 1.9 | Skagit | 0 | 0 | 10 | 12 | SS |
| Vendovi_GStght | Departure | T | N | L2a | LI_D_2 | 48° 38´ 43´´ N 122° 39´ 49´´ W | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | 2.4 | Whatcom | 0 | 0 | 12 | 12 | SS |
| PA_CherryPT | Arrival | T | N | L12 | RS_A_12 | 48° 40´ 35´´ N 122° 42´ 10´´ W | RS_A_13 | 48° 45´ 17´´ N 122° 45´ 50´´ W | 5.3 | Whatcom | 0 | 0 | 15 | 12 | SS |
| BuoyYCA_NB3 | Departure | T | N | L1a | RS_A_13 | 48° 45´ 17´´ N 122° 45´ 50´´ W | SG_D_1 | 48° 47´ 27´´ N 122° 51´ 18´´ W | 4.2 | Whatcom | 0 | 0 | 17 | 13 | SS |
| BuoyYCA_NB3 | Departure | T | N | L2 | SG_D_1 | 48° 47´ 27´´ N 122° 51´ 18´´ W | SG_D_2 | 49° 00´ 09´´ N 123° 14´ 09´´ W | 19.7 | Whatcom | 0 | 0 | SS | SS | SS |
| | | | | | | | | Total Distance | 40.7 nm | | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

## OGV-Routing: BELLINGHAM to TACOMA

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **Starting WP Lat/Lon** | **End WP** | **Ending Waypoint Lat/Lon** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| Bellingham_RS | Departure | M | Y | L6 | BH_D_7 | 48° 42´ 46´´ N 122° 32´ 43´´ W | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | 4.2 | Whatcom | 0 | 0 | 10 | 8 | 6 |
| Bellingham_RS | Departure | X | Y | L5 | BH_D_6 | 48° 38´ 43´´ N 122° 34´ 10´´ W | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | 0.4 | Skagit | 0 | 0 | 11 | 9 | SS |
| Bellingham_RS | Departure | X | Y | L4 | BH_D_5 | 48° 38´ 22´´ N 122° 34´ 18´´ W | BH_D_4 | 48° 36´ 07´´ N 122° 39´ 29´´ W | 4.1 | Skagit | 0 | 0 | 14 | 12 | SS |
| Bellingham_RS | Departure | T | N | L3 | BH_D_4 | 48° 36´ 07´´ N 122° 39´ 29´´ W | BH_D_3 | 48° 33´ 12´´ N 122° 39´ 48´´ W | 2.9 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L2 | BH_D_3 | 48° 33´ 12´´ N 122° 39´ 48´´ W | BH_D_2 | 48° 30´ 09´´ N 122° 43´ 05´´ W | 3.7 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L1 | BH_D_2 | 48° 30´ 09´´ N 122° 43´ 05´´ W | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | 2.2 | Skagit | 0 | 0 | 15 | 13 | SS |
| Bellingham_RS | Departure | T | N | L0a | RS_A_6 | 48° 28´ 00´´ N 122° 43´ 53´´ W | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | 1.9 | San Juan | 0 | 0 | 15 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L2 | AA_D_2 | 48° 24´ 08´´ N 122° 44´ 50´´ W | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | 1.8 | San Juan | 0 | 0 | 16 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L3 | AA_D_3 | 48° 22´ 25´´ N 122° 45´ 34´´ W | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | 9.3 | Island | 0 | 0 | 17 | 13 | SS |
| Anacortes_Admr | Departure | T | N | L4 | AA_D_4 | 48° 13´ 29´´ N 122° 49´ 22´´ W | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | 2.1 | Island | 0 | 0 | SS | SS | SS |
| Anacortes_Admr | Departure | T | N | L5a | AA_D_5 | 48° 11´ 32´´ N 122° 48´ 21´´ W | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | 0.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L9 | PS_A_9 | 48° 10´ 57´´ N 122° 48´ 01´´ W | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | 6.8 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L10 | PS_A_10 | 48° 06´ 35´´ N 122° 40´ 10´´ W | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | 5.6 | Jefferson | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L11 | PS_A_11 | 48° 01´ 08´´ N 122° 38´ 08´´ W | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | 4.0 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L12 | PS_A_12 | 47° 57´ 41´´ N 122° 35´ 10´´ W | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | 1.8 | Island | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L13 | PS_A_13 | 47° 56´ 38´´ N 122° 32´ 57´´ W | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | 2.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L14 | PS_A_14 | 47° 55´ 17´´ N 122° 30´ 06´´ W | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | 9.7 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L15 | PS_A_15 | 47° 45´ 54´´ N 122° 26´ 45´´ W | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | 6.3 | Kitsap | 0 | 0 | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L16 | PS_A_16 | 47° 39´ 42´´ N 122° 28´ 24´´ W | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | 5.2 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L17 | PS_A_17 | 47° 34´ 32´´ N 122° 27´ 32´´ W | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | 2.8 | Kitsap | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | T | N | L18 | PS_A_18 | 47° 31´ 51´´ N 122° 26´ 34´´ W | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | 5.3 | King | 0 | 0 | 16 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L19 | PS_A_19 | 47° 26´ 44´´ N 122° 24´ 45´´ W | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | 4.1 | King | 0 | 0 | 17 | 13 | SS |
| Sea_Tacoma | Arrival | X | Y | L20 | PS_A_20 | 47° 23´ 09´´ N 122° 21´ 56´´ W | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | 5.3 | King | 0 | 0 | 13 | 12 | SS |
| Sea_Tacoma | Arrival | M | Y | L21 | PS_A_21 | 47° 19´ 39´´ N 122° 27´ 52´´ W | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | 0.5 | King | 0 | 0 | 10 | 10 | 9 |
| Sea_Tacoma | Arrival | M | Y | L22 | PS_A_22 | 47° 19´ 10´´ N 122° 28´ 05´´ W | PS_A_23 | 47° 18´ 07´´ N 122° 27´ 41´´ W | 1.1 | Pierce | 0 | 0 | 10 | 10 | 8 |
| | | | | | | | | Total Distance | 93.9 | nm | | | | | |

Note: SS - Service Speed

Note: Red numbers - engines off

## Puget Sound Emissions Inventory

### OGV-Routing: TACOMA to BELLINGHAM

Lat/Long in WGS84 Datum

**DRAFT**

Speed by Link (knots)

| Route | Arr/Dep | Mode | NPE | Link ID | Start WP | WP | End WP | aypoin | Dist. | County | Fast<br>Cruise | Fast<br>Container Auto | Medium<br>Reefer RO/RO Fishing | Slow<br>Bulkers Tankers Log Fishing | Very Slow<br>Fishing |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tacoma_Sea | Departure | M | Y | L2 | PS_D_2 | 47° 1 | PS_D_3 | 47° 19 | 1.3 | Pierce | 0 | 0 | 10 | 10 | 9 |
| Tacoma_Sea | Departure | X | Y | L3 | PS_D_3 | 47° 1 | PS_D_4 | 47° 19 | 0.9 | Pierce | 0 | 0 | 12 | 12 | SS |
| Tacoma_Sea | Departure | X | Y | L4 | PS_D_4 | 47° 1 | PS_D_5 | 47° 23 | 4.8 | King | 0 | 0 | 14 | SS | SS |
| Tacoma_Sea | Departure | X | Y | L5 | PS_D_5 | 47° 2 | PS_D_6 | 47° 26 | 4.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L6 | PS_D_6 | 47° 2 | PS_D_7 | 47° 34 | 7.8 | King | 0 | 0 | 15 | SS | SS |
| Tacoma_Sea | Departure | T | N | L7 | PS_D_7 | 47° 3 | PS_D_8 | 47° 35 | 1.4 | King | 0 | 0 | 16 | SS | SS |
| Tacoma_Sea | Departure | T | N | L8 | PS_D_8 | 47° 3 | PS_D_9 | 47° 37 | 1.1 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L9 | PS_D_9 | 47° 3 | PS_D_10 | 47° 39 | 2.7 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L10 | PS_D_10 | 47° 3 | PS_D_11 | 47° 41 | 2.3 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L11 | PS_D_11 | 47° 4 | PS_D_12 | 47° 45 | 4.0 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L12 | PS_D_12 | 47° 4 | PS_D_13 | 47° 46 | 0.8 | King | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L13 | PS_D_13 | 47° 4 | PS_D_14 | 47° 48 | 1.5 | Snohomish | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L14 | PS_D_14 | 47° 4 | PS_D_15 | 47° 52 | 4.6 | Kitsap | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L15 | PS_D_15 | 47° 5 | PS_D_16 | 47° 55 | 3.1 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L16 | PS_D_16 | 47° 5 | PS_D_17 | 47° 57 | 2.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L17 | PS_D_17 | 47° 5 | PS_D_18 | 47° 58 | 1.9 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L18 | PS_D_18 | 47° 5 | PS_D_19 | 48° 02 | 4.5 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L19 | PS_D_19 | 48° 0 | PS_D_20 | 48° 04 | 2.8 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L20 | PS_D_20 | 48° 0 | PS_D_21 | 48° 06 | 2.2 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L21 | PS_D_21 | 48° 0 | PS_D_22 | 48° 07 | 1.3 | Jefferson | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L22 | PS_D_22 | 48° 0 | PS_D_23 | 48° 11 | 5.3 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L23 | PS_D_23 | 48° 1 | PS_D_24 | 48° 11 | 1.4 | Island | 0 | 0 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L24a | PS_D_24 | 48° 1 | AA_A_1 | 48° 13 | 2.2 | Island | 0 | 0 | SS | SS | SS |
| Admr_Anacortes | Arrival | X | N | L1 | AA_A_1 | 48° 1 | AA_A_2 | 48° 24 | 11.3 | Island | 0 | 0 | 18 | SS | SS |
| Admr_Anacortes | Arrival | T | N | L2 | AA_A_2 | 48° 2 | AA_A_3 | 48° 24 | 0.7 | Island | 0 | 0 | 16 | 12 | SS |
| Admr_Anacortes | Arrival | T | N | L3a | AA_A_3 | 48° 2 | RS_A_6 | 48° 28 | 3.2 | Skagit | 0 | 0 | 15 | 11 | SS |
| RS_Bellingham | Arrival | T | N | L1a | RS_A_6 | 48° 2 | BH_A_2 | 48° 30 | 2.2 | Skagit | 0 | 0 | 14 | 11 | SS |
| RS_Bellingham | Arrival | T | N | L2 | BH_A_2 | 48° 3 | BH_A_3 | 48° 33 | 3.7 | Skagit | 0 | 0 | 14 | 10 | SS |
| RS_Bellingham | Arrival | T | N | L3 | BH_A_3 | 48° 3 | BH_A_4 | 48° 36 | 2.9 | Skagit | 0 | 0 | 14 | 10 | SS |
| RS_Bellingham | Arrival | T | N | L4 | BH_A_4 | 48° 3 | BH_A_5 | 48° 38 | 4.1 | Skagit | 0 | 0 | 14 | 10 | SS |
| RS_Bellingham | Arrival | X | Y | L5 | BH_A_5 | 48° 3 | BH_A_6 | 48° 38 | 0.4 | Skagit | 0 | 0 | 12 | 10 | SS |
| RS_Bellingham | Arrival | M | Y | L6 | BH_A_6 | 48° 3 | BH_A_7 | 48° 42 | 4.2 | Whatcom | 0 | 0 | 10 | 8 | 6 |

Total Distance 97.4 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

**OGV-Routing: PORT ANGELES to VANCOUVER (NB2)**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| | | | | | | | | | | | | | | Bulkers | |
| | | | | | | | | | | | | | Reefer | Tankers | |
| | | | | | | | | | | | | Container | RO/RO | Log | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP La** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08´ | PA_D_2 | 48° 08´ 18 | 1.2 | Calallam | 0 | 6 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08´ | PA_D_3 | 48° 09´ 36 | 1.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3a | PA_D_3 | 48° 09´ | PS_A_6 | 48° 09´ 58 | 0.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| PA_CherryPT | Arrival | X | N | L1a | PS_A_6 | 48° 09´ | RS_A_2 | 48° 16´ 08 | 13.1 | Calallam | 0 | 20 | 15 | 13.5 | SS |
| PA_CherryPT | Arrival | T | N | L2 | RS_A_2 | 48° 16´ | RS_A_3 | 48° 19´ 40 | 6.6 | San Juan | 0 | 21 | 15 | 13 | SS |
| PA_CherryPT | Arrival | T | N | L3 | RS_A_3 | 48° 19´ | AD_D_3 | 48° 19´ 51 | 8.3 | San Juan | 0 | 20 | 15 | 13 | SS |
| AI_NB2 | Departure | T | N | L3 | AD_D_3 | 48° 19´ | AD_D_4 | 48° 24´ 17 | 5.1 | San Juan | 0 | 22 | SS | SS | SS |
| AI_NB2 | Departure | T | N | L4 | AD_D_4 | 48° 24´ | AD_D_5 | 48° 29´ 18 | 7.3 | San Juan | 0 | 22 | SS | SS | SS |
| AI_NB2 | Departure | T | N | L5 | AD_D_5 | 48° 29´ | AD_D_6 | 48° 34´ 47 | 5.8 | San Juan | 0 | 22 | SS | SS | SS |
| AI_NB2 | Departure | X | N | L6 | AD_D_6 | 48° 34´ | AD_D_7 | 48° 40´ 00 | 5.4 | San Juan | 0 | 18 | 16 | 11 | SS |
| | | | | | | | | Total Distance | 54.7 | nm | | | | | |

## Puget Sound Emissions Inventory

**OGV-Routing: VANCOUVER (NB2) to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Fast | Fast | Medium | Slow | Very Slow |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **WP L** | **End WP** | **aypoin** | **Dist.** | **County** | **Cruise** | **Containe Auto** | **Reefer RO/RO Fishing** | **Bulkers Tankers Log Fishing** | **Fishing** |
| NB2_AI | Arrival | T | N | L1 | AD_A_1 | 48° 40 | AD_A_2 | 48° 34 | 5.2 | San Juan | 0 | 18 | 16 | SS | SS |
| NB2_AI | Arrival | T | N | L2 | AD_A_2 | 48° 34 | AD_A_3 | 48° 29 | 5.9 | San Juan | 0 | 22 | SS | SS | SS |
| NB2_AI | Arrival | T | N | L3 | AD_A_3 | 48° 29 | AD_A_4 | 48° 27 | 2.4 | San Juan | 0 | 22 | SS | SS | SS |
| NB2_AI | Arrival | T | N | L4 | AD_A_4 | 48° 27 | AD_A_5 | 48° 25 | 3.6 | San Juan | 0 | 22 | SS | SS | SS |
| NB2_AI | Arrival | T | N | L5 | AD_A_5 | 48° 25 | AD_A_6 | 48° 22 | 3.3 | San Juan | 0 | 22 | SS | SS | SS |
| NB2_AI | Arrival | T | N | L6 | AD_A_6 | 48° 22 | AD_A_7 | 48° 20 | 2.9 | San Juan | 0 | 22 | SS | SS | SS |
| NB2_AI | Arrival | X | N | L7a | AD_A_7 | 48° 20 | PS_D_27 | 48° 10 | 19.0 | Calallam | 0 | 16 | 14 | 13 | 11 |
| CPFern_PA | Arrival | X | Y | L1a | PS_D_27 | 48° 10 | PA_A_2 | 48° 09 | 0.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09 | PA_A_3 | 48° 08 | 1.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08 | PA_A_4 | 48° 08 | 1.0 | Calallam | 0 | 6 | 6 | 6 | 6 |
| | | | | | | | Total Distance | | 45.7 | nm | Note: SS - Service Speed | | | | |

# Puget Sound Emissions Inventory

**OGV-Routing: SEA to PORT ANGELES**

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | Speed by Link (knots) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Container** | **RO/RO** | **Log** | |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **ng WP La** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_Tacoma | Arrival | T | N | L1 | PS_A_1 | 48° 28´ 3 | PS_A_2 | 48° 28´ 3 | 10.7 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L2 | PS_A_2 | 48° 28´ 3 | PS_A_3 | 48° 13´ 2 | 35.9 | Calallam | 0 | SS | SS | SS | SS |
| Sea_Tacoma | Arrival | T | N | L3 | PS_A_3 | 48° 13´ 2 | PS_A_4 | 48° 13´ 2 | 15.4 | Calallam | 0 | 20 | SS | SS | SS |
| Sea_Tacoma | Arrival | X | Y | L4 | PS_A_4 | 48° 13´ 2 | PS_A_5 | 48° 09´ 2 | 6.9 | Calallam | 0 | 16 | 15 | 12 | SS |
| Sea_PortAngeles | Arrival | M | Y | L1a | PS_A_5 | 48° 09´ 2 | PA_A_2 | 48° 09´ 4 | 0.4 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L1 | PA_A_2 | 48° 09´ 4 | PA_A_3 | 48° 08´ 2 | 1.6 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Sea_PortAngeles | Arrival | M | Y | L2 | PA_A_3 | 48° 08´ 2 | PA_A_4 | 48° 08´ 0 | 1.0 | Calallam | 0 | 6 | 6 | 6 | 6 |

Total Distance 71.8 nm

Note: SS - Service Speed

# Puget Sound Emissions Inventory

## OGV-Routing: PORT ANGELES HARBOR

Lat/Long in WGS84 Datum

**DRAFT**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | **Speed by Link (knots)** | | | |
| | | | | | | | | | | | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
| | | | | | | | | | | | | | | **Bulkers** | |
| | | | | | | | | | | | | | **Reefer** | **Tankers** | |
| | | | | | | | | | | | | **Containe** | **RO/RO** | **Log** | |
| **Route** | **To_Port** | **To_Pier** | **Arr/Dep** | **Link ID** | **Start WP** | **WP** | **End WP** | **ypo** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| Sea_PortAngeles | PORT ANGELES | | Arrival | | PA_A_4 | 48° ( | Mode: | M | | Calallam | | | | | |
| PortAngeles_Sea | PORT ANGELES | | Departure | | PA_D_1 | 48° ( | NPE: | Y | | Calallam | | | | | |

NOTE: All ARRIVAL harbor transits branch from PA_A_4

NOTE: All DEPARTURE harbor transits goto PA_D_1

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PortAngeles_1-Nor | PORT ANGELES | 1-NORTH | Arrival | L1a | PA_A_4 | 48° ( | PA_B_1 | N 1 | 2.55 | Calallam | 3 | 3 | 3 | 3 | 3 |
| 1-North_PortAngel | PORT ANGELES | 1-NORTH | Departure | L1a | PA_B_1 | N 12 | PA_D_1 | 48° | 2.55 | Calallam | 4 | 4 | 4 | 4 | 4 |
| | | | | | | | | | | | | | | | |
| PortAngeles_Tesor | PORT ANGELES | TESORO | Arrival | L1a | PA_A_4 | 48° ( | PA_B_2 | N 1 | 2.41 | Calallam | 3 | 3 | 3 | 3 | 3 |
| Tesoro_PortAngele | PORT ANGELES | TESORO | Departure | L1a | PA_B_2 | N 12 | PA_D_1 | 48° | 2.41 | Calallam | 4 | 4 | 4 | 4 | 4 |
| | | | | | | | | | | | | | | | |
| PortAngeles_Tesor | PORT ANGELES | CITY DO | Arrival | L1a | PA_A_4 | 48° ( | PA_B_3 | N 1 | 1.93 | Calallam | 3 | 3 | 3 | 3 | 3 |
| Tesoro_PortAngele | PORT ANGELES | CITY DO | Departure | L1a | PA_B_3 | N 12 | PA_D_1 | 48° | 1.93 | Calallam | 4 | 4 | 4 | 4 | 4 |
| | | | | | | | | | | | | | | | |
| PortAngeles_Tesor | PORT ANGELES | T PIER | Arrival | L1a | PA_A_4 | 48° ( | PA_B_4 | N 1 | 1.83 | Calallam | 3 | 3 | 3 | 3 | 3 |
| Tesoro_PortAngele | PORT ANGELES | T PIER | Departure | L1a | PA_B_4 | N 12 | PA_D_1 | 48° | 1.83 | Calallam | 4 | 4 | 4 | 4 | 4 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sea_PortAngeles | PORT ANGELES | | Arrival | | PA_A_3 | 48° ( | Mode: | M | | Calallam | | | | | |
| PortAngeles_Sea | PORT ANGELES | | Departure | | PA_D_2 | 48° ( | NPE: | Y | | Calallam | | | | | |

NOTE: All ANCHORAGE ARRIVAL harbor transits branch from PA_A_3

NOTE: All ANCHORAGE DEPARTURE harbor transits goto PA_D_2

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PortAngeles_Tesor | PORT ANGELES | ANCHOR | Arrival | L1a | PA_A_4 | 48° ( | PA_B_5 | N 1 | 0.79 | Calallam | 2 | 2 | 2 | 2 | 2 |
| Tesoro_PortAngele | PORT ANGELES | ANCHOR | Departure | L1a | PA_B_5 | N 12 | PA_D_1 | 48° | 0.53 | Calallam | 4 | 4 | 4 | 4 | 4 |

# Puget Sound Emissions Inventory

**OGV-Routing:  PORT ANGELES to SEA**

Lat/Long in WGS84 Datum

|  |  |  |  |  |  |  |  |  |  |  | Speed by Link (knots) |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |  | **Fast** | **Fast** | **Medium** | **Slow** | **Very Slow** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | **Bulkers** |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  | **Reefer** | **Tankers** |  |
| **DRAFT** |  |  |  |  |  |  |  |  |  |  |  | **Containe** | **RO/RO** | **Log** |  |
| **Route** | **Arr/Dep** | **Mode** | **NPE** | **Link ID** | **Start WP** | **g WP L** | **End WP** | **Waypoint** | **Dist.** | **County** | **Cruise** | **Auto** | **Fishing** | **Fishing** | **Fishing** |
| PortAngeles_Sea | Departure | M | Y | L1 | PA_D_1 | 48° 08 | PA_D_2 | 48° 08´ 1 | 1.2 | Calallam | 0 | 6 | 6 | 6 | 6 |
| PortAngeles_Sea | Departure | M | Y | L2 | PA_D_2 | 48° 08 | PA_D_3 | 48° 09´ 3 | 1.5 | Calallam | 0 | 8 | 8 | 8 | 8 |
| PortAngeles_Sea | Departure | M | Y | L3 | PA_D_3 | 48° 09 | PA_D_4 | 48° 11´ 2 | 1.8 | Calallam | 0 | 8 | 8 | 8 | 8 |
| Tacoma_Sea | Departure | X | Y | L28 | PS_D_28 | 48° 11 | PS_D_29 | 48° 14´ 1 | 4.9 | Calallam | 0 | 15 | 14 | 12 | SS |
| Tacoma_Sea | Departure | T | N | L29 | PS_D_29 | 48° 14 | PS_D_30 | 48° 15´ 2 | 3.1 | Calallam | 0 | 19 | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L30 | PS_D_30 | 48° 15 | PS_D_31 | 48° 17´ 3 | 15.4 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L31 | PS_D_31 | 48° 17 | PS_D_32 | 48° 30´ 3 | 34.1 | Calallam | 0 | SS | SS | SS | SS |
| Tacoma_Sea | Departure | T | N | L32 | PS_D_32 | 48° 30 | PS_D_33 | 48° 30´ 4 | 10.9 | Calallam | 0 | SS | SS | SS | SS |
|  |  |  |  |  |  |  |  | Total Distance | 72.8 | nm | Note:  SS - Service Speed |  |  |  |  |

# APPENDIX B - SUPPORTING DATA

## HARBOR VESSEL DATA

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 650273 | Andrew Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | 16-645-E6 | 1981 | ULSD | 2000 | 2818 | 0.31 |
| 650273 | Andrew Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | 16-645-E6 | 1981 | ULSD | 2000 | 2818 | 0.31 |
| 650273 | Andrew Foss | Assist & Escort | Foss | 3 | auxiliary | GM Detroit | 671 | 1982 | ULSD | 100 | 2964 | 0.43 |
| 650273 | Andrew Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 671 | 1982 | ULSD | 100 | 4281 | 0.43 |
| 573848 | Barbara Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | 12-645-E6 | 1975 | ULSD | 2150 | 6914 | 0.31 |
| 573848 | Barbara Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | 12-645-E6 | 1975 | ULSD | 2150 | 6948 | 0.31 |
| 573848 | Barbara Foss | Assist & Escort | Foss | 3 | auxiliary | GM Detroit | 671 | 2003 | ULSD | 192 | 4082 | 0.43 |
| 573848 | Barbara Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 671 | 2003 | ULSD | 192 | 4190 | 0.43 |
| 573848 | Barbara Foss | Assist & Escort | Foss | 5 | auxiliary | GM Detroit | 671 |  | ULSD | 192 | 148 | 0.43 |
| 1063755 | Chief | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3516 | 1998 | ULSD | 2400 | 2600 | 0.31 |
| 1063755 | Chief | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3516 | 1998 | ULSD | 2400 | 2600 | 0.31 |
| 1063755 | Chief | Assist & Escort | Crowley | 3 | auxiliary | CAT | 3304 | 1998 | ULSD | 140 | 3000 | 0.43 |
| 1063755 | Chief | Assist & Escort | Crowley | 4 | auxiliary | CAT | 3304 | 1998 | ULSD | 140 | 3000 | 0.43 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 1 | Propulsion | Fairbanks M | Alco 16-251 | 1981 | ULSD | 4100 | 2730 | 0.31 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 2 | Propulsion | Fairbanks M | Alco 16-251 | 1981 | ULSD | 4100 | 3067 | 0.31 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 3 | auxiliary | Cummins | 6cta 8.3 -dc | 1982 | ULSD | 228 | 4475 | 0.43 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 4 | auxiliary | Cummins | 6cta 8.3 -dc | 1982 | ULSD | 228 | 4193 | 0.43 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 5 | auxiliary | Cummins | N-14-M |  | ULSD | 480 | 144 | 0.43 |
| 1139986 | Corbin Foss | Assist & Escort | Foss | 6 | auxiliary | John Deere | 6068 |  | ULSD | 190 | 83 | 0.43 |
| 1228451 | Delta Lindsey | Assist & Escort | Foss | 1 | Propulsion | Caterpillar | 3516B | 2010 | ULSD | 2575 | 2481 | 0.31 |
| 1228451 | Delta Lindsey | Assist & Escort | Foss | 2 | Propulsion | Caterpillar | 3516B | 2010 | ULSD | 2575 | 2480 | 0.31 |
| 1228451 | Delta Lindsey | Assist & Escort | Foss | 3 | auxiliary | Caterpillar | C6.6 | 2010 | ULSD | 201 | 1623 | 0.43 |
| 1228451 | Delta Lindsey | Assist & Escort | Foss | 4 | auxiliary | Caterpillar | C6.6 | 2010 | ULSD | 201 | 1623 | 0.43 |
| 1228451 | Delta Lindsey | Assist & Escort | Foss | 5 | auxiliary | Caterpillar | C4.4 | 2010 | ULSD | 74 | 4757 | 0.43 |
| 997792 | Garth Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | ME16-710- | 1993 | ULSD | 4000 | 3589 | 0.31 |
| 997792 | Garth Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | ME16-710- | 1993 | ULSD | 4000 | 3589 | 0.31 |
| 997792 | Garth Foss | Assist & Escort | Foss | 3 | auxiliary | GM Detroit | 6V-92TA | 2004 | ULSD | 241 | 5870 | 0.43 |
| 997792 | Garth Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 6V-92TA | 2005 | ULSD | 241 | 3455 | 0.43 |
| 1063763 | Guide | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3516 | 1998 | ULSD | 2400 | 2600 | 0.31 |
| 1063763 | Guide | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3516 | 1998 | ULSD | 2400 | 2600 | 0.31 |
| 1063763 | Guide | Assist & Escort | Crowley | 3 | auxiliary | CAT | 3304 | 1998 | ULSD | 140 | 3000 | 0.43 |
| 1063763 | Guide | Assist & Escort | Crowley | 4 | auxiliary | CAT | 3304 | 1998 | ULSD | 140 | 3000 | 0.43 |
| 650272 | Henry Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | 12-645-E6 | 1982 | ULSD | 1500 | 3156 | 0.31 |
| 650272 | Henry Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | 12-645-E6 | 1982 | ULSD | 1500 | 3156 | 0.31 |
| 650272 | Henry Foss | Assist & Escort | Foss | 3 | Propulsion | Cummins | KTA-50-M2 | 2004 | ULSD | 1700 | 2853 | 0.31 |
| 650272 | Henry Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 671 | 2000 | ULSD | 192 | 1666 | 0.43 |
| 650272 | Henry Foss | Assist & Escort | Foss | 5 | auxiliary | GM Detroit | 671 | 2000 | ULSD | 192 | 4307 | 0.43 |
| 997794 | Lindsey Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | 16-710-G7A | 1993 | ULSD | 4000 | 2849 | 0.31 |
| 997794 | Lindsey Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | 16-710-G7A | 1993 | ULSD | 4000 | 2846 | 0.31 |
| 997794 | Lindsey Foss | Assist & Escort | Foss | 3 | auxiliary | GM Detroit | 6V-92TA | 2001 | ULSD | 550 | 3920 | 0.43 |
| 997794 | Lindsey Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 6V-92TA | 2002 | ULSD | 550 | 3990 | 0.43 |
| 9430507 | Pacific Star | Assist & Escort | Foss | 1 | Propulsion | MTU | T1627M12/ | 2006 | ULSD | 2575 | 3406 | 0.31 |
| 9430507 | Pacific Star | Assist & Escort | Foss | 2 | Propulsion | MTU | T1627M12/ | 2006 | ULSD | 2575 | 3404 | 0.31 |
| 9430507 | Pacific Star | Assist & Escort | Foss | 3 | auxiliary | Northern Li | M99C2 ? 99 | 2007 | ULSD | 201 | 4243 | 0.43 |
| 9430507 | Pacific Star | Assist & Escort | Foss | 4 | auxiliary | Northern Li | M99C2 ? 99 | 2007 | ULSD | 201 | 3620 | 0.43 |
| 1045212 | Protector | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3606 | 1996 | ULSD | 2550 | 2600 | 0.31 |
| 1045212 | Protector | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3606 | 1996 | ULSD | 2550 | 2600 | 0.31 |
| 1045212 | Protector | Assist & Escort | Crowley | 3 | auxiliary | CAT | 3304 | 1996 | ULSD | 140 | 3000 | 0.43 |
| 1045212 | Protector | Assist & Escort | Crowley | 4 | auxiliary | CAT | 3304 | 1996 | ULSD | 140 | 3000 | 0.43 |
| 1129936 | Response | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3308 | 2002 | ULSD | 3600 | 2600 | 0.31 |
| 1129936 | Response | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3308 | 2002 | ULSD | 3600 | 2600 | 0.31 |
| 1129936 | Response | Assist & Escort | Crowley | 3 | auxiliary | CAT | 3306 | 2002 | ULSD | 250 | 3000 | 0.43 |
| 1129936 | Response | Assist & Escort | Crowley | 4 | auxiliary | CAT | 3306 | 2002 | ULSD | 250 | 3000 | 0.43 |
| 1021169 | Tioga | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3516 | 2002 | ULSD | 2400 | 2600 | 0.31 |
| 1021169 | Tioga | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3516 | 2002 | ULSD | 2400 | 2600 | 0.31 |
| 1021169 | Tioga | Assist & Escort | Crowley | 3 | auxiliary | CAT | 3304 | 2002 | ULSD | 140 | 3000 | 0.43 |
| 1021169 | Tioga | Assist & Escort | Crowley | 4 | auxiliary | CAT | 3304 | 2002 | ULSD | 140 | 3000 | 0.43 |
| 1199816 | Valor | Assist & Escort | Crowley | 1 | Propulsion | CAT | 3516C | 2002 | ULSD | 2400 | 2600 | 0.31 |
| 1199816 | Valor | Assist & Escort | Crowley | 2 | Propulsion | CAT | 3516C | 2002 | ULSD | 2400 | 2600 | 0.31 |
| 1199816 | Valor | Assist & Escort | Crowley | 3 | auxiliary | CAT | C4.4 | 2002 | ULSD | 75 | 3000 | 0.43 |
| 1199816 | Valor | Assist & Escort | Crowley | 4 | auxiliary | CAT | C4.4 | 2002 | ULSD | 75 | 3000 | 0.43 |
| 649840 | Wedell Foss | Assist & Escort | Foss | 1 | Propulsion | GM EMD | 12-645-E6 | 1981 | ULSD | 1500 | 3529 | 0.31 |
| 649840 | Wedell Foss | Assist & Escort | Foss | 2 | Propulsion | GM EMD | 12-645-E6 | 1981 | ULSD | 1500 | 3529 | 0.31 |
| 649840 | Wedell Foss | Assist & Escort | Foss | 3 | Propulsion | Cummins | KTA-50-M2 | 2005 | ULSD | 1700 | 2966 | 0.31 |
| 649840 | Wedell Foss | Assist & Escort | Foss | 4 | auxiliary | GM Detroit | 671 | 1982 | ULSD | 192 | 4823 | 0.43 |
| 649840 | Wedell Foss | Assist & Escort | Foss | 5 | auxiliary | GM Detroit | 671 | 1982 | ULSD | 192 | 1697 | 0.43 |
| 7613698 | ADVENTURE | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 350 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7613698 | ADVENTURE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 7613698 | ADVENTURE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 271628 | AFOGNAK | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 290 | 48 | 0.3 |
| 271628 | AFOGNAK | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 290 | 48 | 0.3 |
| 271628 | AFOGNAK | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 599164 | AJ | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 760 | 48 | 0.3 |
| 599164 | AJ | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 760 | 48 | 0.3 |
| 599164 | AJ | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 641608 | AKEMI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 641608 | AKEMI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 641608 | AKEMI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7337165 | ALASKA BEAUTY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 7337165 | ALASKA BEAUTY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 7337165 | ALASKA BEAUTY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 996921 | ALASKA KNIGHT | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 2300 | 48 | 0.3 |
| 996921 | ALASKA KNIGHT | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 2300 | 48 | 0.3 |
| 996921 | ALASKA KNIGHT | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 586179 | ALASKA MIST | Commercial Fishing | GULF MIST | 1 | Propulsion | | | 1944 | ULSD | 750 | 48 | 0.3 |
| 586179 | ALASKA MIST | Commercial Fishing | GULF MIST | 2 | Propulsion | | | 1944 | ULSD | 750 | 48 | 0.3 |
| 586179 | ALASKA MIST | Commercial Fishing | GULF MIST | 3 | auxiliary | | | 1944 | ULSD | 330 | 48 | 0.3 |
| 637856 | ALASKA OCEAN | Commercial Fishing | AK OCEAN | 1 | Propulsion | | | 1981 | ULSD | 3125 | 48 | 0.3 |
| 637856 | ALASKA OCEAN | Commercial Fishing | AK OCEAN | 2 | Propulsion | | | 1981 | ULSD | 3125 | 48 | 0.3 |
| 637856 | ALASKA OCEAN | Commercial Fishing | AK OCEAN | 3 | auxiliary | | | 1981 | ULSD | 900 | 48 | 0.3 |
| 8133059 | ALASKA PACKER | Commercial Fishing | TRIDENT S | 1 | Propulsion | | | 1949 | ULSD | 900 | 48 | 0.3 |
| 8133059 | ALASKA PACKER | Commercial Fishing | TRIDENT S | 2 | Propulsion | | | 1949 | ULSD | 900 | 48 | 0.3 |
| 8133059 | ALASKA PACKER | Commercial Fishing | TRIDENT S | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 5232907 | ALASKA QUEEN II | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 450 | 48 | 0.3 |
| 5232907 | ALASKA QUEEN II | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 450 | 48 | 0.3 |
| 5232907 | ALASKA QUEEN II | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 510811 | ALASKAN | Commercial Fishing | | 1 | Propulsion | | | 1967 | ULSD | 350 | 48 | 0.3 |
| 510811 | ALASKAN | Commercial Fishing | | 2 | Propulsion | | | 1967 | ULSD | 350 | 48 | 0.3 |
| 510811 | ALASKAN | Commercial Fishing | | 3 | auxiliary | | | 1967 | ULSD | 100 | 48 | 0.3 |
| 7719193 | ALASKAN BEAUTY | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 7719193 | ALASKAN BEAUTY | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 7719193 | ALASKAN BEAUTY | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 599383 | ALASKAN COMMA | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 3000 | 48 | 0.3 |
| 599383 | ALASKAN COMMA | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 3000 | 48 | 0.3 |
| 599383 | ALASKAN COMMA | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 595760 | ALASKAN ENTERP | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 595760 | ALASKAN ENTERP | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 595760 | ALASKAN ENTERP | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 8845767 | ALASKAN LEADER | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 800 | 48 | 0.3 |
| 8845767 | ALASKAN LEADER | Commercial Fishing | | 2 | Propulsion | | | 1991 | ULSD | 800 | 48 | 0.3 |
| 8845767 | ALASKAN LEADER | Commercial Fishing | | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 8411932 | ALDEBARAN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8411932 | ALDEBARAN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8411932 | ALDEBARAN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 39072 | ALESSA LEI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 39072 | ALESSA LEI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 39072 | ALESSA LEI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8851649 | ALEUTIAN BALLAD | Commercial Fishing | | 1 | Propulsion | | | 1983 | ULSD | 400 | 48 | 0.3 |
| 8851649 | ALEUTIAN BALLAD | Commercial Fishing | | 2 | Propulsion | | | 1983 | ULSD | 400 | 48 | 0.3 |
| 8851649 | ALEUTIAN BALLAD | Commercial Fishing | | 3 | auxiliary | | | 1983 | ULSD | 100 | 48 | 0.3 |
| 7230989 | ALEUTIAN BEAUT | Commercial Fishing | | 1 | Propulsion | | | 1971 | ULSD | 350 | 48 | 0.3 |
| 7230989 | ALEUTIAN BEAUT | Commercial Fishing | | 2 | Propulsion | | | 1971 | ULSD | 350 | 48 | 0.3 |
| 7230989 | ALEUTIAN BEAUT | Commercial Fishing | | 3 | auxiliary | | | 1971 | ULSD | 100 | 48 | 0.3 |
| 7912109 | ALEUTIAN CHALL | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 850 | 48 | 0.3 |
| 7912109 | ALEUTIAN CHALL | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 850 | 48 | 0.3 |
| 7912109 | ALEUTIAN CHALL | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 642161 | ALEUTIAN FALCO | Commercial Fishing | NORQUEST | 1 | Propulsion | | | 1981 | ULSD | 1500 | 48 | 0.3 |
| 642161 | ALEUTIAN FALCO | Commercial Fishing | NORQUEST | 2 | Propulsion | | | 1981 | ULSD | 1500 | 48 | 0.3 |
| 642161 | ALEUTIAN FALCO | Commercial Fishing | NORQUEST | 3 | auxiliary | | | 1981 | ULSD | 900 | 48 | 0.3 |
| 7915864 | ALEUTIAN MARIN | Commercial Fishing | | 1 | Propulsion | | | 1979 | ULSD | 600 | 48 | 0.3 |
| 7915864 | ALEUTIAN MARIN | Commercial Fishing | | 2 | Propulsion | | | 1979 | ULSD | 600 | 48 | 0.3 |
| 7915864 | ALEUTIAN MARIN | Commercial Fishing | | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 522870 | ALEUTIAN SPRAY | Commercial Fishing | ALEUTIAN | 1 | Propulsion | | | 1969 | ULSD | 290 | 48 | 0.3 |
| 522870 | ALEUTIAN SPRAY | Commercial Fishing | ALEUTIAN | 2 | Propulsion | | | 1969 | ULSD | 290 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 522870 | ALEUTIAN SPRAY | Commercial Fishing | ALEUTIAN | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 8010087 | ALLIANCE | Commercial Fishing | | 1 | Propulsion | | | 1980 | ULSD | 500 | 48 | 0.3 |
| 8010087 | ALLIANCE | Commercial Fishing | | 2 | Propulsion | | | 1980 | ULSD | 500 | 48 | 0.3 |
| 8010087 | ALLIANCE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 560237 | ALYESKA | Commercial Fishing | WA'ATCH | 1 | Propulsion | | | 1974 | ULSD | 900 | 48 | 0.3 |
| 560237 | ALYESKA | Commercial Fishing | WA'ATCH | 2 | Propulsion | | | 1974 | ULSD | 900 | 48 | 0.3 |
| 560237 | ALYESKA | Commercial Fishing | WA'ATCH | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 511315 | AMATULI | Commercial Fishing | WIDING | 1 | Propulsion | | | 1967 | ULSD | 365 | 48 | 0.3 |
| 511315 | AMATULI | Commercial Fishing | WIDING | 2 | Propulsion | | | 1967 | ULSD | 364 | 48 | 0.3 |
| 511315 | AMATULI | Commercial Fishing | WIDING | 3 | auxiliary | | | 1967 | ULSD | 100 | 48 | 0.3 |
| 633219 | American Challenger | Commercial Fishing | AMERICAN | 1 | Propulsion | | | 1981 | ULSD | 450 | 144 | 0.3 |
| 633219 | American Challenger | Commercial Fishing | AMERICAN | 2 | Propulsion | | | 1981 | ULSD | 450 | 144 | 0.3 |
| 633219 | American Challenger | Commercial Fishing | AMERICAN | 3 | auxiliary | | | 1981 | ULSD | 100 | 144 | 0.3 |
| 7390428 | American Dynasty | Commercial Fishing | American Se | 1 | Propulsion | Bergen Dies | BRM 8 | 1990 | ULSD | 4400 | 48 | 0.3 |
| 7390428 | American Dynasty | Commercial Fishing | American Se | 2 | Propulsion | Bergen Dies | BRM 8 | 1990 | ULSD | 4400 | 48 | 0.3 |
| 7513006 | AMERICAN LADY | Commercial Fishing | | 1 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 7513006 | AMERICAN LADY | Commercial Fishing | | 2 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 7513006 | AMERICAN LADY | Commercial Fishing | | 3 | auxiliary | | | 1973 | ULSD | 100 | 48 | 0.3 |
| 7902001 | American No. 1 | Commercial Fishing | North Paciif | 1 | Propulsion | | | 1979 | ULSD | 1125 | 48 | 0.3 |
| 7902001 | American No. 1 | Commercial Fishing | North Paciif | 2 | Propulsion | | | 1979 | ULSD | 1125 | 48 | 0.3 |
| 7902001 | American No. 1 | Commercial Fishing | North Paciif | 3 | auxiliary | | | 1979 | ULSD | 900 | 48 | 0.3 |
| 8851615 | AMERICAN PATRI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8851615 | AMERICAN PATRI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8851615 | AMERICAN PATRI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7738412 | American Triumph | Commercial Fishing | American Se | 1 | Propulsion | Wartsila | 8R32 | 1989 | ULSD | 4400 | 48 | 0.3 |
| 7738412 | American Triumph | Commercial Fishing | American Se | 2 | Propulsion | Wartsila | 8R32 | 1989 | ULSD | 4400 | 48 | 0.3 |
| 6617075 | AMY USEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6617075 | AMY USEN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6617075 | AMY USEN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 249544 | ANGIE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 249544 | ANGIE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 249544 | ANGIE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7611391 | ANITA J | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 7611391 | ANITA J | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 7611391 | ANITA J | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 524384 | ANNA MARIE | Commercial Fishing | | 1 | Propulsion | | | 1970 | ULSD | 425 | 48 | 0.3 |
| 524384 | ANNA MARIE | Commercial Fishing | | 2 | Propulsion | | | 1970 | ULSD | 425 | 48 | 0.3 |
| 524384 | ANNA MARIE | Commercial Fishing | | 3 | auxiliary | | | 1970 | ULSD | 100 | 48 | 0.3 |
| 9204556 | ANNELIES ILENA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 9204556 | ANNELIES ILENA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 9204556 | ANNELIES ILENA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 609117 | ANNIHILATOR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 609117 | ANNIHILATOR | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 609117 | ANNIHILATOR | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 536823 | AQUILA | Commercial Fishing | TAMARAK | 1 | Propulsion | | | 1972 | ULSD | 1200 | 48 | 0.3 |
| 536823 | AQUILA | Commercial Fishing | TAMARAK | 2 | Propulsion | | | 1972 | ULSD | 1200 | 48 | 0.3 |
| 536823 | AQUILA | Commercial Fishing | TAMARAK | 3 | auxiliary | | | 1972 | ULSD | 900 | 48 | 0.3 |
| 550931 | ARCTIC 5 | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1973 | ULSD | 2800 | 48 | 0.3 |
| 550931 | ARCTIC 5 | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1973 | ULSD | 2800 | 48 | 0.3 |
| 550931 | ARCTIC 5 | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1973 | ULSD | 900 | 48 | 0.3 |
| 8117885 | ARCTIC DAWN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 8117885 | ARCTIC DAWN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 8117885 | ARCTIC DAWN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 248169 | ARCTIC ENTERPRI | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1945 | ULSD | 850 | 48 | 0.3 |
| 248169 | ARCTIC ENTERPRI | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1945 | ULSD | 850 | 48 | 0.3 |
| 248169 | ARCTIC ENTERPRI | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1945 | ULSD | 330 | 48 | 0.3 |
| 9031325 | ARCTIC FURY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 3030 | 72 | 0.3 |
| 9031325 | ARCTIC FURY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 3030 | 72 | 0.3 |
| 9031325 | ARCTIC FURY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 900 | 72 | 0.3 |
| 592242 | ARCTIC HUNTER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 550 | 72 | 0.3 |
| 592242 | ARCTIC HUNTER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 592242 | ARCTIC HUNTER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8802390 | ARCTIC OCEAN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8802390 | ARCTIC OCEAN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8802390 | ARCTIC OCEAN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 596137 | ARCTIC SEA | Commercial Fishing | KRISTIAN | 1 | Propulsion | | | 1978 | ULSD | 705 | 48 | 0.3 |
| 596137 | ARCTIC SEA | Commercial Fishing | KRISTIAN | 2 | Propulsion | | | 1978 | ULSD | 705 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 596137 | ARCTIC SEA | Commercial Fishing | KRISTIAN | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 903511 | ARCTIC STORM | Commercial Fishing | ARCTIC ST | 1 | Propulsion | | | 1941 | ULSD | 2500 | 72 | 0.3 |
| 903511 | ARCTIC STORM | Commercial Fishing | ARCTIC ST | 2 | Propulsion | | | 1941 | ULSD | 2500 | 72 | 0.3 |
| 903511 | ARCTIC STORM | Commercial Fishing | ARCTIC ST | 3 | auxiliary | | | 1941 | ULSD | 900 | 72 | 0.3 |
| 655328 | ARCTURUS | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1983 | ULSD | 770 | 48 | 0.3 |
| 655328 | ARCTURUS | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1983 | ULSD | 770 | 48 | 0.3 |
| 655328 | ARCTURUS | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1983 | ULSD | 330 | 48 | 0.3 |
| 550139 | ARICA | Commercial Fishing | ARICA FIS | 1 | Propulsion | | | 1973 | ULSD | 1500 | 48 | 0.3 |
| 550139 | ARICA | Commercial Fishing | ARICA FIS | 2 | Propulsion | | | 1973 | ULSD | 1500 | 48 | 0.3 |
| 550139 | ARICA | Commercial Fishing | ARICA FIS | 3 | auxiliary | | | 1973 | ULSD | 900 | 48 | 0.3 |
| 258139 | ARLINE | Commercial Fishing | | 1 | Propulsion | | | 1989 | ULSD | 800 | 48 | 0.3 |
| 258139 | ARLINE | Commercial Fishing | | 2 | auxiliary | | | 1989 | ULSD | 330 | 48 | 0.3 |
| 635397 | AUGUSTINE | Commercial Fishing | AUGUSTI | 1 | Propulsion | | | 1981 | ULSD | 500 | 48 | 0.3 |
| 635397 | AUGUSTINE | Commercial Fishing | AUGUSTI | 2 | Propulsion | | | 1981 | ULSD | 500 | 48 | 0.3 |
| 635397 | AUGUSTINE | Commercial Fishing | AUGUSTI | 3 | auxiliary | | | 1981 | ULSD | 330 | 48 | 0.3 |
| 259779 | AUTUMN DAWN | Commercial Fishing | AUTUMN | 1 | Propulsion | | | 1949 | ULSD | 300 | 48 | 0.3 |
| 259779 | AUTUMN DAWN | Commercial Fishing | AUTUMN | 2 | Propulsion | | | 1949 | ULSD | 300 | 48 | 0.3 |
| 259779 | AUTUMN DAWN | Commercial Fishing | AUTUMN | 3 | auxiliary | | | 1949 | ULSD | 100 | 48 | 0.3 |
| 7049158 | BALLYHOO | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 625 | 48 | 0.3 |
| 7049158 | BALLYHOO | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 598508 | BARANOF | Commercial Fishing | ROMANZ | 1 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 598508 | BARANOF | Commercial Fishing | ROMANZ | 2 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 598508 | BARANOF | Commercial Fishing | ROMANZ | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 648690 | BARBARA J | Commercial Fishing | | 1 | Propulsion | | | 1982 | ULSD | 400 | 48 | 0.3 |
| 648690 | BARBARA J | Commercial Fishing | | 2 | Propulsion | | | 1982 | ULSD | 400 | 48 | 0.3 |
| 648690 | BARBARA J | Commercial Fishing | | 3 | auxiliary | | | 1982 | ULSD | 100 | 48 | 0.3 |
| 7051668 | BARWELL | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 700 | 48 | 0.3 |
| 7051668 | BARWELL | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 700 | 48 | 0.3 |
| 7051668 | BARWELL | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 33800 | BELINA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 33800 | BELINA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 33800 | BELINA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 631084 | BELLA K | Commercial Fishing | HIGHLAN | 1 | Propulsion | | | 1980 | ULSD | 600 | 48 | 0.3 |
| 631084 | BELLA K | Commercial Fishing | HIGHLAN | 2 | Propulsion | | | 1980 | ULSD | 600 | 48 | 0.3 |
| 631084 | BELLA K | Commercial Fishing | HIGHLAN | 3 | auxiliary | | | 1980 | ULSD | 330 | 48 | 0.3 |
| 973006 | BERING PROWLE | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 675 | 48 | 0.3 |
| 973006 | BERING PROWLE | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8037578 | BERING ROSE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 1125 | 48 | 0.3 |
| 8037578 | BERING ROSE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 1125 | 48 | 0.3 |
| 8037578 | BERING ROSE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 554126 | BERING SEA | Commercial Fishing | POULSEN | 1 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 554126 | BERING SEA | Commercial Fishing | POULSEN | 2 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 554126 | BERING SEA | Commercial Fishing | POULSEN | 3 | auxiliary | | | 1973 | ULSD | 100 | 48 | 0.3 |
| 593310 | BERING STAR | Commercial Fishing | BERING S | 1 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 593310 | BERING STAR | Commercial Fishing | BERING S | 2 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 593310 | BERING STAR | Commercial Fishing | BERING S | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 224779 | BERYL E | Commercial Fishing | HOPPEN | 1 | Propulsion | | | 1925 | ULSD | 200 | 48 | 0.3 |
| 224779 | BERYL E | Commercial Fishing | HOPPEN | 2 | Propulsion | | | 1925 | ULSD | 200 | 48 | 0.3 |
| 224779 | BERYL E | Commercial Fishing | HOPPEN | 3 | auxiliary | | | 1925 | ULSD | 100 | 48 | 0.3 |
| 550190 | BILLIKIN | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1973 | ULSD | 565 | 48 | 0.3 |
| 550190 | BILLIKIN | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1973 | ULSD | 565 | 48 | 0.3 |
| 550190 | BILLIKIN | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1973 | ULSD | 330 | 48 | 0.3 |
| 624429 | BLUE ATTU | Commercial Fishing | BLUE ATT | 1 | Propulsion | | | 1980 | ULSD | 520 | 48 | 0.3 |
| 624429 | BLUE ATTU | Commercial Fishing | BLUE ATT | 2 | Propulsion | | | 1980 | ULSD | 520 | 48 | 0.3 |
| 624429 | BLUE ATTU | Commercial Fishing | BLUE ATT | 3 | auxiliary | | | 1980 | ULSD | 330 | 48 | 0.3 |
| 546234 | BLUE FIN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 500 | 48 | 0.3 |
| 546234 | BLUE FIN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 500 | 48 | 0.3 |
| 546234 | BLUE FIN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 569927 | BLUE PACIFIC | Commercial Fishing | SELDOVIA | 1 | Propulsion | | | 1944 | ULSD | 624 | 48 | 0.3 |
| 569927 | BLUE PACIFIC | Commercial Fishing | SELDOVIA | 2 | Propulsion | | | 1944 | ULSD | 624 | 48 | 0.3 |
| 569927 | BLUE PACIFIC | Commercial Fishing | SELDOVIA | 3 | auxiliary | | | 1944 | ULSD | 330 | 48 | 0.3 |
| 5410418 | BLUE WATERS | Commercial Fishing | | 1 | Propulsion | | | 1980 | ULSD | 235 | 48 | 0.3 |
| 7902207 | BOLD PERFORMA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7902207 | BOLD PERFORMA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7902207 | BOLD PERFORMA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 648108 | BOTANY BAY | Commercial Fishing | | 1 | Propulsion | | | 1982 | ULSD | 350 | 48 | 0.3 |
| 648108 | BOTANY BAY | Commercial Fishing | | 2 | Propulsion | | | 1982 | ULSD | 350 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 648108 | BOTANY BAY | Commercial Fishing |  | 3 | auxiliary |  |  | 1982 | ULSD | 100 | 48 | 0.3 |
| 593404 | BOUNTIFUL | Commercial Fishing | TRIDENT | 1 | Propulsion |  |  | 1978 | ULSD | 850 | 48 | 0.3 |
| 593404 | BOUNTIFUL | Commercial Fishing | TRIDENT | 2 | Propulsion |  |  | 1978 | ULSD | 850 | 48 | 0.3 |
| 593404 | BOUNTIFUL | Commercial Fishing | TRIDENT | 3 | auxiliary |  |  | 1978 | ULSD | 330 | 48 | 0.3 |
| 611519 | BRENNA A | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 250 | 48 | 0.3 |
| 611519 | BRENNA A | Commercial Fishing |  | 2 | Propulsion |  |  |  | ULSD | 250 | 48 | 0.3 |
| 611519 | BRENNA A | Commercial Fishing |  | 3 | auxiliary |  |  |  | ULSD | 100 | 48 | 0.3 |
| 8030647 | BRISTOL EXPLOR | Commercial Fishing |  | 1 | Propulsion |  |  | 1982 | ULSD | 1000 | 48 | 0.3 |
| 8030647 | BRISTOL EXPLOR | Commercial Fishing |  | 2 | Propulsion |  |  | 1982 | ULSD | 1000 | 48 | 0.3 |
| 8030647 | BRISTOL EXPLOR | Commercial Fishing |  | 3 | auxiliary |  |  | 1982 | ULSD | 330 | 48 | 0.3 |
| 1060513 | BRISTOL LEADER | Commercial Fishing |  | 1 | Propulsion |  |  | 1998 | ULSD | 1000 | 48 | 0.3 |
| 1060513 | BRISTOL LEADER | Commercial Fishing |  | 2 | Propulsion |  |  | 1998 | ULSD | 1000 | 48 | 0.3 |
| 1060513 | BRISTOL LEADER | Commercial Fishing |  | 3 | auxiliary |  |  |  | ULSD | 900 | 48 | 0.3 |
| 600856 | BRITTANY | Commercial Fishing | RENFRO | 1 | Propulsion |  |  | 1979 | ULSD | 365 | 48 | 0.3 |
| 600856 | BRITTANY | Commercial Fishing | RENFRO | 2 | Propulsion |  |  | 1979 | ULSD | 365 | 48 | 0.3 |
| 600856 | BRITTANY | Commercial Fishing | RENFRO | 3 | auxiliary |  |  | 1979 | ULSD | 100 | 48 | 0.3 |
| 23277 | CALEDONIAN | Commercial Fishing |  | 1 | Propulsion |  |  | 1974 | ULSD | 425 | 48 | 0.3 |
| 23277 | CALEDONIAN | Commercial Fishing |  | 2 | Propulsion |  |  | 1974 | ULSD | 425 | 48 | 0.3 |
| 7739193 | CALIFORNIA HOR | Commercial Fishing |  | 1 | Propulsion |  |  | 1978 | ULSD | 350 | 48 | 0.3 |
| 7739193 | CALIFORNIA HOR | Commercial Fishing |  | 2 | Propulsion |  |  | 1978 | ULSD | 350 | 48 | 0.3 |
| 7739193 | CALIFORNIA HOR | Commercial Fishing |  | 3 | auxiliary |  |  | 1978 | ULSD | 100 | 48 | 0.3 |
| 6506953 | CANADIAN NO 1 | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 750 | 48 | 0.3 |
| 6506953 | CANADIAN NO 1 | Commercial Fishing |  | 2 | Propulsion |  |  |  | ULSD | 750 | 48 | 0.3 |
| 6506953 | CANADIAN NO 1 | Commercial Fishing |  | 3 | auxiliary |  |  |  | ULSD | 330 | 48 | 0.3 |
| 7939523 | CAPE CALM | Commercial Fishing |  | 1 | Propulsion |  |  | 1978 | ULSD | 460 | 48 | 0.3 |
| 7939523 | CAPE CALM | Commercial Fishing |  | 2 | auxiliary |  |  | 1978 | ULSD | 100 | 48 | 0.3 |
| 8856613 | CAPE CREIG | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 450 | 48 | 0.3 |
| 8856613 | CAPE CREIG | Commercial Fishing |  | 2 | Propulsion |  |  |  | ULSD | 450 | 48 | 0.3 |
| 8856613 | CAPE CREIG | Commercial Fishing |  | 3 | auxiliary |  |  |  | ULSD | 100 | 48 | 0.3 |
| 578178 | CAPE DENBIGH | Commercial Fishing | NORQUES | 1 | Propulsion |  |  | 1944 | ULSD | 750 | 48 | 0.3 |
| 578178 | CAPE DENBIGH | Commercial Fishing | NORQUES | 2 | Propulsion |  |  | 1944 | ULSD | 750 | 48 | 0.3 |
| 578178 | CAPE DENBIGH | Commercial Fishing | NORQUES | 3 | auxiliary |  |  | 1944 | ULSD | 330 | 48 | 0.3 |
| 653806 | CAPE HORN | Commercial Fishing | CAPE HOR | 1 | Propulsion |  |  | 1982 | ULSD | 900 | 48 | 0.3 |
| 653806 | CAPE HORN | Commercial Fishing | CAPE HOR | 2 | Propulsion |  |  | 1982 | ULSD | 900 | 48 | 0.3 |
| 653806 | CAPE HORN | Commercial Fishing | CAPE HOR | 3 | auxiliary |  |  | 1982 | ULSD | 330 | 48 | 0.3 |
| 677905 | CAPE ST JOHN | Commercial Fishing | TRIDENT | 1 | Propulsion |  |  | 1985 | ULSD | 460 | 48 | 0.3 |
| 677905 | CAPE ST JOHN | Commercial Fishing |  | 2 | auxiliary |  |  | 1985 | ULSD | 100 | 48 | 0.3 |
| 557441 | CASCADE MARIN | Commercial Fishing | CASCADE | 1 | Propulsion |  |  | 1974 | ULSD | 450 | 48 | 0.3 |
| 557441 | CASCADE MARIN | Commercial Fishing | CASCADE | 2 | Propulsion |  |  | 1974 | ULSD | 450 | 48 | 0.3 |
| 557441 | CASCADE MARIN | Commercial Fishing | CASCADE | 3 | auxiliary |  |  | 1974 | ULSD | 100 | 48 | 0.3 |
| 619109 | CHAMAI | Commercial Fishing |  | 1 | Propulsion |  |  | 1979 | ULSD | 700 | 48 | 0.3 |
| 619109 | CHAMAI | Commercial Fishing |  | 2 | auxiliary |  |  | 1979 | ULSD | 330 | 48 | 0.3 |
| 632162 | CHANDALAR | Commercial Fishing |  | 1 | Propulsion |  |  | 1980 | ULSD | 175 | 48 | 0.3 |
| 632162 | CHANDALAR | Commercial Fishing |  | 2 | Propulsion |  |  | 1980 | ULSD | 175 | 48 | 0.3 |
| 632162 | CHANDALAR | Commercial Fishing |  | 3 | auxiliary |  |  | 1980 | ULSD | 100 | 48 | 0.3 |
| 623734 | CHASINA | Commercial Fishing |  | 1 | Propulsion |  |  | 1980 | ULSD | 150 | 48 | 0.3 |
| 623734 | CHASINA | Commercial Fishing |  | 2 | Propulsion |  |  | 1980 | ULSD | 150 | 48 | 0.3 |
| 623734 | CHASINA | Commercial Fishing |  | 3 | auxiliary |  |  | 1980 | ULSD | 100 | 48 | 0.3 |
| 9031181 | CHELSEA K | Commercial Fishing |  | 1 | Propulsion |  |  | 1992 | ULSD | 750 | 48 | 0.3 |
| 9031181 | CHELSEA K | Commercial Fishing |  | 2 | Propulsion |  |  | 1992 | ULSD | 750 | 48 | 0.3 |
| 9031181 | CHELSEA K | Commercial Fishing |  | 3 | auxiliary |  |  | 1992 | ULSD | 330 | 48 | 0.3 |
| 251424 | CHICHAGOF | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 750 | 48 | 0.3 |
| 251424 | CHICHAGOF | Commercial Fishing |  | 2 | Propulsion |  |  |  | ULSD | 750 | 48 | 0.3 |
| 251424 | CHICHAGOF | Commercial Fishing |  | 3 | auxiliary |  |  |  | ULSD | 330 | 48 | 0.3 |
| 633593 | CLIPPER ENDEAV | Commercial Fishing |  | 1 | Propulsion |  |  | 1981 | ULSD | 600 | 48 | 0.3 |
| 633593 | CLIPPER ENDEAV | Commercial Fishing |  | 2 | Propulsion |  |  | 1981 | ULSD | 600 | 48 | 0.3 |
| 633593 | CLIPPER ENDEAV | Commercial Fishing |  | 3 | auxiliary |  |  | 1981 | ULSD | 330 | 48 | 0.3 |
| 1038382 | Coastal Merchant | Commercial Fishing | COASTAL | 1 | Propulsion |  |  | 1966 | ULSD | 700 | 48 | 0.3 |
| 1038382 | Coastal Merchant | Commercial Fishing | COASTAL | 2 | Propulsion |  |  | 1966 | ULSD | 700 | 48 | 0.3 |
| 1038382 | Coastal Merchant | Commercial Fishing | COASTAL | 3 | auxiliary |  |  | 1966 | ULSD | 330 | 48 | 0.3 |
| 622773 | COHO | Commercial Fishing |  | 1 | Propulsion |  |  | 1980 | ULSD | 320 | 48 | 0.3 |
| 622773 | COHO | Commercial Fishing |  | 2 | Propulsion |  |  | 1980 | ULSD | 320 | 48 | 0.3 |
| 622773 | COHO | Commercial Fishing |  | 3 | auxiliary |  |  | 1980 | ULSD | 100 | 48 | 0.3 |
| 615729 | COLUMBIA | Commercial Fishing |  | 1 | Propulsion |  |  | 1988 | ULSD | 325 | 48 | 0.3 |
| 615729 | COLUMBIA | Commercial Fishing |  | 2 | Propulsion |  |  | 1988 | ULSD | 325 | 48 | 0.3 |
| 615729 | COLUMBIA | Commercial Fishing |  | 3 | auxiliary |  |  | 1988 | ULSD | 100 | 48 | 0.3 |
| 312068 | COMEALONG | Commercial Fishing |  | 1 | Propulsion |  |  |  | ULSD | 600 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 312068 | COMEALONG | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 312068 | COMEALONG | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 914214 | COMMODORE | Commercial Fishing | EVENING | 1 | Propulsion | | | 1987 | ULSD | 855 | 48 | 0.3 |
| 914214 | COMMODORE | Commercial Fishing | EVENING | 2 | Propulsion | | | 1987 | ULSD | 855 | 48 | 0.3 |
| 914214 | COMMODORE | Commercial Fishing | EVENING | 3 | auxiliary | | | 1987 | ULSD | 330 | 48 | 0.3 |
| 532762 | CONFIDENCE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 532762 | CONFIDENCE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 532762 | CONFIDENCE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 604998 | CONSTELLATION | Commercial Fishing | RSD FISHE | 1 | Propulsion | | | 1979 | ULSD | 550 | 48 | 0.3 |
| 604998 | CONSTELLATION | Commercial Fishing | RSD FISHE | 2 | Propulsion | | | 1979 | ULSD | 550 | 48 | 0.3 |
| 604998 | CONSTELLATION | Commercial Fishing | RSD FISHE | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 1128928 | CONTROLLER BAY | Commercial Fishing | | 1 | Propulsion | | | 2002 | ULSD | 425 | 48 | 0.3 |
| 1128928 | CONTROLLER BAY | Commercial Fishing | | 2 | Propulsion | | | 2002 | ULSD | 425 | 48 | 0.3 |
| 1128928 | CONTROLLER BAY | Commercial Fishing | | 3 | auxiliary | | | 2002 | ULSD | 100 | 48 | 0.3 |
| 8036433 | COPPER STAR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 8036433 | COPPER STAR | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 8036433 | COPPER STAR | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7947398 | COURAGEOUS | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 700 | 48 | 0.3 |
| 7947398 | COURAGEOUS | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 700 | 48 | 0.3 |
| 7947398 | COURAGEOUS | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 284723 | CRANE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 284723 | CRANE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 284723 | CRANE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 1038177 | DALENA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1038177 | DALENA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1038177 | DALENA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 270361 | DANCER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 220 | 48 | 0.3 |
| 270361 | DANCER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 220 | 48 | 0.3 |
| 270361 | DANCER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7223845 | DEBBIE SUE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7223845 | DEBBIE SUE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7223845 | DEBBIE SUE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 643920 | DEBRA D | Commercial Fishing | WARREN | 1 | Propulsion | | | 1981 | ULSD | 350 | 48 | 0.3 |
| 643920 | DEBRA D | Commercial Fishing | WARREN | 2 | Propulsion | | | 1981 | ULSD | 350 | 48 | 0.3 |
| 643920 | DEBRA D | Commercial Fishing | WARREN | 3 | auxiliary | | | 1981 | ULSD | 100 | 48 | 0.3 |
| 640956 | DECEPTION | Commercial Fishing | KALEK | 1 | Propulsion | | | 1988 | ULSD | 200 | 48 | 0.3 |
| 640956 | DECEPTION | Commercial Fishing | KALEK | 2 | auxiliary | | | 1988 | ULSD | 100 | 48 | 0.3 |
| 980422 | DECISION | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 270 | 48 | 0.3 |
| 980422 | DECISION | Commercial Fishing | | 2 | Propulsion | | | 1991 | ULSD | 270 | 48 | 0.3 |
| 980422 | DECISION | Commercial Fishing | | 3 | auxiliary | | | 1991 | ULSD | 100 | 48 | 0.3 |
| 254366 | DECO BAY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 254366 | DECO BAY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 254366 | DECO BAY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 640128 | DEEP PACIFIC | Commercial Fishing | DEEP PAC | 1 | Propulsion | | | 1981 | ULSD | 600 | 48 | 0.3 |
| 640128 | DEEP PACIFIC | Commercial Fishing | DEEP PAC | 2 | Propulsion | | | 1981 | ULSD | 600 | 48 | 0.3 |
| 640128 | DEEP PACIFIC | Commercial Fishing | DEEP PAC | 3 | auxiliary | | | 1981 | ULSD | 330 | 48 | 0.3 |
| 6506226 | DEEP SEA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6506226 | DEEP SEA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6506226 | DEEP SEA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 554030 | DEFENDER | Commercial Fishing | FV DEFEN | 1 | Propulsion | | | 1974 | ULSD | 3300 | 48 | 0.3 |
| 554030 | DEFENDER | Commercial Fishing | FV DEFEN | 2 | Propulsion | | | 1974 | ULSD | 3300 | 48 | 0.3 |
| 554030 | DEFENDER | Commercial Fishing | FV DEFEN | 3 | auxiliary | | | 1974 | ULSD | 900 | 48 | 0.3 |
| 7926514 | DEFIANT | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7926514 | DEFIANT | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7926514 | DEFIANT | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 571879 | DESTINATION | Commercial Fishing | DESTINAT | 1 | Propulsion | | | | ULSD | 1500 | 48 | 0.3 |
| 571879 | DESTINATION | Commercial Fishing | DESTINAT | 2 | Propulsion | | | | ULSD | 1500 | 48 | 0.3 |
| 571879 | DESTINATION | Commercial Fishing | DESTINAT | 3 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 603126 | DILIGENCE | Commercial Fishing | OSTROM F | 1 | Propulsion | | | 1979 | ULSD | 460 | 48 | 0.3 |
| 603126 | DILIGENCE | Commercial Fishing | OSTROM F | 2 | Propulsion | | | 1979 | ULSD | 460 | 48 | 0.3 |
| 500072 | DISCOVERY STAR | Commercial Fishing | ICICLE SEA | 1 | Propulsion | | | 1965 | ULSD | 150 | 48 | 0.3 |
| 500072 | DISCOVERY STAR | Commercial Fishing | ICICLE SEA | 2 | Propulsion | | | 1965 | ULSD | 150 | 48 | 0.3 |
| 500072 | DISCOVERY STAR | Commercial Fishing | ICICLE SEA | 3 | auxiliary | | | 1965 | ULSD | 100 | 48 | 0.3 |
| 617019 | DOLPHIN | Commercial Fishing | TRIDENT S | 1 | Propulsion | | | 1944 | ULSD | 563 | 48 | 0.3 |
| 617019 | DOLPHIN | Commercial Fishing | TRIDENT S | 2 | Propulsion | | | 1944 | ULSD | 563 | 48 | 0.3 |
| 617019 | DOLPHIN | Commercial Fishing | TRIDENT S | 3 | auxiliary | | | 1944 | ULSD | 330 | 48 | 0.3 |
| 602309 | DOMINATOR | Commercial Fishing | TRIDENT S | 1 | Propulsion | | | 1978 | ULSD | 1000 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 602309 | DOMINATOR | Commercial Fishing | TRIDENT S | 2 | Propulsion | | | 1978 | ULSD | 1000 | 48 | 0.3 |
| 602309 | DOMINATOR | Commercial Fishing | TRIDENT S | 3 | auxiliary | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 249559 | DOROTHEA | Commercial Fishing | RUTLEDGI | 1 | Propulsion | | | 1945 | ULSD | 110 | 48 | 0.3 |
| 249559 | DOROTHEA | Commercial Fishing | RUTLEDGI | 2 | Propulsion | | | 1945 | ULSD | 110 | 48 | 0.3 |
| 249559 | DOROTHEA | Commercial Fishing | RUTLEDGI | 3 | auxiliary | | | 1945 | ULSD | 100 | 48 | 0.3 |
| 982375 | EASTERN HUNTEI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 982375 | EASTERN HUNTEI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 982375 | EASTERN HUNTEI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 6920240 | EASTWARD HO | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 325 | 48 | 0.3 |
| 6920240 | EASTWARD HO | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 325 | 48 | 0.3 |
| 6920240 | EASTWARD HO | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 629675 | ECHO | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 629675 | ECHO | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 629675 | ECHO | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 261269 | EIGIL B | Commercial Fishing | EIGIL B IN | 1 | Propulsion | | | 1951 | ULSD | 350 | 48 | 0.3 |
| 261269 | EIGIL B | Commercial Fishing | EIGIL B IN | 2 | Propulsion | | | 1951 | ULSD | 350 | 48 | 0.3 |
| 261269 | EIGIL B | Commercial Fishing | EIGIL B IN | 3 | auxiliary | | | 1951 | ULSD | 100 | 48 | 0.3 |
| 657383 | ENTERPRISE | Commercial Fishing | | 1 | Propulsion | | | 1983 | ULSD | 240 | 48 | 0.3 |
| 657383 | ENTERPRISE | Commercial Fishing | | 2 | Propulsion | | | 1983 | ULSD | 240 | 48 | 0.3 |
| 657383 | ENTERPRISE | Commercial Fishing | | 3 | auxiliary | | | 1983 | ULSD | 100 | 48 | 0.3 |
| 227368 | ENTERPRISE 5 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 227368 | ENTERPRISE 5 | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 227368 | ENTERPRISE 5 | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8851699 | ENTRANCE POINT | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8851699 | ENTRANCE POINT | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8851699 | ENTRANCE POINT | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 603607 | EPIC EXPLORER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 603607 | EPIC EXPLORER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 603607 | EPIC EXPLORER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 972239 | EQUINOX | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 200 | 48 | 0.3 |
| 972239 | EQUINOX | Commercial Fishing | | 2 | Propulsion | | | 1991 | ULSD | 200 | 48 | 0.3 |
| 972239 | EQUINOX | Commercial Fishing | | 3 | auxiliary | | | 1991 | ULSD | 100 | 48 | 0.3 |
| 598365 | ERLA N | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 598365 | ERLA N | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 598365 | ERLA N | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 248539 | EVENING STAR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 170 | 48 | 0.3 |
| 248539 | EVENING STAR | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 170 | 48 | 0.3 |
| 248539 | EVENING STAR | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 967502 | EXCELLENCE | Commercial Fishing | ALASKA J/ | 1 | Propulsion | | | | ULSD | 2850 | 48 | 0.3 |
| 967502 | EXCELLENCE | Commercial Fishing | ALASKA J/ | 2 | Propulsion | | | | ULSD | 2850 | 48 | 0.3 |
| 967502 | EXCELLENCE | Commercial Fishing | ALASKA J/ | 3 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 7932109 | EXODUS | Commercial Fishing | | 1 | Propulsion | | | 1984 | ULSD | 500 | 48 | 0.3 |
| 7932109 | EXODUS | Commercial Fishing | | 2 | Propulsion | | | 1984 | ULSD | 500 | 48 | 0.3 |
| 7932109 | EXODUS | Commercial Fishing | | 3 | auxiliary | | | 1984 | ULSD | 330 | 48 | 0.3 |
| 211065 | EXPRESS | Commercial Fishing | | 1 | Propulsion | | | 1988 | ULSD | 220 | 48 | 0.3 |
| 211065 | EXPRESS | Commercial Fishing | | 2 | Propulsion | | | 1988 | ULSD | 220 | 48 | 0.3 |
| 211065 | EXPRESS | Commercial Fishing | | 3 | auxiliary | | | 1988 | ULSD | 100 | 48 | 0.3 |
| 7950228 | FAIRWIND | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7950228 | FAIRWIND | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7950228 | FAIRWIND | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 369192 | FEELIN FREE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 369192 | FEELIN FREE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 369192 | FEELIN FREE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 925863 | FORUM STAR | Commercial Fishing | FORUM ST | 1 | Propulsion | | | 1988 | ULSD | 738 | 48 | 0.3 |
| 925863 | FORUM STAR | Commercial Fishing | FORUM ST | 2 | Propulsion | | | 1988 | ULSD | 738 | 48 | 0.3 |
| 925863 | FORUM STAR | Commercial Fishing | FORUM ST | 3 | auxiliary | | | 1988 | ULSD | 330 | 48 | 0.3 |
| 20881 | FREE ENTERPRISI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 20881 | FREE ENTERPRISI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 20881 | FREE ENTERPRISI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 975015 | FRONTIER EXPLO | Commercial Fishing | ALASKA FI | 1 | Propulsion | | | 1991 | ULSD | 550 | 48 | 0.3 |
| 975015 | FRONTIER EXPLO | Commercial Fishing | ALASKA FI | 2 | Propulsion | | | 1991 | ULSD | 550 | 48 | 0.3 |
| 975015 | FRONTIER EXPLO | Commercial Fishing | ALASKA FI | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 951441 | FRONTIER SPIRIT | Commercial Fishing | ALASKA FI | 1 | Propulsion | | | 1989 | ULSD | 550 | 48 | 0.3 |
| 951441 | FRONTIER SPIRIT | Commercial Fishing | ALASKA FI | 2 | Propulsion | | | 1989 | ULSD | 550 | 48 | 0.3 |
| 951441 | FRONTIER SPIRIT | Commercial Fishing | ALASKA FI | 3 | auxiliary | | | 1989 | ULSD | 330 | 48 | 0.3 |
| 7628473 | FROSTI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 500 | 48 | 0.3 |
| 7628473 | FROSTI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 500 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7628473 | FROSTI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 617540 | GANDIL | Commercial Fishing | PETTINGI | 1 | Propulsion | | | 1980 | ULSD | 320 | 48 | 0.3 |
| 617540 | GANDIL | Commercial Fishing | PETTINGI | 2 | Propulsion | | | 1980 | ULSD | 320 | 48 | 0.3 |
| 617540 | GANDIL | Commercial Fishing | PETTINGI | 3 | auxiliary | | | 1980 | ULSD | 100 | 48 | 0.3 |
| 630401 | GENE S | Commercial Fishing | FV GENE | 1 | Propulsion | | | 1981 | ULSD | 750 | 48 | 0.3 |
| 630401 | GENE S | Commercial Fishing | FV GENE | 2 | Propulsion | | | 1981 | ULSD | 750 | 48 | 0.3 |
| 600325 | Glacier Bay | Commercial Fishing | GLACIER | 1 | Propulsion | | | 1978 | ULSD | 1125 | 48 | 0.3 |
| 600325 | Glacier Bay | Commercial Fishing | GLACIER | 2 | Propulsion | | | 1978 | ULSD | 1125 | 48 | 0.3 |
| 600325 | Glacier Bay | Commercial Fishing | GLACIER | 3 | auxiliary | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 7938115 | GLADIATOR | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 850 | 48 | 0.3 |
| 7938115 | GLADIATOR | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 850 | 48 | 0.3 |
| 7938115 | GLADIATOR | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 651041 | GOLDEN ALASKA | Commercial Fishing | GAS LLC | 1 | Propulsion | | | 1972 | ULSD | 2400 | 48 | 0.3 |
| 651041 | GOLDEN ALASKA | Commercial Fishing | GAS LLC | 2 | Propulsion | | | 1972 | ULSD | 2400 | 48 | 0.3 |
| 651041 | GOLDEN ALASKA | Commercial Fishing | GAS LLC | 3 | auxiliary | | | 1972 | ULSD | 900 | 48 | 0.3 |
| 604315 | GOLDEN DAWN | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1979 | ULSD | 1000 | 48 | 0.3 |
| 604315 | GOLDEN DAWN | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1979 | ULSD | 1000 | 48 | 0.3 |
| 604315 | GOLDEN DAWN | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1979 | ULSD | 900 | 48 | 0.3 |
| 7932393 | GOLDEN FLEECE | Commercial Fishing | | 1 | Propulsion | | | 1979 | ULSD | 550 | 48 | 0.3 |
| 7932393 | GOLDEN FLEECE | Commercial Fishing | | 2 | Propulsion | | | 1979 | ULSD | 550 | 48 | 0.3 |
| 7932393 | GOLDEN FLEECE | Commercial Fishing | | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 477300 | GOOD PARTNER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 477300 | GOOD PARTNER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 477300 | GOOD PARTNER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 225264 | GRANT | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 225264 | GRANT | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 225264 | GRANT | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7947506 | GREAT PACIFIC | Commercial Fishing | | 1 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 7947506 | GREAT PACIFIC | Commercial Fishing | | 2 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 7947506 | GREAT PACIFIC | Commercial Fishing | | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 608438 | GULF WINDS | Commercial Fishing | GULF WIN | 1 | Propulsion | | | 1979 | ULSD | 250 | 48 | 0.3 |
| 608438 | GULF WINDS | Commercial Fishing | GULF WIN | 2 | Propulsion | | | 1979 | ULSD | 250 | 48 | 0.3 |
| 608438 | GULF WINDS | Commercial Fishing | GULF WIN | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 615796 | HALF MOON BAY | Commercial Fishing | EVENING | 1 | Propulsion | | | 1979 | ULSD | 425 | 48 | 0.3 |
| 615796 | HALF MOON BAY | Commercial Fishing | EVENING | 2 | Propulsion | | | 1979 | ULSD | 425 | 48 | 0.3 |
| 615796 | HALF MOON BAY | Commercial Fishing | EVENING | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 970937 | HANDLER | Commercial Fishing | HANDLER | 1 | Propulsion | | | 1991 | ULSD | 625 | 48 | 0.3 |
| 970937 | HANDLER | Commercial Fishing | HANDLER | 2 | Propulsion | | | 1991 | ULSD | 625 | 48 | 0.3 |
| 970937 | HANDLER | Commercial Fishing | HANDLER | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 7644269 | HARVESTOR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7644269 | HARVESTOR | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7644269 | HARVESTOR | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 594154 | HICKORY WIND | Commercial Fishing | HICKORY | 1 | Propulsion | | | 1978 | ULSD | 475 | 48 | 0.3 |
| 594154 | HICKORY WIND | Commercial Fishing | HICKORY | 2 | Propulsion | | | 1978 | ULSD | 475 | 48 | 0.3 |
| 594154 | HICKORY WIND | Commercial Fishing | HICKORY | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 608177 | HUNTRESS | Commercial Fishing | | 1 | Propulsion | | | 2000 | ULSD | 250 | 48 | 0.3 |
| 608177 | HUNTRESS | Commercial Fishing | | 2 | Propulsion | | | 2000 | ULSD | 250 | 48 | 0.3 |
| 608177 | HUNTRESS | Commercial Fishing | | 3 | auxiliary | | | 2000 | ULSD | 100 | 48 | 0.3 |
| 586918 | HUSKY | Commercial Fishing | HUSKY C | 1 | Propulsion | | | 1942 | ULSD | 600 | 48 | 0.3 |
| 586918 | HUSKY | Commercial Fishing | HUSKY C | 2 | Propulsion | | | 1942 | ULSD | 600 | 48 | 0.3 |
| 586918 | HUSKY | Commercial Fishing | HUSKY C | 3 | auxiliary | | | 1942 | ULSD | 330 | 48 | 0.3 |
| 272744 | ICY BAY | Commercial Fishing | ICY BAY I | 1 | Propulsion | | | 1956 | ULSD | 700 | 48 | 0.3 |
| 272744 | ICY BAY | Commercial Fishing | ICY BAY I | 2 | Propulsion | | | 1956 | ULSD | 700 | 48 | 0.3 |
| 272744 | ICY BAY | Commercial Fishing | ICY BAY I | 3 | auxiliary | | | 1956 | ULSD | 330 | 48 | 0.3 |
| 6701852 | IKAIKA KAI ONE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 2900 | 96 | 0.3 |
| 6701852 | IKAIKA KAI ONE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 2900 | 96 | 0.3 |
| 6701852 | IKAIKA KAI ONE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 900 | 96 | 0.3 |
| 237743 | INDEPENDENCE | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1938 | ULSD | 1100 | 48 | 0.3 |
| 237743 | INDEPENDENCE | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1938 | ULSD | 1100 | 48 | 0.3 |
| 237743 | INDEPENDENCE | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1938 | ULSD | 900 | 48 | 0.3 |
| 9037771 | INTREPID EXPLO | Commercial Fishing | | 1 | Propulsion | | | 1992 | ULSD | 850 | 48 | 0.3 |
| 9037771 | INTREPID EXPLO | Commercial Fishing | | 2 | Propulsion | | | 1992 | ULSD | 850 | 48 | 0.3 |
| 9037771 | INTREPID EXPLO | Commercial Fishing | | 3 | auxiliary | | | 1992 | ULSD | 330 | 48 | 0.3 |
| 610290 | ISLAND ENTERPR | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1979 | ULSD | 2400 | 48 | 0.3 |
| 610290 | ISLAND ENTERPR | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1979 | ULSD | 2400 | 48 | 0.3 |
| 610290 | ISLAND ENTERPR | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1979 | ULSD | 900 | 48 | 0.3 |
| 973478 | ISLAND MIST | Commercial Fishing | EVANS | 1 | Propulsion | | | 1991 | ULSD | 625 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 973478 | ISLAND MIST | Commercial Fishing | EVANS | 2 | Propulsion | | | 1991 | ULSD | 625 | 48 | 0.3 |
| 973478 | ISLAND MIST | Commercial Fishing | EVANS | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 8950639 | ISLAND SUN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 548 | 48 | 0.3 |
| 8950639 | ISLAND SUN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 548 | 48 | 0.3 |
| 8950639 | ISLAND SUN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8807296 | JAMIE MARIE | Commercial Fishing | | 1 | Propulsion | | | 1988 | ULSD | 425 | 48 | 0.3 |
| 8807296 | JAMIE MARIE | Commercial Fishing | | 2 | Propulsion | | | 1988 | ULSD | 425 | 48 | 0.3 |
| 8807296 | JAMIE MARIE | Commercial Fishing | | 3 | auxiliary | | | 1988 | ULSD | 100 | 48 | 0.3 |
| 8939001 | JANICE | Commercial Fishing | | 1 | Propulsion | | | 1958 | ULSD | 125 | 48 | 0.3 |
| 8939001 | JANICE | Commercial Fishing | | 2 | Propulsion | | | 1958 | ULSD | 125 | 48 | 0.3 |
| 8939001 | JANICE | Commercial Fishing | | 3 | auxiliary | | | 1958 | ULSD | 100 | 48 | 0.3 |
| 18085 | JEANNA MARIE | Commercial Fishing | FENNIMO | 1 | Propulsion | | | 1972 | ULSD | 110 | 48 | 0.3 |
| 18085 | JEANNA MARIE | Commercial Fishing | FENNIMO | 2 | auxiliary | | | 1972 | ULSD | 100 | 48 | 0.3 |
| 597611 | JENNIFER A | Commercial Fishing | ST GEORG | 1 | Propulsion | | | 1979 | ULSD | 400 | 48 | 0.3 |
| 597611 | JENNIFER A | Commercial Fishing | ST GEORG | 2 | Propulsion | | | 1979 | ULSD | 400 | 48 | 0.3 |
| 597611 | JENNIFER A | Commercial Fishing | ST GEORG | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 41316 | KAIA | Commercial Fishing | | 1 | Propulsion | | | 1989 | ULSD | 200 | 48 | 0.3 |
| 41316 | KAIA | Commercial Fishing | | 2 | Propulsion | | | 1989 | ULSD | 200 | 48 | 0.3 |
| 41316 | KAIA | Commercial Fishing | | 3 | auxiliary | | | 1989 | ULSD | 100 | 48 | 0.3 |
| 8854495 | KAMI M | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 8854495 | KAMI M | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 8854495 | KAMI M | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 629244 | KAMILAR | Commercial Fishing | | 1 | Propulsion | | | 1980 | ULSD | 250 | 48 | 0.3 |
| 629244 | KAMILAR | Commercial Fishing | | 2 | Propulsion | | | 1980 | ULSD | 250 | 48 | 0.3 |
| 629244 | KAMILAR | Commercial Fishing | | 3 | auxiliary | | | 1980 | ULSD | 100 | 48 | 0.3 |
| 7902219 | KARENORA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7902219 | KARENORA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7902219 | KARENORA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 592291 | KARIN LYNN | Commercial Fishing | KARIN LY | 1 | Propulsion | | | 1978 | ULSD | 225 | 48 | 0.3 |
| 592291 | KARIN LYNN | Commercial Fishing | KARIN LY | 2 | Propulsion | | | 1978 | ULSD | 225 | 48 | 0.3 |
| 592291 | KARIN LYNN | Commercial Fishing | KARIN LY | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 228446 | KARLUK | Commercial Fishing | WRIGHT | 1 | Propulsion | | | 1929 | ULSD | 300 | 48 | 0.3 |
| 228446 | KARLUK | Commercial Fishing | WRIGHT | 2 | Propulsion | | | 1929 | ULSD | 300 | 48 | 0.3 |
| 548612 | KATHLEEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 548612 | KATHLEEN | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 6931055 | Katie Ann | Commercial Fishing | American Se | 1 | Propulsion | Bergen Dies | KVM 18 | 1983 | ULSD | 4200 | 48 | 0.3 |
| 1157826 | KELLY MAE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 300 | 48 | 0.3 |
| 1157826 | KELLY MAE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 300 | 48 | 0.3 |
| 1157826 | KELLY MAE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 612616 | KJEVOLJA | Commercial Fishing | JUBILEE F | 1 | Propulsion | | | 1979 | ULSD | 500 | 48 | 0.3 |
| 612616 | KJEVOLJA | Commercial Fishing | JUBILEE F | 2 | Propulsion | | | 1979 | ULSD | 500 | 48 | 0.3 |
| 612616 | KJEVOLJA | Commercial Fishing | JUBILEE F | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 8023682 | KNIGHT DRAGON | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8023682 | KNIGHT DRAGON | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8023682 | KNIGHT DRAGON | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 579450 | KODIAK ENTERP | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1977 | ULSD | 3000 | 48 | 0.3 |
| 579450 | KODIAK ENTERP | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1977 | ULSD | 3000 | 48 | 0.3 |
| 579450 | KODIAK ENTERP | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1977 | ULSD | 900 | 48 | 0.3 |
| 178828 | KORNAT 1 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 280 | 48 | 0.3 |
| 178828 | KORNAT 1 | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 280 | 48 | 0.3 |
| 178828 | KORNAT 1 | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 66355442 | KYNOC | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 280 | 48 | 0.3 |
| 66355442 | KYNOC | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 280 | 48 | 0.3 |
| 66355442 | KYNOC | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 600600 | LADY HELEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 230 | 48 | 0.3 |
| 600600 | LADY HELEN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 230 | 48 | 0.3 |
| 600600 | LADY HELEN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7336850 | LADY KATE | Commercial Fishing | | 1 | Propulsion | | | 1973 | ULSD | 225 | 48 | 0.3 |
| 7336850 | LADY KATE | Commercial Fishing | | 2 | Propulsion | | | 1973 | ULSD | 225 | 48 | 0.3 |
| 7336850 | LADY KATE | Commercial Fishing | | 3 | auxiliary | | | 1973 | ULSD | 100 | 48 | 0.3 |
| 600072 | LADY KODIAK | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 365 | 48 | 0.3 |
| 600072 | LADY KODIAK | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 365 | 48 | 0.3 |
| 600072 | LADY KODIAK | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 819946 | LADY VALERIE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 230 | 48 | 0.3 |
| 819946 | LADY VALERIE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 230 | 48 | 0.3 |
| 819946 | LADY VALERIE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 667407 | LAST FRONTIER | Commercial Fishing | | 1 | Propulsion | | | 1984 | ULSD | 400 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 667407 | LAST FRONTIER | Commercial Fishing | | 2 | Propulsion | | | 1984 | ULSD | 400 | 48 | 0.3 |
| 667407 | LAST FRONTIER | Commercial Fishing | | 3 | auxiliary | | | 1984 | ULSD | 100 | 48 | 0.3 |
| 127489 | LAUREN L KAPP | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 127489 | LAUREN L KAPP | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 127489 | LAUREN L KAPP | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 697907 | LEGACY | Commercial Fishing | MARTIN | 1 | Propulsion | | | 1985 | ULSD | 435 | 48 | 0.3 |
| 697907 | LEGACY | Commercial Fishing | MARTIN | 2 | Propulsion | | | 1985 | ULSD | 435 | 48 | 0.3 |
| 697907 | LEGACY | Commercial Fishing | MARTIN | 3 | auxiliary | | | 1985 | ULSD | 100 | 48 | 0.3 |
| 976538 | LILLI ANN | Commercial Fishing | LILLI ANN | 1 | Propulsion | | | 1991 | ULSD | 585 | 48 | 0.3 |
| 976538 | LILLI ANN | Commercial Fishing | LILLI ANN | 2 | Propulsion | | | 1991 | ULSD | 585 | 48 | 0.3 |
| 976538 | LILLI ANN | Commercial Fishing | LILLI ANN | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 1038717 | LISA MARIE | Commercial Fishing | | 1 | Propulsion | | | 1996 | ULSD | 425 | 48 | 0.3 |
| 1038717 | LISA MARIE | Commercial Fishing | | 2 | Propulsion | | | 1996 | ULSD | 425 | 48 | 0.3 |
| 1038717 | LISA MARIE | Commercial Fishing | | 3 | auxiliary | | | 1996 | ULSD | 100 | 48 | 0.3 |
| 101579 | LOWRIDER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 101579 | LOWRIDER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 101579 | LOWRIDER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 594399 | MADISON HUNTE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 594399 | MADISON HUNTE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 594399 | MADISON HUNTE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8855358 | MAJESTY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 590 | 48 | 0.3 |
| 8855358 | MAJESTY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 590 | 48 | 0.3 |
| 8855358 | MAJESTY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 975597 | MARAUDER | Commercial Fishing | PURATICH | 1 | Propulsion | | | 1991 | ULSD | 270 | 48 | 0.3 |
| 975597 | MARAUDER | Commercial Fishing | PURATICH | 2 | Propulsion | | | 1991 | ULSD | 270 | 48 | 0.3 |
| 975597 | MARAUDER | Commercial Fishing | PURATICH | 3 | auxiliary | | | 1991 | ULSD | 100 | 48 | 0.3 |
| 615563 | MARGARET LYN | Commercial Fishing | GREAT W | 1 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 615563 | MARGARET LYN | Commercial Fishing | GREAT W | 2 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 615563 | MARGARET LYN | Commercial Fishing | GREAT W | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 1040505 | MARINA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1040505 | MARINA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1040505 | MARINA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 800021 | MARY ISLE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 800021 | MARY ISLE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 350 | 48 | 0.3 |
| 800021 | MARY ISLE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 647314 | MAVERICK | Commercial Fishing | F/V MAVE | 1 | Propulsion | | | 1983 | ULSD | 285 | 48 | 0.3 |
| 647314 | MAVERICK | Commercial Fishing | F/V MAVE | 2 | Propulsion | | | 1983 | ULSD | 285 | 48 | 0.3 |
| 647314 | MAVERICK | Commercial Fishing | F/V MAVE | 3 | auxiliary | | | 1983 | ULSD | 100 | 48 | 0.3 |
| 622875 | MIKETTE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 640 | 48 | 0.3 |
| 622875 | MIKETTE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 640 | 48 | 0.3 |
| 622875 | MIKETTE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 6404789 | MILLBANKE SOU | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 6404789 | MILLBANKE SOU | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 6404789 | MILLBANKE SOU | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 522643 | MISS LEONA | Commercial Fishing | MISS LEO | 1 | Propulsion | | | 1969 | ULSD | 425 | 48 | 0.3 |
| 522643 | MISS LEONA | Commercial Fishing | MISS LEO | 2 | Propulsion | | | 1969 | ULSD | 425 | 48 | 0.3 |
| 522643 | MISS LEONA | Commercial Fishing | MISS LEO | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 668040 | MISTY BLUE | Commercial Fishing | MISTY BL | 1 | Propulsion | | | 1984 | ULSD | 165 | 48 | 0.3 |
| 668040 | MISTY BLUE | Commercial Fishing | MISTY BL | 2 | Propulsion | | | 1984 | ULSD | 165 | 48 | 0.3 |
| 668040 | MISTY BLUE | Commercial Fishing | MISTY BL | 3 | auxiliary | | | 1984 | ULSD | 100 | 48 | 0.3 |
| 926647 | MISTY DAWN | Commercial Fishing | KATAHDI | 1 | Propulsion | | | 1988 | ULSD | 600 | 48 | 0.3 |
| 926647 | MISTY DAWN | Commercial Fishing | KATAHDI | 2 | Propulsion | | | 1988 | ULSD | 600 | 48 | 0.3 |
| 926647 | MISTY DAWN | Commercial Fishing | KATAHDI | 3 | auxiliary | | | 1988 | ULSD | 330 | 48 | 0.3 |
| 611524 | MUIR MILACH | Commercial Fishing | MUIR MIL | 1 | Propulsion | | | 1979 | ULSD | 400 | 48 | 0.3 |
| 611524 | MUIR MILACH | Commercial Fishing | MUIR MIL | 2 | Propulsion | | | 1979 | ULSD | 400 | 48 | 0.3 |
| 611524 | MUIR MILACH | Commercial Fishing | MUIR MIL | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 250971 | MUSKRAT | Commercial Fishing | BLUE SKI | 1 | Propulsion | | | 1942 | ULSD | 250 | 48 | 0.3 |
| 250971 | MUSKRAT | Commercial Fishing | BLUE SKI | 2 | Propulsion | | | 1942 | ULSD | 250 | 48 | 0.3 |
| 250971 | MUSKRAT | Commercial Fishing | BLUE SKI | 3 | auxiliary | | | 1942 | ULSD | 100 | 48 | 0.3 |
| 552893 | MYSTERY BAY | Commercial Fishing | ARCTIC V | 1 | Propulsion | | | 1973 | ULSD | 850 | 48 | 0.3 |
| 552893 | MYSTERY BAY | Commercial Fishing | ARCTIC V | 2 | Propulsion | | | 1973 | ULSD | 850 | 48 | 0.3 |
| 552893 | MYSTERY BAY | Commercial Fishing | ARCTIC V | 3 | auxiliary | | | 1973 | ULSD | 330 | 48 | 0.3 |
| 572337 | NEMESIS | Commercial Fishing | WELCH | 1 | Propulsion | | | | ULSD | 190 | 48 | 0.3 |
| 572337 | NEMESIS | Commercial Fishing | WELCH | 2 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7201756 | NEW LIFE | Commercial Fishing | | 1 | Propulsion | | | 1966 | ULSD | 450 | 48 | 0.3 |
| 7201756 | NEW LIFE | Commercial Fishing | | 2 | Propulsion | | | 1966 | ULSD | 450 | 48 | 0.3 |
| 7201756 | NEW LIFE | Commercial Fishing | | 3 | auxiliary | | | 1966 | ULSD | 100 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 565816 | NEW VENTURE | Commercial Fishing | | 1 | Propulsion | | | 1974 | ULSD | 150 | 48 | 0.3 |
| 565816 | NEW VENTURE | Commercial Fishing | | 2 | Propulsion | | | 1974 | ULSD | 150 | 48 | 0.3 |
| 565816 | NEW VENTURE | Commercial Fishing | | 3 | auxiliary | | | 1974 | ULSD | 100 | 48 | 0.3 |
| 739513 | NOR QUEST | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 739513 | NOR QUEST | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 739513 | NOR QUEST | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8825896 | NORDIC PEARL | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8825896 | NORDIC PEARL | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8825896 | NORDIC PEARL | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 542651 | NORDIC STAR | Commercial Fishing | | 1 | Propulsion | | | 1977 | ULSD | 500 | 48 | 0.3 |
| 542651 | NORDIC STAR | Commercial Fishing | | 2 | Propulsion | | | 1977 | ULSD | 500 | 48 | 0.3 |
| 542651 | NORDIC STAR | Commercial Fishing | | 3 | auxiliary | | | 1977 | ULSD | 330 | 48 | 0.3 |
| 601068 | NORSEMAN II | Commercial Fishing | NORSEMA | 1 | Propulsion | | | 1979 | ULSD | 425 | 48 | 0.3 |
| 601068 | NORSEMAN II | Commercial Fishing | NORSEMA | 2 | Propulsion | | | 1979 | ULSD | 425 | 48 | 0.3 |
| 601068 | NORSEMAN II | Commercial Fishing | NORSEMA | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 566067 | NORTH AMERICA | Commercial Fishing | NORTH A | 1 | Propulsion | | | 1975 | ULSD | 600 | 48 | 0.3 |
| 566067 | NORTH AMERICA | Commercial Fishing | NORTH A | 2 | Propulsion | | | 1975 | ULSD | 600 | 48 | 0.3 |
| 566067 | NORTH AMERICA | Commercial Fishing | NORTH A | 3 | auxiliary | | | 1975 | ULSD | 330 | 48 | 0.3 |
| 950038 | NORTH CAPE | Commercial Fishing | NORTH C | 1 | Propulsion | | | 1989 | ULSD | 460 | 48 | 0.3 |
| 950038 | NORTH CAPE | Commercial Fishing | NORTH C | 2 | Propulsion | | | 1989 | ULSD | 460 | 48 | 0.3 |
| 950038 | NORTH CAPE | Commercial Fishing | NORTH C | 3 | auxiliary | | | 1989 | ULSD | 100 | 48 | 0.3 |
| 606565 | NORTH SEA | Commercial Fishing | KRISTIAN | 1 | Propulsion | | | 1979 | ULSD | 705 | 48 | 0.3 |
| 606565 | NORTH SEA | Commercial Fishing | KRISTIAN | 2 | Propulsion | | | 1979 | ULSD | 705 | 48 | 0.3 |
| 606565 | NORTH SEA | Commercial Fishing | KRISTIAN | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 615387 | NORTHERN BELL | Commercial Fishing | TRITON I | 1 | Propulsion | | | 1979 | ULSD | 375 | 48 | 0.3 |
| 615387 | NORTHERN BELL | Commercial Fishing | TRITON I | 2 | Propulsion | | | 1979 | ULSD | 375 | 48 | 0.3 |
| 615387 | NORTHERN BELL | Commercial Fishing | TRITON I | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 553713 | NORTHERN CLOU | Commercial Fishing | | 1 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 553713 | NORTHERN CLOU | Commercial Fishing | | 2 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 553713 | NORTHERN CLOU | Commercial Fishing | | 3 | auxiliary | | | 1974 | ULSD | 100 | 48 | 0.3 |
| 506694 | Northern Eagle | Commercial Fishing | American Se | 1 | Propulsion | Bergen Dies | BRM 8 | 1988 | ULSD | 3600 | 48 | 0.3 |
| 506694 | Northern Eagle | Commercial Fishing | American Se | 2 | Propulsion | Bergen Dies | BRM 8 | 1988 | ULSD | 3600 | 48 | 0.3 |
| 663457 | NORTHERN GLAC | Commercial Fishing | GLACIER | 1 | Propulsion | | | 1983 | ULSD | 1500 | 48 | 0.3 |
| 663457 | NORTHERN GLAC | Commercial Fishing | GLACIER | 2 | Propulsion | | | 1983 | ULSD | 1500 | 48 | 0.3 |
| 663457 | NORTHERN GLAC | Commercial Fishing | GLACIER | 3 | auxiliary | | | 1983 | ULSD | 900 | 48 | 0.3 |
| 521069 | Northern Jaeger | Commercial Fishing | American Se | 1 | Propulsion | MAK | 453 C | 1989 | ULSD | 3680 | 48 | 0.3 |
| 521069 | Northern Jaeger | Commercial Fishing | American Se | 2 | Propulsion | MAK | 453 C | 1989 | ULSD | 3680 | 48 | 0.3 |
| 511698 | NORTHERN ODIN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 300 | 48 | 0.3 |
| 511698 | NORTHERN ODIN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 300 | 48 | 0.3 |
| 511698 | NORTHERN ODIN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 637744 | NORTHERN PATR | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1981 | ULSD | 1000 | 48 | 0.3 |
| 637744 | NORTHERN PATR | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1981 | ULSD | 1000 | 48 | 0.3 |
| 637744 | NORTHERN PATR | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1981 | ULSD | 900 | 48 | 0.3 |
| 248959 | NORTHERN VICT | Commercial Fishing | EVENING | 1 | Propulsion | | | 1945 | ULSD | 1250 | 48 | 0.3 |
| 248959 | NORTHERN VICT | Commercial Fishing | EVENING | 2 | Propulsion | | | 1945 | ULSD | 1250 | 48 | 0.3 |
| 248959 | NORTHERN VICT | Commercial Fishing | EVENING | 3 | auxiliary | | | 1945 | ULSD | 900 | 48 | 0.3 |
| 7926538 | NORTHWEST EXP | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7926538 | NORTHWEST EXP | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7926538 | NORTHWEST EXP | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 587816 | NORTHWESTERN | Commercial Fishing | HANSEN | 1 | Propulsion | | | 1977 | ULSD | 640 | 48 | 0.3 |
| 587816 | NORTHWESTERN | Commercial Fishing | HANSEN | 2 | Propulsion | | | 1977 | ULSD | 640 | 48 | 0.3 |
| 587816 | NORTHWESTERN | Commercial Fishing | HANSEN | 3 | auxiliary | | | 1977 | ULSD | 330 | 48 | 0.3 |
| 602386 | NORTHWIND | Commercial Fishing | NORDIC F | 1 | Propulsion | | | 1979 | ULSD | 338 | 48 | 0.3 |
| 602386 | NORTHWIND | Commercial Fishing | NORDIC F | 2 | Propulsion | | | 1979 | ULSD | 338 | 48 | 0.3 |
| 602386 | NORTHWIND | Commercial Fishing | NORDIC F | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 936017 | NORTON SOUND | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 936017 | NORTON SOUND | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 936017 | NORTON SOUND | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7202061 | NOTORIOUS | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 7202061 | NOTORIOUS | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 7202061 | NOTORIOUS | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 587551 | NUSHAGAK SPIRI | Commercial Fishing | BELTZ | 1 | Propulsion | | | 1977 | ULSD | 300 | 48 | 0.3 |
| 587551 | NUSHAGAK SPIRI | Commercial Fishing | BELTZ | 2 | Propulsion | | | 1977 | ULSD | 300 | 48 | 0.3 |
| 587551 | NUSHAGAK SPIRI | Commercial Fishing | BELTZ | 3 | auxiliary | | | 1977 | ULSD | 100 | 48 | 0.3 |
| 623210 | OCEAN ALASKA | Commercial Fishing | OCEAN A | 1 | Propulsion | | | 1980 | ULSD | 475 | 48 | 0.3 |
| 623210 | OCEAN ALASKA | Commercial Fishing | OCEAN A | 2 | Propulsion | | | 1980 | ULSD | 475 | 48 | 0.3 |
| 623210 | OCEAN ALASKA | Commercial Fishing | OCEAN A | 3 | auxiliary | | | 1980 | ULSD | 100 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1021269 | OCEAN CAPE | Commercial Fishing | NEAL | 1 | Propulsion | | | 1995 | ULSD | 125 | 48 | 0.3 |
| 1021269 | OCEAN CAPE | Commercial Fishing | NEAL | 2 | Propulsion | | | 1995 | ULSD | 125 | 48 | 0.3 |
| 1021269 | OCEAN CAPE | Commercial Fishing | NEAL | 3 | auxiliary | | | 1995 | ULSD | 100 | 48 | 0.3 |
| 678236 | OCEAN FRESH | Commercial Fishing | | 1 | Propulsion | | | 1984 | ULSD | 900 | 48 | 0.3 |
| 678236 | OCEAN FRESH | Commercial Fishing | | 2 | Propulsion | | | 1984 | ULSD | 900 | 48 | 0.3 |
| 678236 | OCEAN FRESH | Commercial Fishing | | 3 | auxiliary | | | 1984 | ULSD | 330 | 48 | 0.3 |
| 586441 | OCEAN FURY | Commercial Fishing | FURY GRO | 1 | Propulsion | | | 1977 | ULSD | 165 | 48 | 0.3 |
| 586441 | OCEAN FURY | Commercial Fishing | FURY GRO | 2 | Propulsion | | | 1977 | ULSD | 425 | 48 | 0.3 |
| 586441 | OCEAN FURY | Commercial Fishing | FURY GRO | 3 | auxiliary | | | 1977 | ULSD | 100 | 48 | 0.3 |
| 7513331 | OCEAN HARVESTI | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 7513331 | OCEAN HARVESTI | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 7513331 | OCEAN HARVESTI | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 8306292 | OCEAN HOPE 3 | Commercial Fishing | | 1 | Propulsion | | | 1982 | ULSD | 425 | 48 | 0.3 |
| 8306292 | OCEAN HOPE 3 | Commercial Fishing | | 2 | Propulsion | | | 1982 | ULSD | 425 | 48 | 0.3 |
| 8306292 | OCEAN HOPE 3 | Commercial Fishing | | 3 | auxiliary | | | 1982 | ULSD | 100 | 48 | 0.3 |
| 622324 | OCEAN HUNTER | Commercial Fishing | OCEAN FIS | 1 | Propulsion | | | 1980 | ULSD | 425 | 48 | 0.3 |
| 622324 | OCEAN HUNTER | Commercial Fishing | OCEAN FIS | 2 | Propulsion | | | 1980 | ULSD | 425 | 48 | 0.3 |
| 622324 | OCEAN HUNTER | Commercial Fishing | OCEAN FIS | 3 | auxiliary | | | 1980 | ULSD | 100 | 48 | 0.3 |
| 2591 | OCEAN KING | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 2591 | OCEAN KING | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 2591 | OCEAN KING | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7613624 | OCEAN LEADER | Commercial Fishing | | 1 | Propulsion | | | 1974 | ULSD | 850 | 48 | 0.3 |
| 7613624 | OCEAN LEADER | Commercial Fishing | | 2 | Propulsion | | | 1974 | ULSD | 850 | 48 | 0.3 |
| 7613624 | OCEAN LEADER | Commercial Fishing | | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 592441 | OCEAN MAID | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 1000 | 48 | 0.3 |
| 592441 | OCEAN MAID | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 1000 | 48 | 0.3 |
| 592441 | OCEAN MAID | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 900 | 48 | 0.3 |
| 7803152 | OCEAN MARAUDE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 7803152 | OCEAN MARAUDE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 7803152 | OCEAN MARAUDE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 677399 | OCEAN PEACE | Commercial Fishing | OCEAN PE | 1 | Propulsion | | | 1984 | ULSD | 1125 | 48 | 0.3 |
| 677399 | OCEAN PEACE | Commercial Fishing | OCEAN PE | 2 | Propulsion | | | 1984 | ULSD | 1125 | 48 | 0.3 |
| 677399 | OCEAN PEACE | Commercial Fishing | OCEAN PE | 3 | auxiliary | | | 1984 | ULSD | 900 | 48 | 0.3 |
| 966130 | OCEAN PEARL | Commercial Fishing | EBERLE | 1 | Propulsion | | | 1991 | ULSD | 410 | 48 | 0.3 |
| 966130 | OCEAN PEARL | Commercial Fishing | EBERLE | 2 | Propulsion | | | 1991 | ULSD | 410 | 48 | 0.3 |
| 966130 | OCEAN PEARL | Commercial Fishing | EBERLE | 3 | auxiliary | | | 1991 | ULSD | 100 | 48 | 0.3 |
| 296779 | OCEAN PHOENIX | Commercial Fishing | PHOENIX | 1 | Propulsion | | | 1964 | ULSD | 750 | 48 | 0.3 |
| 296779 | OCEAN PHOENIX | Commercial Fishing | PHOENIX | 2 | Propulsion | | | 1964 | ULSD | 750 | 48 | 0.3 |
| 296779 | OCEAN PHOENIX | Commercial Fishing | PHOENIX | 3 | auxiliary | | | 1964 | ULSD | 330 | 48 | 0.3 |
| 632751 | OCEAN PROWLER | Commercial Fishing | OCEAN PR | 1 | Propulsion | | | 1944 | ULSD | 750 | 48 | 0.3 |
| 632751 | OCEAN PROWLER | Commercial Fishing | OCEAN PR | 2 | Propulsion | | | 1944 | ULSD | 750 | 48 | 0.3 |
| 632751 | OCEAN PROWLER | Commercial Fishing | OCEAN PR | 3 | auxiliary | | | 1944 | ULSD | 330 | 48 | 0.3 |
| 7521089 | Ocean Ranger | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7521089 | Ocean Ranger | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7521089 | Ocean Ranger | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7303968 | Ocean Rover | Commercial Fishing | American Se | 1 | Propulsion | Wartsila | Vasa 12V32 | 1990 | ULSD | 6200 | 48 | 0.3 |
| 602279 | OCEAN ROYAL | Commercial Fishing | | 1 | Propulsion | | | 1986 | ULSD | 220 | 48 | 0.3 |
| 602279 | OCEAN ROYAL | Commercial Fishing | | 2 | Propulsion | | | 1986 | ULSD | 220 | 48 | 0.3 |
| 602279 | OCEAN ROYAL | Commercial Fishing | | 3 | auxiliary | | | 1986 | ULSD | 100 | 48 | 0.3 |
| 251138 | OREGON | Commercial Fishing | OREGON I | 1 | Propulsion | | | 1946 | ULSD | 300 | 48 | 0.3 |
| 251138 | OREGON | Commercial Fishing | OREGON I | 2 | Propulsion | | | 1946 | ULSD | 300 | 48 | 0.3 |
| 251138 | OREGON | Commercial Fishing | OREGON I | 3 | auxiliary | | | 1946 | ULSD | 100 | 48 | 0.3 |
| 9158173 | OSPREY 1 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 9158173 | OSPREY 1 | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 9158173 | OSPREY 1 | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 518937 | PACIFIC CHALLEN | Commercial Fishing | PETERSON | 1 | Propulsion | | | 1969 | ULSD | 1000 | 48 | 0.3 |
| 518937 | PACIFIC CHALLEN | Commercial Fishing | PETERSON | 2 | Propulsion | | | 1969 | ULSD | 1000 | 48 | 0.3 |
| 518937 | PACIFIC CHALLEN | Commercial Fishing | PETERSON | 3 | auxiliary | | | 1969 | ULSD | 900 | 48 | 0.3 |
| 678237 | PACIFIC EXPLORE | Commercial Fishing | B & N FISH | 1 | Propulsion | | | 1984 | ULSD | 900 | 48 | 0.3 |
| 678237 | PACIFIC EXPLORE | Commercial Fishing | B & N FISH | 2 | Propulsion | | | 1984 | ULSD | 900 | 48 | 0.3 |
| 678237 | PACIFIC EXPLORE | Commercial Fishing | B & N FISH | 3 | auxiliary | | | 1984 | ULSD | 330 | 48 | 0.3 |
| 561934 | PACIFIC FURY | Commercial Fishing | FURY GRO | 1 | Propulsion | | | 1974 | ULSD | 750 | 48 | 0.3 |
| 561934 | PACIFIC FURY | Commercial Fishing | FURY GRO | 2 | Propulsion | | | 1974 | ULSD | 750 | 48 | 0.3 |
| 561934 | PACIFIC FURY | Commercial Fishing | FURY GRO | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 933627 | PACIFIC GLACIER | Commercial Fishing | GLACIER F | 1 | Propulsion | | | 1988 | ULSD | 3300 | 96 | 0.3 |
| 933627 | PACIFIC GLACIER | Commercial Fishing | GLACIER F | 2 | Propulsion | | | 1988 | ULSD | 3300 | 96 | 0.3 |
| 933627 | PACIFIC GLACIER | Commercial Fishing | GLACIER F | 3 | auxiliary | | | 1988 | ULSD | 900 | 96 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5268231 | PACIFIC HARVEST | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5268231 | PACIFIC HARVEST | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5268231 | PACIFIC HARVEST | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 92105 | PACIFIC LAD 1 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 92105 | PACIFIC LAD 1 | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 92105 | PACIFIC LAD 1 | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 598959 | PACIFIC MAIDEN | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 350 | 48 | 0.3 |
| 598959 | PACIFIC MAIDEN | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 350 | 48 | 0.3 |
| 598959 | PACIFIC MAIDEN | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 560501 | PACIFIC MARINER | Commercial Fishing | PAC MARI | 1 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 560501 | PACIFIC MARINER | Commercial Fishing | PAC MARI | 2 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 560501 | PACIFIC MARINER | Commercial Fishing | PAC MARI | 3 | auxiliary | | | 1974 | ULSD | 100 | 48 | 0.3 |
| 5268308 | PACIFIC OCEAN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5268308 | PACIFIC OCEAN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5268308 | PACIFIC OCEAN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 697280 | PACIFIC PRINCE | Commercial Fishing | PACIFIC P | 1 | Propulsion | | | 1986 | ULSD | 1000 | 48 | 0.3 |
| 697280 | PACIFIC PRINCE | Commercial Fishing | PACIFIC P | 2 | Propulsion | | | 1986 | ULSD | 1000 | 48 | 0.3 |
| 697280 | PACIFIC PRINCE | Commercial Fishing | PACIFIC P | 3 | auxiliary | | | 1986 | ULSD | 900 | 48 | 0.3 |
| 679774 | PACIFIC QUEEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 550 | 48 | 0.3 |
| 679774 | PACIFIC QUEEN | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8124230 | PACIFIC SOUNDE | Commercial Fishing | | 1 | Propulsion | | | 1977 | ULSD | 150 | 48 | 0.3 |
| 8124230 | PACIFIC SOUNDE | Commercial Fishing | | 2 | auxiliary | | | 1977 | ULSD | 100 | 48 | 0.3 |
| 7742358 | PACIFIC STAR | Commercial Fishing | | 1 | Propulsion | | | 1974 | ULSD | 1500 | 48 | 0.3 |
| 7742358 | PACIFIC STAR | Commercial Fishing | | 2 | Propulsion | | | 1974 | ULSD | 1500 | 48 | 0.3 |
| 7742358 | PACIFIC STAR | Commercial Fishing | | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 555058 | PACIFIC VIKING | Commercial Fishing | TRIDENT | 1 | Propulsion | CAT | 3512 | 1988 | ULSD | 1300 | 48 | 0.3 |
| 555058 | PACIFIC VIKING | Commercial Fishing | TRIDENT | 2 | auxiliary | CAT | 3406 | 1992 | ULSD | 450 | 48 | 0.3 |
| 555058 | PACIFIC VIKING | Commercial Fishing | TRIDENT | 3 | auxiliary | CAT | 3406 | 1992 | ULSD | 450 | 48 | 0.3 |
| 536161 | PAPADO 2 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 1125 | 48 | 0.3 |
| 536161 | PAPADO 2 | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 7437630 | PARAGON | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 1150 | 48 | 0.3 |
| 7437630 | PARAGON | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 900 | 48 | 0.3 |
| 597612 | PATRICIA LEE | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 800 | 48 | 0.3 |
| 597612 | PATRICIA LEE | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 800 | 48 | 0.3 |
| 597612 | PATRICIA LEE | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 597532 | PAVLOF | Commercial Fishing | PAVLOF F | 1 | Propulsion | | | 1979 | ULSD | 660 | 48 | 0.3 |
| 597532 | PAVLOF | Commercial Fishing | PAVLOF F | 2 | Propulsion | | | 1979 | ULSD | 660 | 48 | 0.3 |
| 597532 | PAVLOF | Commercial Fishing | PAVLOF F | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 6708484 | PEGGY JO | Commercial Fishing | | 1 | Propulsion | | | 1966 | ULSD | 550 | 48 | 0.3 |
| 6708484 | PEGGY JO | Commercial Fishing | | 2 | Propulsion | | | 1966 | ULSD | 550 | 48 | 0.3 |
| 6708484 | PEGGY JO | Commercial Fishing | | 3 | auxiliary | | | 1966 | ULSD | 330 | 48 | 0.3 |
| 982610 | PERSEVERANCE | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 350 | 48 | 0.3 |
| 982610 | PERSEVERANCE | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 350 | 48 | 0.3 |
| 982610 | PERSEVERANCE | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 1075512 | PINNACLE | Commercial Fishing | FV PINNA | 1 | Propulsion | | | 1998 | ULSD | 1000 | 48 | 0.3 |
| 1075512 | PINNACLE | Commercial Fishing | FV PINNA | 2 | Propulsion | | | 1998 | ULSD | 1000 | 48 | 0.3 |
| 1075512 | PINNACLE | Commercial Fishing | FV PINNA | 3 | auxiliary | | | 1998 | ULSD | 900 | 48 | 0.3 |
| 609940 | POLAR LADY | Commercial Fishing | MGF FISH | 1 | Propulsion | | | 1979 | ULSD | 325 | 48 | 0.3 |
| 609940 | POLAR LADY | Commercial Fishing | MGF FISH | 2 | Propulsion | | | 1979 | ULSD | 325 | 48 | 0.3 |
| 523613 | POLAR PRINCE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 523613 | POLAR PRINCE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 609940 | POLAR PRINCE | Commercial Fishing | MGF FISH | 3 | auxiliary | | | 1979 | ULSD | 100 | 48 | 0.3 |
| 523613 | POLAR QUEEN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 589317 | POLAR SEA | Commercial Fishing | WARNESS | 1 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 589317 | POLAR SEA | Commercial Fishing | WARNESS | 2 | Propulsion | | | 1978 | ULSD | 425 | 48 | 0.3 |
| 589317 | POLAR SEA | Commercial Fishing | WARNESS | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 210960 | POLARIS | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 175 | 48 | 0.3 |
| 210960 | POLARIS | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 175 | 48 | 0.3 |
| 210960 | POLARIS | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 293151 | PRIBILOF | Commercial Fishing | NORQUES | 1 | Propulsion | | | 1954 | ULSD | 750 | 48 | 0.3 |
| 293151 | PRIBILOF | Commercial Fishing | NORQUES | 2 | Propulsion | | | 1954 | ULSD | 750 | 48 | 0.3 |
| 293151 | PRIBILOF | Commercial Fishing | NORQUES | 3 | auxiliary | | | 1954 | ULSD | 330 | 48 | 0.3 |
| 8016524 | PROWLER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8016524 | PROWLER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8016524 | PROWLER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 394194 | QUEENS REACH | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 394194 | QUEENS REACH | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 394194 | QUEENS REACH | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 604314 | QUEST | Commercial Fishing | | 1 | Propulsion | | | 1979 | ULSD | 1000 | 48 | 0.3 |
| 604314 | QUEST | Commercial Fishing | | 2 | Propulsion | | | 1979 | ULSD | 1000 | 48 | 0.3 |
| 604314 | QUEST | Commercial Fishing | | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 538431 | RAINIER | Commercial Fishing | RAINER I | 1 | Propulsion | | | 1972 | ULSD | 425 | 48 | 0.3 |
| 538431 | RAINIER | Commercial Fishing | RAINER I | 2 | Propulsion | | | 1972 | ULSD | 425 | 48 | 0.3 |
| 538431 | RAINIER | Commercial Fishing | RAINER I | 3 | auxiliary | | | 1972 | ULSD | 100 | 48 | 0.3 |
| 8856259 | RAMBLIN ROSE | Commercial Fishing | | 1 | Propulsion | | | 1990 | ULSD | 350 | 48 | 0.3 |
| 8856259 | RAMBLIN ROSE | Commercial Fishing | | 2 | Propulsion | | | 1990 | ULSD | 350 | 48 | 0.3 |
| 8856259 | RAMBLIN ROSE | Commercial Fishing | | 3 | auxiliary | | | 1990 | ULSD | 100 | 48 | 0.3 |
| 629499 | RAVEN | Commercial Fishing | | 1 | Propulsion | | | 1987 | ULSD | 175 | 48 | 0.3 |
| 629499 | RAVEN | Commercial Fishing | | 2 | Propulsion | | | 1987 | ULSD | 175 | 48 | 0.3 |
| 629499 | RAVEN | Commercial Fishing | | 3 | auxiliary | | | 1987 | ULSD | 100 | 48 | 0.3 |
| 697637 | REBECCA IRENE | Commercial Fishing | REBECCA | 1 | Propulsion | | | 1986 | ULSD | 900 | 48 | 0.3 |
| 697637 | REBECCA IRENE | Commercial Fishing | REBECCA | 2 | Propulsion | | | 1986 | ULSD | 900 | 48 | 0.3 |
| 697637 | REBECCA IRENE | Commercial Fishing | REBECCA | 3 | auxiliary | | | 1986 | ULSD | 330 | 48 | 0.3 |
| 319724 | RED SKY 1 | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 319724 | RED SKY 1 | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 150 | 48 | 0.3 |
| 319724 | RED SKY 1 | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 516256 | RELIANCE | Commercial Fishing | RELIANCE | 1 | Propulsion | | | 1968 | ULSD | 725 | 48 | 0.3 |
| 516256 | RELIANCE | Commercial Fishing | RELIANCE | 2 | Propulsion | | | 1968 | ULSD | 725 | 48 | 0.3 |
| 516256 | RELIANCE | Commercial Fishing | RELIANCE | 3 | auxiliary | | | 1968 | ULSD | 330 | 48 | 0.3 |
| 4162 | REPUBLIC | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 4162 | REPUBLIC | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 4162 | REPUBLIC | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 223688 | RESOLUTE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 223688 | RESOLUTE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 223688 | RESOLUTE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7710745 | RM THORSTENSO | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7710745 | RM THORSTENSO | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7710745 | RM THORSTENSO | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 246619 | ROBERT S | Commercial Fishing | PORT HIL | 1 | Propulsion | | | 1944 | ULSD | 143 | 48 | 0.3 |
| 246619 | ROBERT S | Commercial Fishing | PORT HIL | 2 | Propulsion | | | 1944 | ULSD | 143 | 48 | 0.3 |
| 246619 | ROBERT S | Commercial Fishing | PORT HIL | 3 | auxiliary | | | 1944 | ULSD | 100 | 48 | 0.3 |
| 591632 | ROBERTA M | Commercial Fishing | ROBERTA | 1 | Propulsion | | | 1978 | ULSD | 380 | 48 | 0.3 |
| 591632 | ROBERTA M | Commercial Fishing | ROBERTA | 2 | Propulsion | | | 1978 | ULSD | 380 | 48 | 0.3 |
| 591632 | ROBERTA M | Commercial Fishing | ROBERTA | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 944290 | ROGUE | Commercial Fishing | LIGHTSHI | 1 | Propulsion | | | 1988 | ULSD | 350 | 48 | 0.3 |
| 944290 | ROGUE | Commercial Fishing | LIGHTSHI | 2 | Propulsion | | | 1988 | ULSD | 350 | 48 | 0.3 |
| 944290 | ROGUE | Commercial Fishing | LIGHTSHI | 3 | auxiliary | | | 1988 | ULSD | 100 | 48 | 0.3 |
| 555403 | ROLLO | Commercial Fishing | NYHAMM | 1 | Propulsion | | | 1974 | ULSD | 450 | 48 | 0.3 |
| 555403 | ROLLO | Commercial Fishing | NYHAMM | 2 | Propulsion | | | 1974 | ULSD | 450 | 48 | 0.3 |
| 555403 | ROLLO | Commercial Fishing | NYHAMM | 3 | auxiliary | | | 1974 | ULSD | 100 | 48 | 0.3 |
| 624371 | ROYAL AMERICA | Commercial Fishing | ROYAL AM | 1 | Propulsion | | | 1980 | ULSD | 630 | 48 | 0.3 |
| 624371 | ROYAL AMERICA | Commercial Fishing | ROYAL AM | 2 | Propulsion | | | 1980 | ULSD | 630 | 48 | 0.3 |
| 624371 | ROYAL AMERICA | Commercial Fishing | ROYAL AM | 3 | auxiliary | | | 1980 | ULSD | 330 | 48 | 0.3 |
| 559271 | ROYAL ATLANTIC | Commercial Fishing | ROYAL AT | 1 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 559271 | ROYAL ATLANTIC | Commercial Fishing | ROYAL AT | 2 | Propulsion | | | 1974 | ULSD | 425 | 48 | 0.3 |
| 6810184 | ROYAL CANADIA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6810184 | ROYAL CANADIA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6810184 | ROYAL CANADIA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 521927 | ROYAL PACIFIC | Commercial Fishing | FORDE | 1 | Propulsion | | | 1969 | ULSD | 360 | 48 | 0.3 |
| 521927 | ROYAL PACIFIC | Commercial Fishing | FORDE | 2 | Propulsion | | | 1969 | ULSD | 360 | 48 | 0.3 |
| 521927 | ROYAL PACIFIC | Commercial Fishing | FORDE | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 542375 | ROYAL VIKING | Commercial Fishing | TRIDENT | 1 | Propulsion | | D398 | 1972 | ULSD | 1000 | 48 | 0.3 |
| 542375 | ROYAL VIKING | Commercial Fishing | TRIDENT | 2 | auxiliary | CAT | 3406 | 1972 | ULSD | 450 | 48 | 0.3 |
| 542375 | ROYAL VIKING | Commercial Fishing | TRIDENT | 3 | auxiliary | CAT | 3406 | 1972 | ULSD | 450 | 48 | 0.3 |
| 648763 | SABRINA | Commercial Fishing | | 1 | Propulsion | | | 1981 | ULSD | 200 | 48 | 0.3 |
| 648763 | SABRINA | Commercial Fishing | | 2 | Propulsion | | | 1981 | ULSD | 200 | 48 | 0.3 |
| 648763 | SABRINA | Commercial Fishing | | 3 | auxiliary | | | 1981 | ULSD | 100 | 48 | 0.3 |
| 313111 | SALMON TRANSP | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 313111 | SALMON TRANSP | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 313111 | SALMON TRANSP | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 5280667 | SAOOK BAY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5280667 | SAOOK BAY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 5280667 | SAOOK BAY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 239651 | SATURN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 239651 | SATURN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 200 | 48 | 0.3 |
| 239651 | SATURN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 625096 | SAVANNAH RAY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 425 | 48 | 0.3 |
| 625096 | SAVANNAH RAY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 425 | 48 | 0.3 |
| 625096 | SAVANNAH RAY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7933529 | SCANDIES ROSE | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 240 | 48 | 0.3 |
| 7933529 | SCANDIES ROSE | Commercial Fishing | | 2 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 39296 | SEA BIRD | Commercial Fishing | | 1 | Propulsion | | | 1983 | ULSD | 600 | 48 | 0.3 |
| 39296 | SEA BIRD | Commercial Fishing | | 2 | auxiliary | | | 1983 | ULSD | 330 | 48 | 0.3 |
| 249301 | SEA LION | Commercial Fishing | TRIDENT S | 1 | Propulsion | | | 1946 | ULSD | 325 | 48 | 0.3 |
| 249301 | SEA LION | Commercial Fishing | TRIDENT S | 2 | Propulsion | | | 1946 | ULSD | 325 | 48 | 0.3 |
| 249301 | SEA LION | Commercial Fishing | TRIDENT S | 3 | auxiliary | | | 1946 | ULSD | 100 | 48 | 0.3 |
| 7048271 | SEA STAR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7048271 | SEA STAR | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 628959 | SEA STORM | Commercial Fishing | SEA STORM | 1 | Propulsion | | | 1980 | ULSD | 875 | 48 | 0.3 |
| 628959 | SEA STORM | Commercial Fishing | SEA STORM | 2 | Propulsion | | | 1980 | ULSD | 875 | 48 | 0.3 |
| 628959 | SEA STORM | Commercial Fishing | SEA STORM | 3 | auxiliary | | | 1980 | ULSD | 330 | 48 | 0.3 |
| 573519 | SEA TRADER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 675 | 48 | 0.3 |
| 573519 | SEA TRADER | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 563829 | SEA WARRIOR | Commercial Fishing | THREE RIV | 1 | Propulsion | | | 1975 | ULSD | 470 | 48 | 0.3 |
| 563829 | SEA WARRIOR | Commercial Fishing | THREE RIV | 2 | Propulsion | | | 1975 | ULSD | 470 | 48 | 0.3 |
| 563829 | SEA WARRIOR | Commercial Fishing | THREE RIV | 3 | auxiliary | | | 1975 | ULSD | 100 | 48 | 0.3 |
| 609823 | SEA WOLF | Commercial Fishing | KENDRICK | 1 | Propulsion | | | 1979 | ULSD | 855 | 48 | 0.3 |
| 609823 | SEA WOLF | Commercial Fishing | KENDRICK | 2 | Propulsion | | | 1979 | ULSD | 855 | 48 | 0.3 |
| 609823 | SEA WOLF | Commercial Fishing | KENDRICK | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 7433907 | SEAFISHER | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 375 | 48 | 0.3 |
| 7433907 | SEAFISHER | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 375 | 48 | 0.3 |
| 7433907 | SEAFISHER | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 517242 | SEAFREEZE ALASK | Commercial Fishing | SEAFREEZ | 1 | Propulsion | | | 1968 | ULSD | 1500 | 48 | 0.3 |
| 517242 | SEAFREEZE ALASK | Commercial Fishing | SEAFREEZ | 2 | Propulsion | | | 1968 | ULSD | 1500 | 48 | 0.3 |
| 517242 | SEAFREEZE ALASK | Commercial Fishing | SEAFREEZ | 3 | auxiliary | | | 1968 | ULSD | 900 | 48 | 0.3 |
| 904767 | SEATTLE ENTERP | Commercial Fishing | TRIDENT S | 1 | Propulsion | | | 1973 | ULSD | 1950 | 48 | 0.3 |
| 904767 | SEATTLE ENTERP | Commercial Fishing | TRIDENT S | 2 | Propulsion | | | 1973 | ULSD | 1950 | 48 | 0.3 |
| 904767 | SEATTLE ENTERP | Commercial Fishing | TRIDENT S | 3 | auxiliary | | | 1973 | ULSD | 900 | 48 | 0.3 |
| 250279 | SELDOVIA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 250279 | SELDOVIA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 250 | 48 | 0.3 |
| 250279 | SELDOVIA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 6422602 | SENA II | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6422602 | SENA II | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6422602 | SENA II | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 7940247 | SEVEN DAUGHTE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7940247 | SEVEN DAUGHTE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7940247 | SEVEN DAUGHTE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 914477 | SEYMOUR | Commercial Fishing | | 1 | Propulsion | | | 1987 | ULSD | 160 | 48 | 0.3 |
| 914477 | SEYMOUR | Commercial Fishing | | 2 | Propulsion | | | 1987 | ULSD | 160 | 48 | 0.3 |
| 914477 | SEYMOUR | Commercial Fishing | | 3 | auxiliary | | | 1987 | ULSD | 100 | 48 | 0.3 |
| 6621648 | SHARLENE K | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 340 | 48 | 0.3 |
| 6621648 | SHARLENE K | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 340 | 48 | 0.3 |
| 6621648 | SHARLENE K | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 7308774 | SHELLFISH | Commercial Fishing | | 1 | Propulsion | | | 1967 | ULSD | 325 | 48 | 0.3 |
| 7308774 | SHELLFISH | Commercial Fishing | | 2 | Propulsion | | | 1967 | ULSD | 325 | 48 | 0.3 |
| 7308774 | SHELLFISH | Commercial Fishing | | 3 | auxiliary | | | 1967 | ULSD | 100 | 48 | 0.3 |
| 9054377 | SIBERIAN SEA | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 650 | 48 | 0.3 |
| 9054377 | SIBERIAN SEA | Commercial Fishing | | 2 | Propulsion | | | 1991 | ULSD | 650 | 48 | 0.3 |
| 9054377 | SIBERIAN SEA | Commercial Fishing | | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 547726 | SILVER DOLPHIN | Commercial Fishing | BREKKAA | 1 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 547726 | SILVER DOLPHIN | Commercial Fishing | BREKKAA | 2 | Propulsion | | | 1973 | ULSD | 425 | 48 | 0.3 |
| 547726 | SILVER DOLPHIN | Commercial Fishing | BREKKAA | 3 | auxiliary | | | 1973 | ULSD | 100 | 48 | 0.3 |
| 8836273 | SNOPAC INNOVAT | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8836273 | SNOPAC INNOVAT | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8836273 | SNOPAC INNOVAT | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 391861 | SNOW DRIFT | Commercial Fishing | NO 162 SEA | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 391861 | SNOW DRIFT | Commercial Fishing | NO 162 SEA | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 391861 | SNOW DRIFT | Commercial Fishing | NO 162 SEA | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 383423 | SNOW QUEEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 383423 | SNOW QUEEN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 383423 | SNOW QUEEN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29310 | SOUTHERN RIDG | Commercial Fishing | | 1 | Propulsion | | | 1975 | ULSD | 750 | 48 | 0.3 |
| 29310 | SOUTHERN RIDG | Commercial Fishing | | 2 | Propulsion | | | 1975 | ULSD | 750 | 48 | 0.3 |
| 29310 | SOUTHERN RIDG | Commercial Fishing | | 3 | auxiliary | | | 1975 | ULSD | 330 | 48 | 0.3 |
| 625927 | SOUTHERN WIND | Commercial Fishing | NORQUES | 1 | Propulsion | | | 1981 | ULSD | 800 | 48 | 0.3 |
| 625927 | SOUTHERN WIND | Commercial Fishing | NORQUES | 2 | Propulsion | | | 1981 | ULSD | 800 | 48 | 0.3 |
| 625927 | SOUTHERN WIND | Commercial Fishing | NORQUES | 3 | auxiliary | | | 1981 | ULSD | 330 | 48 | 0.3 |
| 518545 | ST JUDE | Commercial Fishing | CURRY | 1 | Propulsion | | | 1969 | ULSD | 450 | 48 | 0.3 |
| 518545 | ST JUDE | Commercial Fishing | CURRY | 2 | Propulsion | | | 1969 | ULSD | 450 | 48 | 0.3 |
| 518545 | ST JUDE | Commercial Fishing | CURRY | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 393998 | STAR | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 393998 | STAR | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 393998 | STAR | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 561651 | STAR FISH | Commercial Fishing | STARFISH | 1 | Propulsion | | | 1974 | ULSD | 510 | 48 | 0.3 |
| 561651 | STAR FISH | Commercial Fishing | STARFISH | 2 | Propulsion | | | 1974 | ULSD | 510 | 48 | 0.3 |
| 561651 | STAR FISH | Commercial Fishing | STARFISH | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 8807284 | STARBOUND | Commercial Fishing | | 1 | Propulsion | | | 1989 | ULSD | 2500 | 48 | 0.3 |
| 8807284 | STARBOUND | Commercial Fishing | | 2 | Propulsion | | | 1989 | ULSD | 2500 | 48 | 0.3 |
| 8807284 | STARBOUND | Commercial Fishing | | 3 | auxiliary | | | 1989 | ULSD | 330 | 48 | 0.3 |
| 7819228 | STARLITE | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 7819228 | STARLITE | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 550 | 48 | 0.3 |
| 7819228 | STARLITE | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 638851 | SULTAN | Commercial Fishing | SULTAN F | 1 | Propulsion | | | 1981 | ULSD | 600 | 48 | 0.3 |
| 638851 | SULTAN | Commercial Fishing | SULTAN F | 2 | Propulsion | | | 1981 | ULSD | 600 | 48 | 0.3 |
| 638851 | SULTAN | Commercial Fishing | SULTAN F | 3 | auxiliary | | | 1981 | ULSD | 330 | 48 | 0.3 |
| CZ4548 | SUN MAIDEN | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| CZ4548 | SUN MAIDEN | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| CZ4548 | SUN MAIDEN | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 2574403 | SUNNYVALE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 2574403 | SUNNYVALE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 400 | 48 | 0.3 |
| 2574403 | SUNNYVALE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | | 48 | 0.3 |
| 251957 | SUNWARD | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 110 | 48 | 0.3 |
| 251957 | SUNWARD | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 110 | 48 | 0.3 |
| 251957 | SUNWARD | Commercial Fishing | | 3 | auxiliary | | | | ULSD | | 48 | 0.3 |
| 6928553 | TAMANGO | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6928553 | TAMANGO | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 6928553 | TAMANGO | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 249682 | TEBENKOF | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 636 | 48 | 0.3 |
| 249682 | TEBENKOF | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 636 | 48 | 0.3 |
| 249682 | TEBENKOF | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 611985 | TEMPEST | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 611985 | TEMPEST | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 611985 | TEMPEST | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 620538 | TEMPO SEA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 270 | 48 | 0.3 |
| 620538 | TEMPO SEA | Commercial Fishing | | 2 | auxiliary | | | | ULSD | 100 | 48 | 0.3 |
| 654362 | TENACIOUS | Commercial Fishing | TENACIOU | 1 | Propulsion | | | 1983 | ULSD | 270 | 48 | 0.3 |
| 654362 | TENACIOUS | Commercial Fishing | TENACIOU | 2 | auxiliary | | | 1983 | ULSD | 100 | 48 | 0.3 |
| 8852356 | TIME BANDIT | Commercial Fishing | | 1 | Propulsion | | | 1991 | ULSD | 425 | 48 | 0.3 |
| 8852356 | TIME BANDIT | Commercial Fishing | | 2 | Propulsion | | | 1991 | ULSD | 425 | 48 | 0.3 |
| 8852356 | TIME BANDIT | Commercial Fishing | | 3 | auxiliary | | | 1991 | ULSD | 330 | 48 | 0.3 |
| 967015 | TINA B | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 967015 | TINA B | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 967015 | TINA B | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 596514 | TRAILBLAZER | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 750 | 48 | 0.3 |
| 596514 | TRAILBLAZER | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 750 | 48 | 0.3 |
| 596514 | TRAILBLAZER | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 929356 | TRAVELER | Commercial Fishing | | 1 | Propulsion | | | 1989 | ULSD | 650 | 48 | 0.3 |
| 929356 | TRAVELER | Commercial Fishing | | 2 | Propulsion | | | 1989 | ULSD | 650 | 48 | 0.3 |
| 929356 | TRAVELER | Commercial Fishing | | 3 | auxiliary | | | 1989 | ULSD | 330 | 48 | 0.3 |
| 513354 | TUXEDNI | Commercial Fishing | FV TUXED | 1 | Propulsion | | | 1968 | ULSD | 245 | 48 | 0.3 |
| 513354 | TUXEDNI | Commercial Fishing | FV TUXED | 2 | Propulsion | | | 1968 | ULSD | 245 | 48 | 0.3 |
| 513354 | TUXEDNI | Commercial Fishing | FV TUXED | 3 | auxiliary | | | 1968 | ULSD | 100 | 48 | 0.3 |
| 604439 | U S INTREPID | Commercial Fishing | U S FISHI | 1 | Propulsion | | | 1979 | ULSD | 1600 | 48 | 0.3 |
| 604439 | U S INTREPID | Commercial Fishing | U S FISHI | 2 | Propulsion | | | 1979 | ULSD | 1600 | 48 | 0.3 |
| 604439 | U S INTREPID | Commercial Fishing | U S FISHI | 3 | auxiliary | | | 1979 | ULSD | 900 | 48 | 0.3 |
| 637693 | UNIMAK | Commercial Fishing | UNIMAK F | 1 | Propulsion | | | 1981 | ULSD | 1500 | 48 | 0.3 |
| 637693 | UNIMAK | Commercial Fishing | UNIMAK F | 3 | auxiliary | | | 1981 | ULSD | 900 | 48 | 0.3 |
| 611520 | US LIBERATOR | Commercial Fishing | LIBERATO | 1 | Propulsion | | | 1979 | ULSD | 850 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 611520 | US LIBERATOR | Commercial Fishing | LIBERATO | 2 | Propulsion | | | 1979 | ULSD | 850 | 48 | 0.3 |
| 611520 | US LIBERATOR | Commercial Fishing | LIBERATO | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 611225 | VAERDAL | Commercial Fishing | JUBILEE F | 1 | Propulsion | | | 1979 | ULSD | 725 | 48 | 0.3 |
| 611225 | VAERDAL | Commercial Fishing | JUBILEE F | 2 | Propulsion | | | 1979 | ULSD | 725 | 48 | 0.3 |
| 611225 | VAERDAL | Commercial Fishing | JUBILEE F | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 522574 | VALIANT | Commercial Fishing | BOWLDEN | 1 | Propulsion | | | 1969 | ULSD | 480 | 48 | 0.3 |
| 522574 | VALIANT | Commercial Fishing | BOWLDEN | 2 | Propulsion | | | 1969 | ULSD | 480 | 48 | 0.3 |
| 522574 | VALIANT | Commercial Fishing | BOWLDEN | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 384011 | VAMPY 1 | Commercial Fishing | | 1 | Propulsion | | | 1978 | ULSD | 750 | 48 | 0.3 |
| 384011 | VAMPY 1 | Commercial Fishing | | 2 | Propulsion | | | 1978 | ULSD | 750 | 48 | 0.3 |
| 384011 | VAMPY 1 | Commercial Fishing | | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 210906 | VANSEE | Commercial Fishing | ODEGAAR | 1 | Propulsion | | | 1913 | ULSD | 250 | 48 | 0.3 |
| 210906 | VANSEE | Commercial Fishing | ODEGAAR | 2 | auxiliary | | | 1913 | ULSD | 100 | 48 | 0.3 |
| 611642 | VESTERAALEN | Commercial Fishing | VESTERAA | 1 | Propulsion | | | 1978 | ULSD | 600 | 48 | 0.3 |
| 611642 | VESTERAALEN | Commercial Fishing | VESTERAA | 2 | Propulsion | | | 1978 | ULSD | 600 | 48 | 0.3 |
| 611642 | VESTERAALEN | Commercial Fishing | VESTERAA | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 565017 | VIKING | Commercial Fishing | VIKING L | 1 | Propulsion | | | 1974 | ULSD | 884 | 48 | 0.3 |
| 565017 | VIKING | Commercial Fishing | VIKING L | 2 | Propulsion | | | 1974 | ULSD | 884 | 48 | 0.3 |
| 565017 | VIKING | Commercial Fishing | VIKING L | 3 | auxiliary | | | 1974 | ULSD | 330 | 48 | 0.3 |
| 7803114 | VIKING CAVALIE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7803114 | VIKING CAVALIE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7803114 | VIKING CAVALIE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8802404 | VIKING ENTERPIS | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8802404 | VIKING ENTERPIS | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8802404 | VIKING ENTERPIS | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 605228 | VIKING EXPLORE | Commercial Fishing | ROYAL VI | 1 | Propulsion | | | 1979 | ULSD | 600 | 48 | 0.3 |
| 605228 | VIKING EXPLORE | Commercial Fishing | ROYAL VI | 2 | Propulsion | | | 1979 | ULSD | 600 | 48 | 0.3 |
| 605228 | VIKING EXPLORE | Commercial Fishing | ROYAL VI | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 817566 | VIKING MOON | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 817566 | VIKING MOON | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 817566 | VIKING MOON | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 8989147 | VIKING PRIDE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8989147 | VIKING PRIDE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 8989147 | VIKING PRIDE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 508212 | VIKING QUEEN | Commercial Fishing | ICICLE SE | 1 | Propulsion | | | 1967 | ULSD | 350 | 48 | 0.3 |
| 508212 | VIKING QUEEN | Commercial Fishing | ICICLE SE | 2 | Propulsion | | | 1967 | ULSD | 350 | 48 | 0.3 |
| 508212 | VIKING QUEEN | Commercial Fishing | ICICLE SE | 3 | auxiliary | | | 1967 | ULSD | 100 | 48 | 0.3 |
| 593623 | VIKING STAR | Commercial Fishing | OLSEN | 1 | Propulsion | | | 1978 | ULSD | 183 | 48 | 0.3 |
| 593623 | VIKING STAR | Commercial Fishing | OLSEN | 2 | Propulsion | | | 1978 | ULSD | 183 | 48 | 0.3 |
| 593623 | VIKING STAR | Commercial Fishing | OLSEN | 3 | auxiliary | | | 1978 | ULSD | 100 | 48 | 0.3 |
| 7919858 | VIKING STORM | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7919858 | VIKING STORM | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 7919858 | VIKING STORM | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 640544 | WASSILIE B | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 640544 | WASSILIE B | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 640544 | WASSILIE B | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 1043151 | WENDY SEA | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1043151 | WENDY SEA | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 1043151 | WENDY SEA | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 368913 | WESTERLY | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 368913 | WESTERLY | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 368913 | WESTERLY | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 524423 | WESTERN DAWN | Commercial Fishing | OLSEN | 1 | Propulsion | | | 1970 | ULSD | 640 | 48 | 0.3 |
| 524423 | WESTERN DAWN | Commercial Fishing | OLSEN | 2 | Propulsion | | | 1970 | ULSD | 640 | 48 | 0.3 |
| 524423 | WESTERN DAWN | Commercial Fishing | OLSEN | 3 | auxiliary | | | 1970 | ULSD | 330 | 48 | 0.3 |
| 3066273 | WESTERN INVEST | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 3066273 | WESTERN INVEST | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 3066273 | WESTERN INVEST | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 322411 | WESTERN KING | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 322411 | WESTERN KING | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 750 | 48 | 0.3 |
| 322411 | WESTERN KING | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 585926 | WESTERN MARIN | Commercial Fishing | WESTERN | 1 | Propulsion | | | 1977 | ULSD | 425 | 48 | 0.3 |
| 585926 | WESTERN MARIN | Commercial Fishing | WESTERN | 2 | Propulsion | | | 1977 | ULSD | 425 | 48 | 0.3 |
| 585926 | WESTERN MARIN | Commercial Fishing | WESTERN | 3 | auxiliary | | | 1977 | ULSD | 100 | 48 | 0.3 |
| 223931 | WESTWARD | Commercial Fishing | PACIFIC C | 1 | Propulsion | | | 1924 | ULSD | 150 | 48 | 0.3 |
| 223931 | WESTWARD | Commercial Fishing | PACIFIC C | 2 | Propulsion | | | 1924 | ULSD | 150 | 48 | 0.3 |
| 223931 | WESTWARD | Commercial Fishing | PACIFIC C | 3 | auxiliary | | | 1924 | ULSD | 100 | 48 | 0.3 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 615165 | WESTWARD 1 | Commercial Fishing | WESTWAR | 1 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 615165 | WESTWARD 1 | Commercial Fishing | WESTWAR | 2 | Propulsion | | | 1979 | ULSD | 750 | 48 | 0.3 |
| 615165 | WESTWARD 1 | Commercial Fishing | WESTWAR | 3 | auxiliary | | | 1979 | ULSD | 330 | 48 | 0.3 |
| 7743467 | WESTWARD WIND | Commercial Fishing | HIGHLANI | 1 | Propulsion | | | 1978 | ULSD | 650 | 48 | 0.3 |
| 7743467 | WESTWARD WIND | Commercial Fishing | HIGHLANI | 2 | Propulsion | | | 1978 | ULSD | 650 | 48 | 0.3 |
| 7743467 | WESTWARD WIND | Commercial Fishing | HIGHLANI | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 7316408 | WHALE | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 480 | 48 | 0.3 |
| 7316408 | WHALE | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 480 | 48 | 0.3 |
| 7316408 | WHALE | Commercial Fishing | | 3 | auxiliary | | | | ULSD | | 48 | 0.3 |
| 583100 | WIDE BAY | Commercial Fishing | TRIDENT | 1 | Propulsion | | | 1977 | ULSD | 230 | 48 | 0.3 |
| 583100 | WIDE BAY | Commercial Fishing | TRIDENT | 2 | Propulsion | | | 1977 | ULSD | 230 | 48 | 0.3 |
| 583100 | WIDE BAY | Commercial Fishing | TRIDENT | 3 | auxiliary | | | 1977 | ULSD | 100 | 48 | 0.3 |
| 1077274 | WILD SALMON | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 1077274 | WILD SALMON | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 600 | 48 | 0.3 |
| 1077274 | WILD SALMON | Commercial Fishing | | 3 | auxiliary | | | | ULSD | 330 | 48 | 0.3 |
| 594470 | WIZARD | Commercial Fishing | WIZARD F | 1 | Propulsion | | | 1978 | ULSD | 600 | 48 | 0.3 |
| 594470 | WIZARD | Commercial Fishing | WIZARD F | 2 | Propulsion | | | 1978 | ULSD | 600 | 48 | 0.3 |
| 594470 | WIZARD | Commercial Fishing | WIZARD F | 3 | auxiliary | | | 1978 | ULSD | 330 | 48 | 0.3 |
| 524422 | YANKEE CLIPPER | Commercial Fishing | CAIN | 1 | Propulsion | | | 1969 | ULSD | 360 | 48 | 0.3 |
| 524422 | YANKEE CLIPPER | Commercial Fishing | CAIN | 2 | Propulsion | | | 1969 | ULSD | 360 | 48 | 0.3 |
| 524422 | YANKEE CLIPPER | Commercial Fishing | CAIN | 3 | auxiliary | | | 1969 | ULSD | 100 | 48 | 0.3 |
| 628313 | ZENITH | Commercial Fishing | ZENITH FI | 1 | Propulsion | | | 1980 | ULSD | 425 | 48 | 0.3 |
| 628313 | ZENITH | Commercial Fishing | ZENITH FI | 2 | Propulsion | | | 1980 | ULSD | 425 | 48 | 0.3 |
| 628313 | ZENITH | Commercial Fishing | ZENITH FI | 3 | auxiliary | | | 1980 | ULSD | 100 | 48 | 0.3 |
| 9183556 | ZODIAK | Commercial Fishing | | 1 | Propulsion | | | | ULSD | 718 | 48 | 0.3 |
| 9183556 | ZODIAK | Commercial Fishing | | 2 | Propulsion | | | | ULSD | 718 | 48 | 0.3 |
| 9183556 | ZODIAK | Commercial Fishing | | 3 | auxiliary | | | | ULSD | | 48 | 0.3 |
| 1219885 | ZORRO | Commercial Fishing | | 1 | Propulsion | | | 1979 | ULSD | 215 | 48 | 0.3 |
| 1219885 | ZORRO | Commercial Fishing | | 2 | Propulsion | | | 1979 | ULSD | 215 | 48 | 0.3 |
| 1219885 | ZORRO | Commercial Fishing | | 3 | auxiliary | | | 1979 | ULSD | | 48 | 0.3 |
| D231868 | AQUA EXPRESS | Excursion | AQUA EXP | 1 | Propulsion | | | 1992 | ULSD | 2990 | 2500 | 0.42 |
| 600818 | BEAVER | Excursion | ARGOSY L | 1 | Propulsion | Catepillar | 3208T | 1993 | ULSD | 325 | 500 | 0.42 |
| 234281 | CARMELITA | Excursion | EVANS MA | 1 | Propulsion | | | 1992 | ULSD | 330 | 800 | 0.42 |
| 944434 | CELEBRATIONS | Excursion | ARGOSY L | 1 | Propulsion | Cummins | 6BT5.9 | 1999 | ULSD | 210 | 1283 | 0.42 |
| 944434 | CELEBRATIONS | Excursion | ARGOSY L | 2 | Propulsion | Cummins | 6BT5.9 | 1999 | ULSD | 210 | 879 | 0.42 |
| 944434 | CELEBRATIONS | Excursion | ARGOSY L | 3 | auxiliary | Yanmar | 4JH26-TNE | 2000 | ULSD | 40 | 879 | 0.43 |
| PSECL | CHAMPAGNE LAD | Excursion | ARGOSY L | 1 | Propulsion | John Deere | 6068TFM | 1998 | ULSD | 210 | 1385 | 0.42 |
| PSECL | CHAMPAGNE LAD | Excursion | ARGOSY L | 2 | Propulsion | John Deere | 6068TFM | 1998 | ULSD | 210 | 996 | 0.42 |
| PSECL | CHAMPAGNE LAD | Excursion | ARGOSY L | 3 | auxiliary | Toyota | M984K | 1998 | ULSD | 40 | 996 | 0.43 |
| 253102 | CHARLES N. CURT | Excursion | MT RAINIE | 1 | Propulsion | Detroit | | 1992 | ULSD | 320 | 300 | 0.42 |
| 253102 | CHARLES N. CURT | Excursion | MT RAINIE | 2 | Propulsion | Detroit | | 1992 | ULSD | 320 | 300 | 0.42 |
| 253102 | CHARLES N. CURT | Excursion | MT RAINIE | 3 | auxiliary | | | 1985 | ULSD | 40 | 300 | 0.43 |
| 956275 | CHARLIE WELLS | Excursion | HERRON | 1 | Propulsion | | | 1992 | ULSD | 180 | 3000 | 0.42 |
| 956275 | CHARLIE WELLS | Excursion | HERRON | 2 | Propulsion | | | 1992 | ULSD | 180 | 3000 | 0.42 |
| 1109391 | Destiny | Excursion | WATERWA | 1 | Propulsion | | | 1992 | ULSD | 750 | 208 | 0.42 |
| 1109391 | Destiny | Excursion | WATERWA | 2 | Propulsion | | | 1992 | ULSD | 750 | 208 | 0.42 |
| 1109391 | Destiny | Excursion | WATERWA | 3 | auxiliary | | | 1985 | ULSD | 56 | 60 | 0.43 |
| 520222 | EMERALD STAR | Excursion | WATERWA | 1 | Propulsion | | | 1992 | ULSD | 155 | 824 | 0.42 |
| 520222 | EMERALD STAR | Excursion | WATERWA | 2 | Propulsion | | | 1992 | ULSD | 155 | 824 | 0.42 |
| 520222 | EMERALD STAR | Excursion | WATERWA | 3 | auxiliary | | | 1985 | ULSD | 13 | 60 | 0.43 |
| 921107 | FAIRHAVEN | Excursion | PACIFIC C | 1 | Propulsion | | | 1992 | ULSD | 120 | 2000 | 0.42 |
| 685462 | FREMONT AVENU | Excursion | SEATTLE | 1 | Propulsion | | | 1985 | ULSD | 133 | 400 | 0.42 |
| 571306 | GOODTIME II | Excursion | ARGOSY L | 1 | Propulsion | Catepillar | D343 | 1976 | ULSD | 365 | 766 | 0.42 |
| 571306 | GOODTIME II | Excursion | ARGOSY L | 2 | Propulsion | Catepillar | D343 | 1976 | ULSD | 365 | 2083 | 0.42 |
| 571306 | GOODTIME II | Excursion | ARGOSY L | 3 | auxiliary | Shibaura | 3H3XL2 | 2003 | ULSD | 27 | 912 | 0.43 |
| 571306 | GOODTIME II | Excursion | ARGOSY L | 4 | auxiliary | Shibaura | 3H3XL2 | 2003 | ULSD | 22 | 912 | 0.43 |
| 594261 | GOODTIME III | Excursion | ARGOSY L | 1 | Propulsion | Catepillar | 3408 | 1978 | ULSD | 365 | 1371 | 0.42 |
| 594261 | GOODTIME III | Excursion | ARGOSY L | 2 | Propulsion | Catepillar | 3408 | 1978 | ULSD | 365 | 1207 | 0.42 |
| 594261 | GOODTIME III | Excursion | ARGOSY L | 3 | auxiliary | Kubota | F2803-BGE | 2002 | ULSD | 36 | 1020 | 0.43 |
| 594261 | GOODTIME III | Excursion | ARGOSY L | 4 | auxiliary | Isusu | BV-4LE1T | 2011 | ULSD | 36 | 1020 | 0.43 |
| 1064771 | HUMPBACK | Excursion | R W MILLE | 1 | Propulsion | | | 1992 | ULSD | 210 | 1200 | 0.42 |
| PSEIN | INSPIRATION | Excursion | LAKE UNI | 1 | Propulsion | | | 1992 | Gasolin | 450 | 10 | 0.42 |
| 559548 | ISLAND CAPER | Excursion | ISLAND M | 1 | Propulsion | | | 1992 | ULSD | 725 | 500 | 0.42 |
| 559548 | ISLAND CAPER | Excursion | ISLAND M | 2 | Propulsion | | | 1992 | ULSD | 725 | 500 | 0.42 |
| 559548 | ISLAND CAPER | Excursion | ISLAND M | 3 | Propulsion | | | 1992 | ULSD | 725 | 500 | 0.42 |
| IDB | ISLAND DIVER | Excursion | BANDITO | 1 | Propulsion | | | 2009 | ULSD | 315 | 250 | 0.42 |
| 603440 | ISLAND EXPLORE | Excursion | AGGERGA | 1 | Propulsion | | | 1992 | ULSD | 800 | 1500 | 0.42 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 603440 | ISLAND EXPLORE | Excursion | AGGERGA | 2 | Propulsion | | | 1992 | ULSD | 800 | 1500 | 0.42 |
| 603440 | ISLAND EXPLORE | Excursion | AGGERGA | 3 | auxiliary | | | 1985 | ULSD | 20 | 1500 | 0.43 |
| PSEIE | ISLAND EXPRESS | Excursion | ISLAND EX | 1 | Propulsion | | | 1992 | ULSD | 315 | 1000 | 0.42 |
| PSEIE | ISLAND EXPRESS | Excursion | ISLAND EX | 2 | Propulsion | | | 1992 | ULSD | 315 | 1000 | 0.42 |
| PSEIEII | ISLAND EXPRESS I | Excursion | ISLAND EX | 1 | Propulsion | | | 1992 | ULSD | 315 | 1000 | 0.42 |
| PSEIEII | ISLAND EXPRESS I | Excursion | ISLAND EX | 2 | Propulsion | | | 1992 | ULSD | 315 | 1000 | 0.42 |
| PSEIS | ISLAND SPIRIT | Excursion | NEW DIM | 1 | Propulsion | | | 1992 | ULSD | 2200 | 1000 | 0.42 |
| 525654 | JAMAL | Excursion | JAMAL CH | 1 | Propulsion | | | 1970 | ULSD | 325 | 100 | 0.42 |
| 525654 | JAMAL | Excursion | JAMAL CH | 2 | auxiliary | | | 1991 | ULSD | 40 | 100 | 0.43 |
| 525654 | JAMAL | Excursion | JAMAL CH | 3 | auxiliary | | | 1991 | ULSD | 54 | 100 | 0.43 |
| PSEK | KITTIWAKE | Excursion | SAN JUAN | 1 | Propulsion | | | 1992 | ULSD | 250 | 1000 | 0.42 |
| 594991 | KOINONIA | Excursion | HEETER | 1 | Propulsion | | | 2005 | ULSD | 425 | 400 | 0.42 |
| 594991 | KOINONIA | Excursion | HEETER | 2 | Propulsion | | | 2005 | ULSD | 425 | 400 | 0.42 |
| 543871 | LADY MARY | Excursion | ARGOSY L | 1 | Propulsion | John Deere | 6068SFM | 2006 | ULSD | 236 | 1101 | 0.42 |
| 543871 | LADY MARY | Excursion | ARGOSY L | 2 | Propulsion | John Deere | 6068SFM | 2006 | ULSD | 236 | 1211 | 0.42 |
| 543871 | LADY MARY | Excursion | ARGOSY L | 3 | auxiliary | Cummins | 4B-3.9 | 1994 | ULSD | 20 | 1068 | 0.43 |
| 543871 | LADY MARY | Excursion | ARGOSY L | 4 | auxiliary | John Deere | TD4276T | 2000 | ULSD | 27 | 1068 | 0.43 |
| 1033659 | Maritime Instrcutor | Excursion | Seattle Marit | 1 | Propulsion | Caterpillar | V-3412 | 1994 | ULSD | 800 | 264 | 0.42 |
| 1033659 | Maritime Instrcutor | Excursion | Seattle Marit | 2 | Propulsion | Caterpillar | V-3412 | 1994 | ULSD | 800 | 264 | 0.42 |
| 908725 | MATCH MAKER | Excursion | CRISTAL C | 1 | Propulsion | | | 1992 | ULSD | 320 | 1000 | 0.42 |
| 908725 | MATCH MAKER | Excursion | CRISTAL C | 2 | Propulsion | | | 1992 | ULSD | 320 | 1000 | 0.42 |
| 908725 | MATCH MAKER | Excursion | CRISTAL C | 3 | auxiliary | | | 1985 | ULSD | 24 | 1000 | 0.43 |
| 593090 | MY GIRL | Excursion | BROWNS | 1 | Propulsion | | | 1976 | ULSD | 350 | 480 | 0.42 |
| 593090 | MY GIRL | Excursion | BROWNS | 2 | Propulsion | | | 1976 | ULSD | 350 | 480 | 0.42 |
| 593090 | MY GIRL | Excursion | BROWNS | 3 | auxiliary | | | 1985 | ULSD | 34 | 240 | 0.43 |
| 504847 | Naknak | Excursion | BANDITO | 1 | Propulsion | | | 1992 | ULSD | 215 | 300 | 0.42 |
| PSEOQ | OCEAN QUEST | Excursion | BANDITO | 1 | Propulsion | | | 1992 | ULSD | 250 | 425 | 0.42 |
| 698903 | OLYMPAS | Excursion | THE UND | 1 | Propulsion | | | 1992 | ULSD | 495 | 800 | 0.42 |
| 1055060 | OLYMPIC STAR | Excursion | WATERWA | 1 | Propulsion | | | 1992 | ULSD | 230 | 740 | 0.42 |
| 1055060 | OLYMPIC STAR | Excursion | WATERWA | 2 | Propulsion | | | 1992 | ULSD | 230 | 740 | 0.42 |
| 1055060 | OLYMPIC STAR | Excursion | WATERWA | 3 | auxiliary | | | 1985 | ULSD | 27 | 60 | 0.43 |
| 1000079 | ORCA SONG | Excursion | ORCA SON | 1 | Propulsion | | | 1992 | ULSD | 1650 | 800 | 0.42 |
| 553780 | ORCAS EXPRESS | Excursion | ORCAS ISL | 1 | Propulsion | | | 2005 | ULSD | 150 | 1095 | 0.42 |
| 553780 | ORCAS EXPRESS | Excursion | ORCAS ISL | 2 | Propulsion | | | 2005 | ULSD | 150 | 1095 | 0.42 |
| 1051053 | PARACLETE | Excursion | HEETER | 1 | Propulsion | | | 2002 | ULSD | 318 | 2800 | 0.42 |
| 1051053 | PARACLETE | Excursion | HEETER | 2 | Propulsion | | | 2002 | ULSD | 318 | 2800 | 0.42 |
| 1033607 | PAUL JOHANSEN | Excursion | PORT MA | 1 | Propulsion | | | 1992 | ULSD | 264 | 500 | 0.42 |
| 1079075 | PELAGIC | Excursion | PELAGIC | 1 | Propulsion | | | 2001 | ULSD | 480 | 600 | 0.42 |
| PSEPL | PLOVER | Excursion | DRAYTON | 1 | Propulsion | | | 1992 | ULSD | 120 | 600 | 0.42 |
| PSEPO | Popeye | Excursion | SEBRING | 1 | Propulsion | | | 1992 | ULSD | 350 | 500 | 0.42 |
| 976735 | QUEENS LAUNCH | Excursion | ARGOSY L | 1 | Propulsion | Perkins | LD20663U | 1992 | ULSD | 85 | 446 | 0.42 |
| RAV1 | Raven | Excursion | ARGOSY L | 1 | Propulsion | Suzuki | DF250 | 2000 | Gasolin | 250 | 100 | 0.42 |
| 1093282 | ROYAL ARGOSY | Excursion | ARGOSY L | 1 | Propulsion | Komatsu | SA6P170-A- | 2000 | ULSD | 700 | 916 | 0.42 |
| 1093282 | ROYAL ARGOSY | Excursion | ARGOSY L | 2 | Propulsion | Komatsu | SA6P170-A- | 2000 | ULSD | 700 | 1775 | 0.42 |
| 1093282 | ROYAL ARGOSY | Excursion | ARGOSY L | 3 | auxiliary | Komatsu | SA6D140-1 | 2000 | ULSD | 40 | 295 | 0.43 |
| 1093282 | ROYAL ARGOSY | Excursion | ARGOSY L | 4 | auxiliary | Komatsu | SA6D140-1 | 2000 | ULSD | 54 | 1033 | 0.43 |
| 1093282 | ROYAL ARGOSY | Excursion | ARGOSY L | 5 | auxiliary | John Deere | 4045T | 2000 | ULSD | 47 | 1033 | 0.43 |
| 601283 | SALVAGER I | Excursion | BALLARD | 1 | Propulsion | | | 2002 | ULSD | 370 | 20 | 0.42 |
| 601283 | SALVAGER I | Excursion | BALLARD | 2 | Propulsion | | | 2002 | ULSD | 370 | 20 | 0.42 |
| 514506 | SAMPAN | Excursion | BANDITO | 1 | Propulsion | | | 1992 | ULSD | 350 | 600 | 0.42 |
| PSESH | SEA HAWK | Excursion | SAN JUAN | 1 | Propulsion | | | 1992 | ULSD | 160 | 1000 | 0.42 |
| PSES | Seeker | Excursion | ANCHOR | 1 | Propulsion | | | 1974 | ULSD | 300 | 285 | 0.42 |
| PSES | Seeker | Excursion | ANCHOR | 2 | Propulsion | | | 1974 | ULSD | 300 | 285 | 0.42 |
| PSES | Seeker | Excursion | ANCHOR | 3 | auxiliary | | | 1974 | ULSD | 27 | 285 | 0.43 |
| 282387 | SIGHTSEER | Excursion | ARGOSY L | 1 | Propulsion | Catepillar | D343 | 1978 | ULSD | 365 | 910 | 0.42 |
| 282387 | SIGHTSEER | Excursion | ARGOSY L | 2 | auxiliary | John Deere | 4039D | 1999 | ULSD | 47 | 426 | 0.43 |
| 916587 | SPIRIT OF SEATTL | Excursion | ARGOSY L | 1 | Propulsion | Catepillar | 3408 B | 1987 | ULSD | 445 | 1828 | 0.42 |
| 916587 | SPIRIT OF SEATTL | Excursion | ARGOSY L | 2 | Propulsion | Catepillar | 3408 B | 1987 | ULSD | 445 | 404 | 0.42 |
| 916587 | SPIRIT OF SEATTL | Excursion | ARGOSY L | 3 | auxiliary | John Deere | 4276D | 1987 | ULSD | 40 | 926 | 0.43 |
| 916587 | SPIRIT OF SEATTL | Excursion | ARGOSY L | 4 | auxiliary | John Deere | 4239T | 1987 | ULSD | 40 | 926 | 0.43 |
| 578880 | SQUITO | Excursion | Tom Averna | 1 | Propulsion | | | 1976 | ULSD | 180 | 300 | 0.42 |
| 578880 | SQUITO | Excursion | Tom Averna | 2 | Propulsion | | | 1976 | ULSD | 180 | 300 | 0.42 |
| 579981 | STELLAR SEA | Excursion | SALISH SE | 1 | Propulsion | | | 2003 | ULSD | 235 | 1000 | 0.42 |
| 579981 | STELLAR SEA | Excursion | SALISH SE | 2 | Propulsion | | | 2003 | ULSD | 235 | 1000 | 0.42 |
| 1025644 | SYLVAN SPIRIT | Excursion | HEETER | 1 | Propulsion | | | 1996 | ULSD | 300 | 800 | 0.42 |
| 1025644 | SYLVAN SPIRIT | Excursion | HEETER | 2 | Propulsion | | | 1996 | ULSD | 300 | 800 | 0.42 |
| PSETI | THE ISLANDER | Excursion | LAKE UNI | 1 | Propulsion | | | 1992 | ULSD | 180 | 500 | 0.42 |

# Puget Sound Emissions Inventory
## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1081068 | TYLER M | Excursion | SEBRING | 1 | Propulsion | | | 1992 | ULSD | 350 | 500 | 0.42 |
| 1060642 | UNITY | Excursion | LAKE UNI | 1 | Propulsion | | | 1992 | Gasolin | 450 | 10 | 0.42 |
| 633786 | VICTORIA EXPRES | Excursion | VICTORIA | 1 | Propulsion | | | 1986 | ULSD | 485 | 500 | 0.42 |
| 633786 | VICTORIA EXPRES | Excursion | VICTORIA | 2 | Propulsion | | | 1986 | ULSD | 485 | 500 | 0.42 |
| 633786 | VICTORIA EXPRES | Excursion | VICTORIA | 3 | Propulsion | | | 1986 | ULSD | 485 | 500 | 0.42 |
| 633786 | VICTORIA EXPRES | Excursion | VICTORIA | 4 | auxiliary | | | 1986 | ULSD | 150 | 500 | 0.43 |
| 605959 | VICTORIA EXPRES | Excursion | VICTORIA | 1 | Propulsion | | | 1986 | ULSD | 510 | 500 | 0.42 |
| 605959 | VICTORIA EXPRES | Excursion | VICTORIA | 2 | Propulsion | | | 1986 | ULSD | 510 | 500 | 0.42 |
| 605959 | VICTORIA EXPRES | Excursion | VICTORIA | 3 | Propulsion | | | 1986 | ULSD | 510 | 500 | 0.42 |
| 605959 | VICTORIA EXPRES | Excursion | VICTORIA | 4 | Propulsion | | | 1986 | ULSD | 510 | 500 | 0.42 |
| 605959 | VICTORIA EXPRES | Excursion | VICTORIA | 5 | auxiliary | | | 1986 | ULSD | 150 | 500 | 0.43 |
| 572980 | VICTORIA STAR2 | Excursion | PACIFIC C | 1 | Propulsion | | | 1992 | ULSD | 600 | 2000 | 0.42 |
| 572980 | VICTORIA STAR2 | Excursion | PACIFIC C | 2 | Propulsion | | | 1992 | ULSD | 600 | 2000 | 0.42 |
| 572980 | VICTORIA STAR2 | Excursion | PACIFIC C | 3 | Propulsion | | | 1992 | ULSD | 600 | 2000 | 0.42 |
| 572980 | VICTORIA STAR2 | Excursion | PACIFIC C | 4 | auxiliary | | | 1985 | ULSD | 40 | 2000 | 0.43 |
| PSEVS | VIKING STAR | Excursion | VIKING C | 1 | Propulsion | | | 1992 | ULSD | 760 | 1500 | 0.42 |
| 222170 | VIRGINIA V | Excursion | THE STEA | 1 | Propulsion | | | 1992 | ULSD | 400 | 500 | 0.42 |
| 222170 | VIRGINIA V | Excursion | THE STEA | 2 | auxiliary | | | 1985 | ULSD | 27 | 500 | 0.43 |
| 222170 | VIRGINIA V | Excursion | THE STEA | 3 | auxiliary | | | 1985 | ULSD | 40 | 500 | 0.43 |
| 539994 | WESTERN PRINCE | Excursion | WESTERN | 1 | Propulsion | | | 1992 | ULSD | 316 | 900 | 0.42 |
| 539994 | WESTERN PRINCE | Excursion | WESTERN | 2 | Propulsion | | | 1992 | ULSD | 316 | 900 | 0.42 |
| PSFC | CALLAHAN | Ferry | WASHING | 1 | Propulsion | Detroit | 8V71 | 1994 | ULSD | 300 | 2600 | 0.34 |
| PSFC | CALLAHAN | Ferry | WASHING | 2 | Propulsion | Detroit | 8V71 | 1994 | ULSD | 300 | 2600 | 0.34 |
| PSFC | CALLAHAN | Ferry | WASHING | 3 | auxiliary | Lugger | | 1985 | ULSD | 16 | 2600 | 0.43 |
| 214872 | CARLISLE II | Ferry | KITSAP TR | 1 | Propulsion | | | 1994 | ULSD | 330 | 4000 | 0.34 |
| 636551 | Cathlamet | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 6494 | 0.34 |
| 636551 | Cathlamet | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 6494 | 0.34 |
| 636551 | Cathlamet | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 7015 | 0.43 |
| 636551 | Cathlamet | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 5851 | 0.43 |
| 636551 | Cathlamet | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 1089 | 0.43 |
| 636551 | Cathlamet | Ferry | Washington | 6 | auxiliary | Detroit | 6V71 | 2003 | ULSD | 168 | 24 | 0.43 |
| 636551 | Cathlamet | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1500 | 0.43 |
| 636551 | Cathlamet | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1500 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2005 | ULSD | 2500 | 4867 | 0.34 |
| 999032 | Chelan | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2005 | ULSD | 2500 | 4867 | 0.34 |
| 999032 | Chelan | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 3968 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 2012 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 2035 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 6 | auxiliary | Detroit | 6V71 | 2003 | ULSD | 168 | 24 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1000 | 0.43 |
| 999032 | Chelan | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1000 | 0.43 |
| 1228643 | Chetzemoka | Ferry | Washington | 1 | Propulsion | EMD | 12-710 | 2011 | ULSD | 3000 | 4561 | 0.34 |
| 1228643 | Chetzemoka | Ferry | Washington | 2 | Propulsion | EMD | 12-710 | 2011 | ULSD | 3000 | 4561 | 0.34 |
| 1228643 | Chetzemoka | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2011 | ULSD | | | 0.43 |
| 1228643 | Chetzemoka | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2011 | ULSD | | | 0.43 |
| 1228643 | Chetzemoka | Ferry | Washington | 5 | boiler | Weil McLain | 88 | 2011 | ULSD | 60 | | 0.43 |
| 1228643 | Chetzemoka | Ferry | Washington | 6 | boiler | Weil McLain | 88 | 2011 | ULSD | 60 | | 0.43 |
| 1023545 | Christine Anderson | Ferry | COUNTY C | 1 | Propulsion | | | 1996 | ULSD | 960 | 5150 | 0.34 |
| 1023545 | Christine Anderson | Ferry | COUNTY C | 2 | Propulsion | | | 1996 | ULSD | 960 | 5150 | 0.34 |
| 1023545 | Christine Anderson | Ferry | COUNTY C | 3 | auxiliary | | | 1985 | ULSD | 99 | 2760 | 0.43 |
| 1023545 | Christine Anderson | Ferry | COUNTY C | 4 | auxiliary | | | 1985 | ULSD | 99 | 2760 | 0.43 |
| PSFCa | COHO | Ferry | BLACK BA | 1 | Propulsion | EMD | 12V | 1994 | ULSD | 2600 | 1350 | 0.34 |
| PSFCa | COHO | Ferry | BLACK BA | 2 | Propulsion | | | 1994 | ULSD | 2600 | 1350 | 0.34 |
| PSFE | EAGLE | Ferry | HORLUCK | 1 | Propulsion | | | 1994 | ULSD | 500 | 4000 | 0.34 |
| 537794 | EL Bartlett | Ferry | Seattle Marit | 1 | Propulsion | Fairbanks M | 38D 81/8 | 1969 | ULSD | 1500 | 384 | 0.34 |
| 537794 | EL Bartlett | Ferry | Seattle Marit | 2 | Propulsion | Fairbanks M | 38D 81/8 | 1969 | ULSD | 1500 | 384 | 0.34 |
| 537794 | EL Bartlett | Ferry | Seattle Marit | 3 | auxiliary | Cummins | NT855G3M | 1969 | ULSD | 200 | 384 | 0.43 |
| 537794 | EL Bartlett | Ferry | Seattle Marit | 4 | auxiliary | Cummins | NT855G3M | 1969 | ULSD | 200 | 384 | 0.43 |
| 1117163 | Elsie M II | Ferry | HAT ISLAN | 1 | Propulsion | Detroit Dies | 6v72 | 2010 | ULSD | 400 | 3000 | 0.34 |
| 512324 | Elwha | Ferry | Washington | 1 | Propulsion | EMD | 645F7B | 1991 | ULSD | 2550 | 5958 | 0.34 |
| 512324 | Elwha | Ferry | Washington | 2 | Propulsion | EMD | 645F7B | 1991 | ULSD | 2550 | 5958 | 0.34 |
| 512324 | Elwha | Ferry | Washington | 3 | Propulsion | EMD | 645F7B | 1991 | ULSD | 2550 | 5958 | 0.34 |
| 512324 | Elwha | Ferry | Washington | 4 | Propulsion | EMD | 645F7B | 1991 | ULSD | 2550 | 5958 | 0.34 |
| 512324 | Elwha | Ferry | Washington | 5 | auxiliary | Cat | 3412 | 1991 | ULSD | 451 | 185 | 0.43 |
| 512324 | Elwha | Ferry | Washington | 6 | auxiliary | Cat | 3406 | 1991 | ULSD | 451 | 24 | 0.43 |
| 512324 | Elwha | Ferry | Washington | 7 | boiler | Weil McLain | 94 | 1991 | ULSD | 60 | 2000 | 0.43 |
| 512324 | Elwha | Ferry | Washington | 8 | boiler | Weil McLain | 94 | 1991 | ULSD | 60 | 2000 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 268732 | Evergreen State | Ferry | Washington | 1 | Propulsion | Stork Werks | 9FHD 240 | 1988 | ULSD | 1250 | 4141 | 0.34 |
| 268732 | Evergreen State | Ferry | Washington | 2 | Propulsion | Stork Werks | 9FHD 240 | 1988 | ULSD | 1250 | 4141 | 0.34 |
| 268732 | Evergreen State | Ferry | Washington | 3 | auxiliary | Cummins | NTA 855 | 1988 | ULSD | 425 | 48 | 0.43 |
| 268732 | Evergreen State | Ferry | Washington | 4 | auxiliary | Cummins | NTA 855 | 1988 | ULSD | 425 | 28 | 0.43 |
| 268732 | Evergreen State | Ferry | Washington | 5 | boiler | Weil McLain | BL-1088-SF | 1988 | ULSD | 60 | 24 | 0.43 |
| PSFGS | Glacier Spirit | Ferry | Puget Sound | 1 | Propulsion |  |  | 1994 | ULSD | 1300 | 800 | 0.34 |
| 601686 | GUEMES ISLAND I | Ferry | Skagit Count | 1 | Propulsion | Cummins | KTA-19 | 2005 | ULSD | 540 | 6000 | 0.34 |
| 601686 | GUEMES ISLAND I | Ferry | Skagit Count | 2 | Propulsion | Cummins | KTA-19 | 2005 | ULSD | 540 | 6000 | 0.34 |
| 601686 | GUEMES ISLAND I | Ferry | Skagit Count | 3 | Propulsion | Cummins | KTA-19 | 2005 | ULSD | 540 | 0 | 0.34 |
| 601686 | GUEMES ISLAND I | Ferry | Skagit Count | 4 | auxiliary | Cat |  | 2009 | ULSD | 54 | 0 | 0.43 |
| 1034230 | Hat Express | Ferry | HAT ISLAN | 1 | Propulsion | Detroit Dies | 16v92 | 1996 | ULSD | 1100 | 1100 | 0.34 |
| 1034230 | Hat Express | Ferry | HAT ISLAN | 2 | Propulsion | Detroit Dies | 16v92 | 1996 | ULSD | 1100 | 1100 | 0.34 |
| 508159 | Hiyu | Ferry | Washington | 1 | Propulsion | CAT | D 379 | 1967 | ULSD | 430 | 301 | 0.34 |
| 508159 | Hiyu | Ferry | Washington | 2 | Propulsion | CAT | D379 | 1967 | ULSD | 430 | 301 | 0.34 |
| 508159 | Hiyu | Ferry | Washington | 3 | auxiliary | Cummins | 4BT 3.9G2 | 1967 | ULSD | 102 | 0 | 0.43 |
| 508159 | Hiyu | Ferry | Washington | 4 | auxiliary | Cummins | 4BT 3.9G2 | 1967 | ULSD | 102 | 0 | 0.43 |
| 508159 | Hiyu | Ferry | Washington | 5 | auxiliary | Cummins | 4BT 3.9 | 1967 | ULSD | 82 | 0 | 0.43 |
| 508159 | Hiyu | Ferry | Washington | 6 | boiler | Way Wolf | 2128 - 8C | 1967 | ULSD | 60 | 0 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 1 | Propulsion | EMD | 645F7B | 2005 | ULSD | 2000 | 6264 | 0.34 |
| 508160 | Hyak | Ferry | Washington | 2 | Propulsion | EMD | 645F7B | 2005 | ULSD | 2000 | 6264 | 0.34 |
| 508160 | Hyak | Ferry | Washington | 3 | Propulsion | EMD | 645F7B | 2005 | ULSD | 2000 | 6264 | 0.34 |
| 508160 | Hyak | Ferry | Washington | 4 | Propulsion | EMD | 645F7B | 2005 | ULSD | 2000 | 6264 | 0.34 |
| 508160 | Hyak | Ferry | Washington | 5 | auxiliary | Detroit | Series 50 DI | 1999 | ULSD | 134 | 4651 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 6 | auxiliary | Cat | 3412 | 1999 | ULSD | 451 | 3620 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 7 | auxiliary | Cat | 3412 | 1999 | ULSD | 451 | 2457 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 8 | auxiliary | Detroit | 6V92 | 1999 | ULSD | 355 | 24 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 9 | boiler | Weil McLain |  | 1999 | ULSD | 60 | 750 | 0.43 |
| 508160 | Hyak | Ferry | Washington | 10 | boiler | Weil McLain |  | 1999 | ULSD | 60 | 750 | 0.43 |
| 574608 | ISLAND COMMUTI | Ferry | ISLAND C | 1 | Propulsion |  |  | 1994 | ULSD | 400 | 2000 | 0.34 |
| 574608 | ISLAND COMMUTI | Ferry | ISLAND C | 2 | Propulsion |  |  | 1994 | ULSD | 400 | 2000 | 0.34 |
| 624022 | Issaquah | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 6836 | 0.34 |
| 624022 | Issaquah | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 6836 | 0.34 |
| 624022 | Issaquah | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 6842 | 0.43 |
| 624022 | Issaquah | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 3562 | 0.43 |
| 624022 | Issaquah | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 3484 | 0.43 |
| 624022 | Issaquah | Ferry | Washington | 6 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 168 | 24 | 0.43 |
| 624022 | Issaquah | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1700 | 0.43 |
| 624022 | Issaquah | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1700 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 1 | Propulsion | EMD | 645 E5 | 1999 | ULSD | 2000 | 5471 | 0.34 |
| 508604 | Kaleetan | Ferry | Washington | 2 | Propulsion | EMD | 645 E5 | 1999 | ULSD | 2000 | 5471 | 0.34 |
| 508604 | Kaleetan | Ferry | Washington | 3 | Propulsion | EMD | 645 E5 | 1999 | ULSD | 2000 | 5471 | 0.34 |
| 508604 | Kaleetan | Ferry | Washington | 4 | Propulsion | EMD | 645 E5 | 1999 | ULSD | 2000 | 5471 | 0.34 |
| 508604 | Kaleetan | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2002 | ULSD | 400 | 5821 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 6 | auxiliary | Detroit | Series 60 DI | 2002 | ULSD | 400 | 3045 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 7 | auxiliary | Detroit | Series 60 DI | 2002 | ULSD | 400 | 3035 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 8 | auxiliary | Detroit | 6V92 | 2002 | ULSD | 355 | 44 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 9 | boiler | Weil McLain | 94 | 2002 | ULSD | 60 | 1500 | 0.43 |
| 508604 | Kaleetan | Ferry | Washington | 10 | boiler | Weil McLain | 94 | 2002 | ULSD | 60 | 1500 | 0.43 |
| 1229902 | Kennewick | Ferry | Washington | 1 | Propulsion | EMD | 710G7C-T2 | 2011 | ULSD | 3000 | 4060 | 0.34 |
| 1229902 | Kennewick | Ferry | Washington | 2 | Propulsion | EMD | 710G7C-T2 | 2011 | ULSD | 3000 | 4060 | 0.34 |
| 1229902 | Kennewick | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2011 | ULSD |  |  | 0.43 |
| 1229902 | Kennewick | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2011 | ULSD |  |  | 0.43 |
| 1229902 | Kennewick | Ferry | Washington | 5 | boiler | Weil McLain | 88 | 2011 | ULSD | 60 |  | 0.43 |
| 1229902 | Kennewick | Ferry | Washington | 6 | boiler | Weil McLain | 88 | 2011 | ULSD | 60 |  | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 5882 | 0.34 |
| 630023 | Kitsap | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 5882 | 0.34 |
| 630023 | Kitsap | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 6551 | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 1168 | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 5588 | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 6 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 168 | 24 | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 3000 | 0.43 |
| 630023 | Kitsap | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 3000 | 0.43 |
| 627507 | Kittitas | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 4772 | 0.34 |
| 627507 | Kittitas | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2003 | ULSD | 2500 | 4772 | 0.34 |
| 627507 | Kittitas | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 6587 | 0.43 |
| 627507 | Kittitas | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 3391 | 0.43 |
| 627507 | Kittitas | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2003 | ULSD | 400 | 3142 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 627507 | Kittitas | Ferry | Washington | 6 | auxiliary | Detroit | Series 6V71 | 2003 | ULSD | 168 | 36 | 0.43 |
| 627507 | Kittitas | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1500 | 0.43 |
| 627507 | Kittitas | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2003 | ULSD | 60 | 1500 | 0.43 |
| 277872 | Klahowya | Ferry | Washington | 1 | Propulsion | EMD | 645 7B | 1995 | ULSD | 1250 | 5739 | 0.34 |
| 277872 | Klahowya | Ferry | Washington | 2 | Propulsion | EMD | 645 7B | 1995 | ULSD | 1250 | 5739 | 0.34 |
| 277872 | Klahowya | Ferry | Washington | 3 | auxiliary | Cummins | NTA 855 | 1995 | ULSD | 325 | 61 | 0.43 |
| 277872 | Klahowya | Ferry | Washington | 4 | auxiliary | Cummins | NTA 855 | 1995 | ULSD | 325 | 31 | 0.43 |
| 277872 | Klahowya | Ferry | Washington | 5 | boiler | Weil McLain | | 1995 | ULSD | 60 | 0 | 0.43 |
| PSFML | MARY L | Ferry | HORLUCK | 1 | Propulsion | | | 1994 | ULSD | 400 | 4000 | 0.34 |
| 678705 | MCNEIL | Ferry | WASHING | 1 | Propulsion | Detroit | 8V71 | 1994 | ULSD | 300 | 2900 | 0.34 |
| 678705 | MCNEIL | Ferry | WASHING | 2 | Propulsion | Detroit | 8V71 | 1994 | ULSD | 300 | 2900 | 0.34 |
| 678705 | MCNEIL | Ferry | WASHING | 3 | auxiliary | Lugger | | 1985 | ULSD | 16 | 2900 | 0.43 |
| 510289 | NEIL HENLY | Ferry | MCNEIL IS | 1 | Propulsion | Cat | D343 | 1994 | ULSD | 335 | 2600 | 0.34 |
| 510289 | NEIL HENLY | Ferry | MCNEIL IS | 2 | Propulsion | Cat | D343 | 1994 | ULSD | 335 | 2600 | 0.34 |
| 510289 | NEIL HENLY | Ferry | MCNEIL IS | 3 | auxiliary | Kato | | 1985 | ULSD | 27 | 2600 | 0.43 |
| 510289 | NEIL HENLY | Ferry | MCNEIL IS | 4 | auxiliary | Yanmar | | 1985 | ULSD | 30 | 2600 | 0.43 |
| 1061310 | Puyallup | Ferry | Washington | 1 | Propulsion | EMD | 710 G7B | 1999 | ULSD | 3300 | 6717 | 0.34 |
| 1061310 | Puyallup | Ferry | Washington | 2 | Propulsion | EMD | 710 G7B | 1999 | ULSD | 3300 | 6717 | 0.34 |
| 1061310 | Puyallup | Ferry | Washington | 3 | Propulsion | EMD | 710 G7B | 1999 | ULSD | 3300 | 6717 | 0.34 |
| 1061310 | Puyallup | Ferry | Washington | 4 | Propulsion | EMD | 710 G7B | 1999 | ULSD | 3300 | 6717 | 0.34 |
| 1061310 | Puyallup | Ferry | Washington | 5 | auxiliary | Cat | 3412 | 1999 | ULSD | 719 | 1691 | 0.43 |
| 1061310 | Puyallup | Ferry | Washington | 6 | auxiliary | Cat | 3412 | 1999 | ULSD | 831 | 202 | 0.43 |
| 1061310 | Puyallup | Ferry | Washington | 7 | boiler | Weil McLain | 888 | 1999 | ULSD | 60 | 600 | 0.43 |
| 1061310 | Puyallup | Ferry | Washington | 8 | boiler | Weil McLain | 888 | 1999 | ULSD | 60 | 600 | 0.43 |
| PSFRH | Red Head | Ferry | Puget Sound | 1 | Propulsion | | | 1994 | ULSD | 900 | 800 | 0.34 |
| 251646 | Rhododendron | Ferry | Washington | 3 | auxiliary | Cummins | 6CTA8.3-G | 1990 | ULSD | 277 | 5088 | 0.43 |
| 251646 | Rhododendron | Ferry | Washington | 4 | auxiliary | Cummins | 6CTA8.3-G | 1990 | ULSD | 277 | 847 | 0.43 |
| 251646 | Rhododendron | Ferry | Washington | 5 | auxiliary | Cummins | 6BT5.9 | 1990 | ULSD | 166 | 25 | 0.43 |
| 251646 | Rhododendron | Ferry | Washington | 6 | boiler | Weil McLain | H1088WS | 1990 | ULSD | 60 | 2500 | 0.43 |
| 251646 | Rhodondendron | Ferry | Washington | 1 | Propulsion | Wartsilla | 624 TS | 1990 | ULSD | 1086 | 6218 | 0.34 |
| 251646 | Rhodondendron | Ferry | Washington | 2 | Propulsion | Wartsilla | 624 TS | 1990 | ULSD | 1086 | 6218 | 0.34 |
| 1229903 | Salish | Ferry | Washington | 1 | Propulsion | EMD | 710G7C-T2 | 2007 | ULSD | 3000 | 2707 | 0.34 |
| 1229903 | Salish | Ferry | Washington | 2 | Propulsion | EMD | 710G7C-T2 | 2007 | ULSD | 3000 | 2707 | 0.34 |
| 1229903 | Salish | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 D | 2006 | ULSD | | | 0.43 |
| 1229903 | Salish | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 D | 2006 | ULSD | | | 0.43 |
| 1229903 | Salish | Ferry | Washington | 5 | boiler | Weil McLain | 88 | 2006 | ULSD | 60 | | 0.43 |
| 1229903 | Salish | Ferry | Washington | 6 | boiler | Weil McLain | 88 | 2006 | ULSD | 60 | | 0.43 |
| 662478 | Sealth | Ferry | Washington | 1 | Propulsion | GE | 7FDM12EF | 2004 | ULSD | 2500 | 5438 | 0.34 |
| 662478 | Sealth | Ferry | Washington | 2 | Propulsion | GE | 7FDM12EF | 2004 | ULSD | 2500 | 5438 | 0.34 |
| 662478 | Sealth | Ferry | Washington | 3 | auxiliary | Detroit | Series 60 D | 2004 | ULSD | 400 | 5628 | 0.43 |
| 662478 | Sealth | Ferry | Washington | 4 | auxiliary | Detroit | Series 60 D | 2004 | ULSD | 400 | 796 | 0.43 |
| 662478 | Sealth | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 D | 2004 | ULSD | 400 | 4821 | 0.43 |
| 662478 | Sealth | Ferry | Washington | 6 | auxiliary | Detroit | Series 6V71 | 2004 | ULSD | 168 | 24 | 0.43 |
| 662478 | Sealth | Ferry | Washington | 7 | boiler | Seattle Boile | SDW50M | 2004 | ULSD | 60 | 1200 | 0.43 |
| 662478 | Sealth | Ferry | Washington | 8 | boiler | Seattle Boile | SDW50M | 2004 | ULSD | 60 | 1200 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 1 | Propulsion | EMD | 645 F7B | 1972 | ULSD | 2875 | 6311 | 0.34 |
| 544785 | Spokane | Ferry | Washington | 2 | Propulsion | EMD | 645 F7B | 1972 | ULSD | 2875 | 6311 | 0.34 |
| 544785 | Spokane | Ferry | Washington | 3 | Propulsion | EMD | 645 F7B | 1972 | ULSD | 2875 | 6311 | 0.34 |
| 544785 | Spokane | Ferry | Washington | 4 | Propulsion | EMD | 645 F7B | 1972 | ULSD | 2875 | 6311 | 0.34 |
| 544785 | Spokane | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 D | 2002 | ULSD | 400 | 6393 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 6 | auxiliary | Cummins | KTA38 | 2002 | ULSD | 1210 | 3427 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 7 | auxiliary | Cummins | KTA38 | 2002 | ULSD | 1210 | 3087 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 8 | auxiliary | Detroit | Series 60 D | 2002 | ULSD | 400 | 24 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 9 | boiler | Weil McLain | PL-1194S/F | 2002 | ULSD | 60 | 3000 | 0.43 |
| 544785 | Spokane | Ferry | Washington | 10 | boiler | Weil McLain | PL-1194S/F | 2002 | ULSD | 60 | 3000 | 0.43 |
| PSFS | STEILICOOM | Ferry | WASHING | 1 | Propulsion | Cummins | 6 Cyl. | 1983 | ULSD | 250 | 500 | 0.34 |
| PSFS | STEILICOOM | Ferry | WASHING | 2 | auxiliary | | | 1985 | ULSD | 20 | 500 | 0.43 |
| 1052576 | Tacoma | Ferry | Washington | 1 | Propulsion | EMD | 710 G7B | 1997 | ULSD | 3300 | 5345 | 0.34 |
| 1052576 | Tacoma | Ferry | Washington | 2 | Propulsion | EMD | 710 G7B | 1997 | ULSD | 3300 | 5345 | 0.34 |
| 1052576 | Tacoma | Ferry | Washington | 3 | Propulsion | EMD | 710 G7B | 1997 | ULSD | 3300 | 5345 | 0.34 |
| 1052576 | Tacoma | Ferry | Washington | 4 | Propulsion | EMD | 710 G7B | 1997 | ULSD | 3300 | 5345 | 0.34 |
| 1052576 | Tacoma | Ferry | Washington | 5 | auxiliary | Cat | 3412 | 1997 | ULSD | 719 | 1314 | 0.43 |
| 1052576 | Tacoma | Ferry | Washington | 6 | auxiliary | Cat | 3412 | 1997 | ULSD | 831 | 46 | 0.43 |
| 1052576 | Tacoma | Ferry | Washington | 7 | boiler | Weil McLain | 888 | 1997 | ULSD | 60 | 300 | 0.43 |
| 1052576 | Tacoma | Ferry | Washington | 8 | boiler | Weil McLain | 888 | 1997 | ULSD | 60 | 300 | 0.43 |
| 278437 | Tillikum | Ferry | Washington | 1 | Propulsion | EMD | 645 7B | 1959 | ULSD | 1250 | 5707 | 0.34 |
| 278437 | Tillikum | Ferry | Washington | 2 | Propulsion | EMD | 645 7B | 1959 | ULSD | 1250 | 5707 | 0.34 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278437 | Tillikum | Ferry | Washington | 3 | auxiliary | Cummins | NTA 855 | 1959 | ULSD | 425 | 249 | 0.43 |
| 278437 | Tillikum | Ferry | Washington | 4 | auxiliary | Cummins | NTA 855 | 1959 | ULSD | 325 | 33 | 0.43 |
| 278437 | Tillikum | Ferry | Washington | 5 | boiler | Weil McLain | H1088WS | 1959 | ULSD | 60 | 100 | 0.43 |
| 8520757 | Victoria Clipper | Ferry | Victoria Clip | 1 | Propulsion | MTU | 16V396T74I | 1994 | ULSD | 2500 | 1000 | 0.34 |
| 8520757 | Victoria Clipper | Ferry | Victoria Clip | 2 | Propulsion | MTU | 16V396T74I | 1994 | ULSD | 2500 | 1000 | 0.34 |
| 965831 | Victoria Clipper III | Ferry | Victoria Clip | 1 | Propulsion | Detroit | 16V149TI | 1989 | ULSD | 1600 | 1200 | 0.34 |
| 965831 | Victoria Clipper III | Ferry | Victoria Clip | 2 | Propulsion | Detroit | 16V149TI | 1989 | ULSD | 1600 | 1200 | 0.34 |
| 991479 | Victoria Clipper IV | Ferry | Victoria Clip | 1 | Propulsion | MTU | 16V396T74I | 1993 | ULSD | 4400 | 2000 | 0.34 |
| 991479 | Victoria Clipper IV | Ferry | Victoria Clip | 2 | Propulsion | MTU | 16V396T74I | 1993 | ULSD | 4000 | 2000 | 0.34 |
| 546382 | Walla Walla | Ferry | Washington | 1 | Propulsion | EMD | 645 F7B | 2005 | ULSD | 2875 | 5988 | 0.34 |
| 546382 | Walla Walla | Ferry | Washington | 2 | Propulsion | EMD | 645 F7B | 2005 | ULSD | 2875 | 5988 | 0.34 |
| 546382 | Walla Walla | Ferry | Washington | 3 | Propulsion | EMD | 645 F7B | 2005 | ULSD | 2875 | 5988 | 0.34 |
| 546382 | Walla Walla | Ferry | Washington | 4 | Propulsion | EMD | 645 F7B | 2005 | ULSD | 2875 | 5988 | 0.34 |
| 546382 | Walla Walla | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2002 | ULSD | 400 | 3103 | 0.43 |
| 546382 | Walla Walla | Ferry | Washington | 6 | auxiliary | Cummins | KTA38 | 2002 | ULSD | 1210 | 529 | 0.43 |
| 546382 | Walla Walla | Ferry | Washington | 7 | auxiliary | Cummins | KTA38 | 2002 | ULSD | 1210 | 2731 | 0.43 |
| 546382 | Walla Walla | Ferry | Washington | 8 | auxiliary | Detroit | Series 60 DI | 2002 | ULSD | 400 | 24 | 0.43 |
| 546382 | Walla Walla | Ferry | Washington | 9 | boiler | Weil McLain | PL-1194S/F | 2002 | ULSD | 60 | 1000 | 0.43 |
| 546382 | Walla Walla | Ferry | Washington | 10 | boiler | Weil McLain | PL-1194S/F | 2002 | ULSD | 60 | 1000 | 0.43 |
| 1061309 | Wenatchee | Ferry | Washington | 1 | Propulsion | EMD | 710 G7B | 1998 | ULSD | 3300 | 6176 | 0.34 |
| 1061309 | Wenatchee | Ferry | Washington | 2 | Propulsion | EMD | 710 G7B | 1998 | ULSD | 3300 | 6176 | 0.34 |
| 1061309 | Wenatchee | Ferry | Washington | 3 | Propulsion | EMD | 710 G7B | 1998 | ULSD | 3300 | 6176 | 0.34 |
| 1061309 | Wenatchee | Ferry | Washington | 4 | Propulsion | EMD | 710 G7B | 1998 | ULSD | 3300 | 6176 | 0.34 |
| 1061309 | Wenatchee | Ferry | Washington | 5 | auxiliary | Cat | 3412 | 1998 | ULSD | 719 | 1314 | 0.43 |
| 1061309 | Wenatchee | Ferry | Washington | 6 | auxiliary | Cat | 3412 | 1998 | ULSD | 831 | 131 | 0.43 |
| 1061309 | Wenatchee | Ferry | Washington | 7 | boiler | | | 1998 | ULSD | 60 | 300 | 0.43 |
| 1061309 | Wenatchee | Ferry | Washington | 8 | boiler | | | 1998 | ULSD | 60 | 300 | 0.43 |
| 288249 | WHATCOM CHIEF | Ferry | WHATCOM | 1 | Propulsion | Cat | | 2004 | ULSD | 360 | 6000 | 0.34 |
| 288249 | WHATCOM CHIEF | Ferry | WHATCOM | 2 | Propulsion | Cat | | 2004 | ULSD | 360 | 6000 | 0.34 |
| 288249 | WHATCOM CHIEF | Ferry | WHATCOM | 3 | auxiliary | | | 2004 | ULSD | 20 | 3250 | 0.43 |
| 288249 | WHATCOM CHIEF | Ferry | WHATCOM | 4 | auxiliary | | | 2004 | ULSD | 13 | 3250 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 1 | Propulsion | EMD | 645 E5 | 2000 | ULSD | 2000 | 4788 | 0.34 |
| 511823 | Yakima | Ferry | Washington | 2 | Propulsion | EMD | 645 E5 | 2000 | ULSD | 2000 | 4788 | 0.34 |
| 511823 | Yakima | Ferry | Washington | 3 | Propulsion | EMD | 645 E5 | 2000 | ULSD | 2000 | 4788 | 0.34 |
| 511823 | Yakima | Ferry | Washington | 4 | Propulsion | EMD | 645 E5 | 2000 | ULSD | 2000 | 4788 | 0.34 |
| 511823 | Yakima | Ferry | Washington | 5 | auxiliary | Detroit | Series 60 DI | 2004 | ULSD | 400 | 3954 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 6 | auxiliary | Detroit | Series 60 DI | 2004 | ULSD | 400 | 2272 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 7 | auxiliary | Detroit | Series 60 DI | 2004 | ULSD | 400 | 3099 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 8 | auxiliary | Detroit | Series 6V71 | 2004 | ULSD | 355 | 23 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 9 | boiler | Weil McLain | 94 | 2004 | ULSD | 60 | 1000 | 0.43 |
| 511823 | Yakima | Ferry | Washington | 10 | boiler | Weil McLain | 94 | 2004 | ULSD | 60 | 1000 | 0.43 |
| WMEC 618 | Active | Government | USCG | 1 | Propulsion | Alco | 251CE | 1988 | ULSD | 2500 | 40 | 0.51 |
| WMEC 618 | Active | Government | USCG | 2 | Propulsion | Alco | 251CE | 1988 | ULSD | 2500 | 40 | 0.51 |
| PSGAD | Adelie | Government | USCG | 1 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1500 | 2000 | 0.51 |
| PSGAD | Adelie | Government | USCG | 2 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1500 | 2000 | 0.51 |
| 231095 | Alki | Government | Seattle Fire I | 1 | Propulsion | | | 1940 | ULSD | 500 | 143 | 0.51 |
| 231095 | Alki | Government | Seattle Fire I | 2 | Propulsion | | | 1940 | ULSD | 500 | 143 | 0.51 |
| 231095 | Alki | Government | Seattle Fire I | 3 | auxiliary | | | 1940 | ULSD | 160 | 7 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 4 | auxiliary | | | 1940 | ULSD | 160 | 7 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 5 | auxiliary | | | 1940 | ULSD | 160 | 10 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 6 | auxiliary | | | 1940 | ULSD | 160 | 15 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 7 | auxiliary | | | 1940 | ULSD | 160 | 57 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 8 | auxiliary | | | 1940 | ULSD | 160 | 57 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 9 | auxiliary | | | 1940 | ULSD | 160 | 193 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 10 | auxiliary | | | 1940 | ULSD | 160 | 8 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 11 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 12 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 13 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 14 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 15 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| 231095 | Alki | Government | Seattle Fire I | 16 | auxiliary | | | 1940 | ULSD | 160 | 45 | 0.43 |
| WPB 87301 | Barracuda | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87301 | Barracuda | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87354 | BlueShark | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87354 | BlueShark | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| 674678 | Chief Seattle | Government | Seattle Fire I | 1 | Propulsion | | | 1984 | ULSD | 1000 | 339 | 0.51 |
| 674678 | Chief Seattle | Government | Seattle Fire I | 2 | Propulsion | | | 1984 | ULSD | 1000 | 339 | 0.51 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 674678 | Chief Seattle | Government | Seattle Fire I | 3 | Propulsion | | | 1984 | ULSD | 1000 | 339 | 0.51 |
| 674678 | Chief Seattle | Government | Seattle Fire I | 4 | auxiliary | | | 1984 | ULSD | 140 | 255 | 0.43 |
| 674678 | Chief Seattle | Government | Seattle Fire I | 5 | auxiliary | | | 1984 | ULSD | 140 | 226 | 0.43 |
| CG044937 | Cuttyhunk | Government | USCG | 1 | Propulsion | Paxman | V16 | 1988 | ULSD | 2880 | 1200 | 0.51 |
| CG044937 | Cuttyhunk | Government | USCG | 2 | Propulsion | Paxman | V16 | 1988 | ULSD | 2880 | 1200 | 0.51 |
| 7333195 | David Starr Jordan | Government | NOAA | 1 | Propulsion | White Superior | | 1984 | ULSD | 534 | 50 | 0.51 |
| 7333195 | David Starr Jordan | Government | NOAA | 2 | Propulsion | White Superior | | 1966 | ULSD | 534 | 50 | 0.51 |
| PSGDB | DAWN BREAKER | Government | STATE OF | 1 | Propulsion | | | 2004 | ULSD | 175 | 200 | 0.51 |
| PSGDB | DAWN BREAKER | Government | STATE OF | 2 | Propulsion | | | 2004 | ULSD | 175 | 200 | 0.51 |
| PSGDM1 | DOC MEDIC 1 | Government | WASHING | 1 | Propulsion | Chevy | 350 | 1988 | Gasolin | 300 | 150 | 0.51 |
| PSGDP2 | DOC PATROL 2 | Government | WASHING | 1 | Propulsion | Mercruiser | 350 | 1988 | Gasolin | 300 | 250 | 0.51 |
| PSGDP3 | DOC PATROL 3 | Government | WASHING | 1 | Propulsion | Mercruiser | 350 | 1988 | Gasolin | 300 | 250 | 0.51 |
| PSGDP5 | DOC PATROL 5 | Government | WASHING | 1 | Propulsion | Chevy | 350 | 1988 | Gasolin | 300 | 250 | 0.51 |
| F0418 | Engine I | Government | Seattle Fire I | 1 | Propulsion | | | 2006 | ULSD | 715 | 122 | 0.51 |
| F0418 | Engine I | Government | Seattle Fire I | 2 | Propulsion | | | 2006 | ULSD | 715 | 123 | 0.51 |
| F0418 | Engine I | Government | Seattle Fire I | 3 | auxiliary | | | 2006 | ULSD | 19 | 39 | 0.43 |
| F0418 | Engine I | Government | Seattle Fire I | 4 | auxiliary | | | 2006 | ULSD | 19 | 39 | 0.43 |
| WAGB 20 | Healy | Government | USCG | 1 | Propulsion | Sulzer | Sulzer 12ZA | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WAGB 20 | Healy | Government | USCG | 2 | Propulsion | Sulzer | Sulzer 12ZA | 1988 | ULSD | 1500 | 1800 | 0.51 |
| CG060360 | Henry Blake | Government | USCG | 1 | Propulsion | CAT | 3508 | 1988 | ULSD | 2880 | 1200 | 0.51 |
| CG060360 | Henry Blake | Government | USCG | 2 | Propulsion | CAT | 3508 | 1988 | ULSD | 2880 | 1200 | 0.51 |
| CG830693 | John H. Cobb | Government | NOAA | 1 | Propulsion | FM | | 1988 | ULSD | 325 | 50 | 0.51 |
| PSGK | KIMBERLY | Government | WASHING | 1 | Propulsion | GM | V12-71 | 1988 | ULSD | 400 | 2700 | 0.51 |
| PSGK | KIMBERLY | Government | WASHING | 2 | Propulsion | GM | V12-71 | 1988 | ULSD | 400 | 2700 | 0.51 |
| PSGK | KIMBERLY | Government | WASHING | 3 | auxiliary | GM | 361S | 1978 | ULSD | 43 | 2700 | 0.43 |
| F0419 | Leschi | Government | Seattle Fire I | 1 | Propulsion | | | 2007 | ULSD | 1555 | 193 | 0.51 |
| F0419 | Leschi | Government | Seattle Fire I | 2 | Propulsion | | | 2007 | ULSD | 1555 | 193 | 0.51 |
| F0419 | Leschi | Government | Seattle Fire I | 3 | auxiliary | | | 2007 | ULSD | 1555 | 22 | 0.43 |
| F0419 | Leschi | Government | Seattle Fire I | 4 | auxiliary | | | 2007 | ULSD | 1555 | 21 | 0.43 |
| F0419 | Leschi | Government | Seattle Fire I | 5 | auxiliary | | | 2007 | ULSD | 174 | 115 | 0.43 |
| F0419 | Leschi | Government | Seattle Fire I | 6 | auxiliary | | | 2007 | ULSD | 174 | 127 | 0.43 |
| CG325332 | McArthur II | Government | NOAA | 1 | Propulsion | GE | | 1985 | ULSD | 800 | 50 | 0.51 |
| CG325332 | McArthur II | Government | NOAA | 2 | Propulsion | GE | | 1985 | ULSD | 800 | 50 | 0.51 |
| CG044855 | Mellon | Government | USCG | 1 | Propulsion | F-M | 38TD8 | 1988 | ULSD | 3500 | 40 | 0.51 |
| CG044855 | Mellon | Government | USCG | 2 | Propulsion | F-M | 38TD8 | 1988 | ULSD | 3500 | 40 | 0.51 |
| CG004637 | Midgett | Government | USCG | 1 | Propulsion | F-M | 38TD8 | 1988 | ULSD | 3500 | 40 | 0.51 |
| CG004637 | Midgett | Government | USCG | 2 | Propulsion | F-M | 38TD8 | 1988 | ULSD | 3500 | 40 | 0.51 |
| 508932 | Miller Freeman | Government | NOAA | 1 | Propulsion | GM | | 1988 | ULSD | 2200 | 50 | 0.51 |
| PSGM | MILLEWA | Government | WASHING | 1 | Propulsion | Detroit | V12 | 1988 | ULSD | 400 | 2200 | 0.51 |
| PSGM | MILLEWA | Government | WASHING | 2 | Propulsion | Detroit | V12 | 1988 | ULSD | 400 | 2200 | 0.51 |
| PSGM | MILLEWA | Government | WASHING | 3 | auxiliary | GM | 271 | 1978 | ULSD | 40 | 2200 | 0.43 |
| PSGM | MILLEWA | Government | WASHING | 4 | auxiliary | GM | 271 | 1978 | ULSD | 40 | 2200 | 0.43 |
| PSGMR | Mount Rainier | Government | NOAA | 1 | Propulsion | EMD | | 1968 | ULSD | 1200 | 50 | 0.51 |
| PSGMR | Mount Rainier | Government | NOAA | 2 | Propulsion | EMD | | 1968 | ULSD | 1200 | 50 | 0.51 |
| CG608131 | Osprey | Government | USCG | 1 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1600 | 1800 | 0.51 |
| CG608131 | Osprey | Government | USCG | 2 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1600 | 1800 | 0.51 |
| SPP1 | Patrol 1 | Government | Seattle Polic | 1 | Propulsion | | | 1988 | ULSD | 375 | 1083 | 0.51 |
| SPP1 | Patrol 1 | Government | Seattle Polic | 2 | Propulsion | | | 1988 | ULSD | 375 | 1083 | 0.51 |
| SPP15 | Patrol 15 | Government | Seattle Polic | 1 | Propulsion | | | 1988 | Gasolin | 300 | 192 | 0.51 |
| SPP16 | Patrol 16 | Government | Seattle Polic | 1 | Propulsion | | | 2009 | Gasolin | 80 | 50 | 0.51 |
| SPP2 | Patrol 2 | Government | Seattle Polic | 1 | Propulsion | | | 2000 | ULSD | 587 | 100 | 0.51 |
| SPP2 | Patrol 2 | Government | Seattle Polic | 2 | Propulsion | | | 2000 | ULSD | 587 | 100 | 0.51 |
| SPP3 | Patrol 3 | Government | Seattle Polic | 1 | Propulsion | | | 2009 | Gasolin | 225 | 729 | 0.51 |
| SPP3 | Patrol 3 | Government | Seattle Polic | 2 | Propulsion | | | 2009 | Gasolin | 225 | 729 | 0.51 |
| SPP4 | Patrol 4 | Government | Seattle Polic | 1 | Propulsion | | | 1988 | ULSD | 660 | 1400 | 0.51 |
| SPP4 | Patrol 4 | Government | Seattle Polic | 2 | Propulsion | | | 1988 | ULSD | 660 | 1400 | 0.51 |
| SPP4 | Patrol 4 | Government | Seattle Polic | 3 | auxiliary | | | 1978 | ULSD | 425 | 1400 | 0.43 |
| SPP5 | Patrol 5 | Government | Seattle Polic | 1 | Propulsion | | | 2009 | Gasolin | 250 | 192 | 0.51 |
| SPP6 | Patrol 6 | Government | Seattle Polic | 1 | Propulsion | | | 2000 | Gasolin | 250 | 50 | 0.51 |
| SPP6 | Patrol 6 | Government | Seattle Polic | 2 | Propulsion | | | 2000 | Gasolin | 250 | 50 | 0.51 |
| SPP6 | Patrol 6 | Government | Seattle Polic | 3 | Propulsion | | | 2000 | Gasolin | 250 | 50 | 0.51 |
| SPP7 | Patrol 7 | Government | Seattle Polic | 1 | Propulsion | | | 2000 | Gasolin | 140 | 636 | 0.51 |
| SPP8 | Patrol 8 | Government | Seattle Polic | 1 | Propulsion | | | 2000 | Gasolin | 140 | 286 | 0.51 |
| SPPX1 | Patrol X1 | Government | Seattle Polic | 1 | Propulsion | | | 1988 | Gasolin | 10 | 40 | 0.51 |
| 605216 | PEGGY N | Government | WASHING | 1 | Propulsion | Detroit | 8V71 | 1988 | ULSD | 700 | 2500 | 0.51 |
| 605216 | PEGGY N | Government | WASHING | 2 | Propulsion | Detroit | 8V71 | 1988 | ULSD | 700 | 2500 | 0.51 |
| 605216 | PEGGY N | Government | WASHING | 3 | Propulsion | Detroit | 8V71 | 1988 | ULSD | 700 | 2500 | 0.51 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 605216 | PEGGY N | Government | WASHING | 4 | auxiliary | Detroit | 271 | 1978 | ULSD | 40 | 2500 | 0.43 |
| 605216 | PEGGY N | Government | WASHING | 5 | auxiliary | Detroit | 271 | 1978 | ULSD | 40 | 2500 | 0.43 |
| WAGB 11 | Polar Sea | Government | USCG | 1 | Propulsion | ALCO | F-M - ALC | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WAGB 11 | Polar Sea | Government | USCG | 2 | Propulsion | ALCO | F-M - ALC | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WAGB 10 | Polar Star | Government | USCG | 1 | Propulsion | ALCO | F-M - ALC | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WAGB 10 | Polar Star | Government | USCG | 2 | Propulsion | ALCO | F-M - ALC | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87368 | Sea Devil | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87368 | Sea Devil | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87374 | Sea Fox | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87374 | Sea Fox | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| PSGSL | Sea Lion | Government | USCG | 1 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| PSGSL | Sea Lion | Government | USCG | 2 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87358 | Swordfish | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87358 | Swordfish | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87366 | Terrapin | Government | USCG | 1 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WPB 87366 | Terrapin | Government | USCG | 2 | Propulsion | MTU | MTU 8V396 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE1 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE2 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE3 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE4 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE5 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE6 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE7 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE8 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| WADNRE9 | WA DNR Enforceme | Government | STATE OF | 1 | Propulsion |  | 4-Stroke | 2001 | Gasolin | 250 | 200 | 0.51 |
| PSGW | Wahoo | Government | USCG | 1 | Propulsion | MTU | 8V396TE94 | 1988 | ULSD | 1500 | 1800 | 0.51 |
| 526883 | Alison S | Harbor Tug | Island Tug & | 1 | Propulsion | John Deere | 8L | 1999 | ULSD | 300 | 1200 | 0.31 |
| 526883 | Alison S | Harbor Tug | Island Tug & | 2 | Propulsion | John Deere | 8L | 1999 | ULSD | 300 | 1200 | 0.31 |
| 526883 | Alison S | Harbor Tug | Island Tug & | 3 | Propulsion | John Deere | 8L | 1999 | ULSD | 300 | 1200 | 0.31 |
| 526883 | Alison S | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 526883 | Alison S | Harbor Tug | Island Tug & | 5 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 502662 | Alyssa Ann | Harbor Tug | Harley Mari | 1 | Propulsion | EMD |  | 1978 | ULSD | 1050 | 1968 | 0.31 |
| 502662 | Alyssa Ann | Harbor Tug | Harley Mari | 2 | Propulsion | EMD |  | 1978 | ULSD | 1050 | 1977 | 0.31 |
| 502662 | Alyssa Ann | Harbor Tug | Harley Mari | 3 | auxiliary |  |  | 1978 | ULSD | 95 | 4009 | 0.43 |
| 502662 | Alyssa Ann | Harbor Tug | Harley Mari | 4 | auxiliary |  |  | 1978 | ULSD | 95 | 4283 | 0.43 |
| WDE6211 | Bandit | Harbor Tug | Campbell M | 1 | Propulsion |  |  |  | ULSD | 470 | 200 | 0.31 |
| WDF2810 | Blarney | Harbor Tug | Campbell M | 1 | Propulsion | Mitsubishi |  | 1984 | ULSD | 2150 | 750 | 0.31 |
| WDF2810 | Blarney | Harbor Tug | Campbell M | 2 | auxiliary | Caterpillar | 3304 |  | ULSD | 80 | 350 | 0.43 |
| WDF2810 | Blarney | Harbor Tug | Campbell M | 3 | auxiliary | Caterpillar | 3304 |  | ULSD | 80 | 350 | 0.43 |
| WDF2810 | Blarney | Harbor Tug | Campbell M | 4 | auxiliary | Caterpillar | 3304 |  | ULSD | 201 | 50 | 0.43 |
| PSHTB | Blueberry | Harbor Tug | Fremont Tu | 1 | Propulsion | GM | 671 | 1977 | ULSD | 165 | 500 | 0.31 |
| PSHTB | Blueberry | Harbor Tug | Fremont Tu | 2 | Propulsion | GM | 671 | 1977 | ULSD | 165 | 500 | 0.31 |
| 292934 | Brian S | Harbor Tug | Harley Mari | 1 | Propulsion | EMD | 12-645-E2 |  | ULSD |  | 639 | 0.31 |
| 292934 | Brian S | Harbor Tug | Harley Mari | 2 | Propulsion | EMD | 12-645-E2 |  | ULSD |  | 644 | 0.31 |
| 292934 | Brian S | Harbor Tug | Harley Mari | 3 | auxiliary | Detroit | Apr-71 |  | ULSD |  | 1131 | 0.43 |
| 292934 | Brian S | Harbor Tug | Harley Mari | 4 | auxiliary | Detroit | Apr-71 |  | ULSD |  | 755 | 0.43 |
| CG058217 | Camano | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3306DITA | 1984 | ULSD | 220 | 832 | 0.31 |
| 583332 | Catherine Quigg | Harbor Tug | Harley Mari | 1 | Propulsion | Detroit | 12-149 | 1977 | ULSD | 675 | 272 | 0.31 |
| 583332 | Catherine Quigg | Harbor Tug | Harley Mari | 2 | Propulsion | Detroit | 12-149 | 1977 | ULSD | 675 | 246 | 0.31 |
| 583332 | Catherine Quigg | Harbor Tug | Harley Mari | 3 | auxiliary | Detroit | Apr-71 | 1977 | ULSD | 50 | 659 | 0.43 |
| 583332 | Catherine Quigg | Harbor Tug | Harley Mari | 4 | auxiliary | Detroit | Jun-71 | 1977 | ULSD | 50 | 987 | 0.43 |
| 529534 | Cedar King | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 343 | 1976 | ULSD | 340 | 2150 | 0.31 |
| 7514236 | CF Campbell | Harbor Tug | Harley Mari | 1 | Propulsion | Caterpillar | 3516B | 1975 | ULSD | 2200 | 3613 | 0.31 |
| 7514236 | CF Campbell | Harbor Tug | Harley Mari | 2 | Propulsion | Caterpillar | 3516B | 1975 | ULSD | 2200 | 3586 | 0.31 |
| 7514236 | CF Campbell | Harbor Tug | Harley Mari | 3 | auxiliary | GM | Jun-71 | 1975 | ULSD | 95 | 3729 | 0.43 |
| 7514236 | CF Campbell | Harbor Tug | Harley Mari | 4 | auxiliary | GM | Jun-71 | 1975 | ULSD | 95 | 5041 | 0.43 |
| 263365 | Dixie | Harbor Tug | Fremont Tu | 1 | Propulsion | Cummins |  | 1951 | ULSD | 500 | 500 | 0.31 |
| 1187285 | Driftwood | Harbor Tug | Campbell M | 1 | Propulsion |  |  | 1945 | ULSD | 450 | 150 | 0.31 |
| 1187285 | Driftwood | Harbor Tug | Campbell M | 2 | auxiliary |  |  | 1945 | ULSD | 150 | 150 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 588535 | Eagle | Harbor Tug | Harley Marin | 1 | Propulsion | Caterpillar | 3512B | 1978 | ULSD | 1500 | 2282 | 0.31 |
| 588535 | Eagle | Harbor Tug | Harley Marin | 2 | Propulsion | Caterpillar | 3512B | 1978 | ULSD | 1500 | 2282 | 0.31 |
| 588535 | Eagle | Harbor Tug | Harley Marin | 3 | auxiliary | Detroit | Jun-71 | 1978 | ULSD | 95 | 3897 | 0.43 |
| 588535 | Eagle | Harbor Tug | Harley Marin | 4 | auxiliary | Detroit | Jun-71 | 1978 | ULSD | 95 | 4107 | 0.43 |
| 521907 | Ernest Campbell | Harbor Tug | Harley Marin | 1 | Propulsion | EMD | 12-645-E2 | 1969 | ULSD | 1500 | 1378 | 0.31 |
| 521907 | Ernest Campbell | Harbor Tug | Harley Marin | 2 | Propulsion | EMD | 12-645-E2 | 1969 | ULSD | 1500 | 1367 | 0.31 |
| 521907 | Ernest Campbell | Harbor Tug | Harley Marin | 3 | auxiliary | Detroit | Jun-71 | 1969 | ULSD | 95 | 1702 | 0.43 |
| 521907 | Ernest Campbell | Harbor Tug | Harley Marin | 4 | auxiliary | Detroit | Jun-71 | 1969 | ULSD | 95 | 1285 | 0.43 |
| PSHTF | Fidalge | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3406 | 1998 | ULSD | 365 | 4368 | 0.31 |
| PSHTF | Fidalge | Harbor Tug | Dunlap Tow | 2 | Propulsion | Cat | 3406 | 1998 | ULSD | 365 | 4368 | 0.31 |
| 636922 | Flyer | Harbor Tug | Western Tow | 1 | Propulsion | Cummins | 1150 | 1981 | ULSD | 400 | 1200 | 0.31 |
| WN8626RF | General Lee | Harbor Tug | Fremont Tug | 1 | Propulsion | Detroit | 671 | 1995 | ULSD | 165 | 500 | 0.31 |
| WN8626RF | General Lee | Harbor Tug | Fremont Tug | 2 | Propulsion | Detroit | 671 | 1995 | ULSD | 165 | 500 | 0.31 |
| 639797 | Gladys M | Harbor Tug | Manson Con | 1 | Propulsion | Caterpillar | 3508 MARL | 2004 | ULSD | 1000 | 3893 | 0.31 |
| 639797 | Gladys M | Harbor Tug | Manson Con | 2 | Propulsion | Caterpillar | 3508 MARL | 2004 | ULSD | 1000 | 3893 | 0.31 |
| 639797 | Gladys M | Harbor Tug | Manson Con | 3 | auxiliary | Toyota | M-33C.2 | 2004 | ULSD | 48 | 2592 | 0.43 |
| 639797 | Gladys M | Harbor Tug | Manson Con | 4 | auxiliary | Toyota | M-33C.2 | 2004 | ULSD | 48 | 2612 | 0.43 |
| 639797 | Gladys M | Harbor Tug | Manson Con | 5 | auxiliary | Caterpillar | 3054 CIPU | 2002 | ULSD | 120 | 243 | 0.43 |
| 512190 | Grace | Harbor Tug | Fremont Tug | 1 | Propulsion | Caterpillar |  | 1968 | ULSD | 365 | 500 | 0.31 |
| 507652 | Grizzly | Harbor Tug | Harley Marin | 1 | Propulsion | Caterpillar | D398 |  | ULSD |  | 700 | 0.31 |
| 507652 | Grizzly | Harbor Tug | Harley Marin | 2 | Propulsion | Caterpillar | D398 |  | ULSD |  | 700 | 0.31 |
| 507652 | Grizzly | Harbor Tug | Harley Marin | 3 | auxiliary | John Deere | 4045TF280 |  | ULSD |  | 183 | 0.43 |
| 507652 | Grizzly | Harbor Tug | Harley Marin | 4 | auxiliary | John Deere | 4045TF280 |  | ULSD |  | 186 | 0.43 |
| 564341 | Harry M | Harbor Tug | Manson Con | 1 | Propulsion | Caterpillar | 3508 MAR | 2001 | ULSD | 1000 | 2518 | 0.31 |
| 564341 | Harry M | Harbor Tug | Manson Con | 2 | Propulsion | Caterpillar | 3508 MAR | 2001 | ULSD | 1000 | 2479 | 0.31 |
| 564341 | Harry M | Harbor Tug | Manson Con | 3 | auxiliary | Detroit Dies | 6-71 (1063-7 | 1975 | ULSD | 180 | 532 | 0.43 |
| 564341 | Harry M | Harbor Tug | Manson Con | 4 | auxiliary | Detroit Dies | 6-71 (1063-7 | 1975 | ULSD | 180 | 7685 | 0.43 |
| 249861 | Helen S | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | D348 | 1945 | ULSD | 800 | 0 | 0.31 |
| 249861 | Helen S | Harbor Tug | Island Tug & | 2 | auxiliary | GM | 671 | 1945 | ULSD | 100 | 0 | 0.43 |
| 249861 | Helen S | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1945 | ULSD | 100 | 0 | 0.43 |
| 506094 | Hornet | Harbor Tug | Western Tow | 1 | Propulsion | CAT | 3406 | 2008 | ULSD | 365 | 1000 | 0.31 |
| 524599 | Hunter D | Harbor Tug | Harley Marin | 1 | Propulsion | Caterpillar | 3516A |  | ULSD |  | 3823 | 0.31 |
| 524599 | Hunter D | Harbor Tug | Harley Marin | 2 | Propulsion | Caterpillar | 3516A |  | ULSD |  | 3823 | 0.31 |
| 524599 | Hunter D | Harbor Tug | Harley Marin | 3 | auxiliary | Detroit | Jun-71 |  | ULSD |  | 4213 | 0.43 |
| 524599 | Hunter D | Harbor Tug | Harley Marin | 4 | auxiliary | Detroit | Jun-71 |  | ULSD |  | 4634 | 0.43 |
| 299737 | Island Breeze | Harbor Tug | Island Tug & | 1 | Propulsion | Cummins |  | 1999 | ULSD | 550 | 1200 | 0.31 |
| 299737 | Island Breeze | Harbor Tug | Island Tug & | 2 | Propulsion | Cummins |  | 1999 | ULSD | 550 | 1200 | 0.31 |
| 299737 | Island Breeze | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 299737 | Island Breeze | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 299614 | Island Champion | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 3606 | 1996 | ULSD | 2800 | 1200 | 0.31 |
| 299614 | Island Champion | Harbor Tug | Island Tug & | 2 | auxiliary | GM | 671 | 1996 | ULSD | 100 | 600 | 0.43 |
| 299614 | Island Champion | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1996 | ULSD | 100 | 600 | 0.43 |
| 290759 | Island Chief | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 398 | 1963 | ULSD | 900 | 1200 | 0.31 |
| 290759 | Island Chief | Harbor Tug | Island Tug & | 2 | Propulsion | CAT | 398 | 1963 | ULSD | 900 | 1200 | 0.31 |
| 290759 | Island Chief | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1963 | ULSD | 100 | 600 | 0.43 |
| 290759 | Island Chief | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1963 | ULSD | 100 | 600 | 0.43 |
| 648423 | Island Eagle | Harbor Tug | Island Tug & | 1 | Propulsion | Detroit Dies | 12V71 | 1982 | ULSD | 400 | 1200 | 0.31 |
| 648423 | Island Eagle | Harbor Tug | Island Tug & | 2 | Propulsion | Detroit Dies | 12V71 | 1982 | ULSD | 400 | 1200 | 0.31 |
| 648423 | Island Eagle | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1982 | ULSD | 100 | 600 | 0.43 |
| 648423 | Island Eagle | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1982 | ULSD | 100 | 600 | 0.43 |
| 501938 | Island Mist | Harbor Tug | Island Tug & | 1 | Propulsion | Detroit Dies | 12V71 | 1965 | ULSD | 400 | 1200 | 0.31 |
| 501938 | Island Mist | Harbor Tug | Island Tug & | 2 | Propulsion | Detroit Dies | 12V71 | 1965 | ULSD | 400 | 1200 | 0.31 |
| 501938 | Island Mist | Harbor Tug | Island Tug & | 3 | Propulsion | Detroit Dies | 12V71 | 1965 | ULSD | 400 | 1200 | 0.31 |
| 501938 | Island Mist | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1965 | ULSD | 100 | 600 | 0.43 |
| 501938 | Island Mist | Harbor Tug | Island Tug & | 5 | auxiliary | GM | 671 | 1965 | ULSD | 100 | 600 | 0.43 |
| 510653 | Island Scout | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 3512B | 1999 | ULSD | 1500 | 1200 | 0.31 |
| 510653 | Island Scout | Harbor Tug | Island Tug & | 2 | Propulsion | CAT | 3512B | 1999 | ULSD | 1500 | 1200 | 0.31 |
| 510653 | Island Scout | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 510653 | Island Scout | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 640554 | Island Spirit | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 3512B | 1981 | ULSD | 1250 | 1200 | 0.31 |
| 640554 | Island Spirit | Harbor Tug | Island Tug & | 2 | Propulsion | CAT | 3512B | 1981 | ULSD | 1250 | 1200 | 0.31 |
| 640554 | Island Spirit | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1981 | ULSD | 100 | 600 | 0.43 |
| 640554 | Island Spirit | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1981 | ULSD | 100 | 600 | 0.43 |
| 294666 | Island Storm | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 3412 | 1964 | ULSD | 600 | 1200 | 0.31 |
| 294666 | Island Storm | Harbor Tug | Island Tug & | 2 | Propulsion | CAT | 3412 | 1964 | ULSD | 600 | 1200 | 0.31 |
| 294666 | Island Storm | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1964 | ULSD | 100 | 600 | 0.43 |
| 294666 | Island Storm | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1964 | ULSD | 100 | 600 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 537733 | James T Quigg | Harbor Tug | Harley Marir | 1 | Propulsion | EMD | L12-645-E2 | | ULSD | | 2130 | 0.31 |
| 537733 | James T Quigg | Harbor Tug | Harley Marir | 2 | Propulsion | EMD | R12-645-E2 | | ULSD | | 2130 | 0.31 |
| 537733 | James T Quigg | Harbor Tug | Harley Marir | 3 | auxiliary | Detroit | Apr-71 | | ULSD | | 2954 | 0.43 |
| 537733 | James T Quigg | Harbor Tug | Harley Marir | 4 | auxiliary | Detroit | Jun-71 | | ULSD | | 5386 | 0.43 |
| PSHTJ | Jeep | Harbor Tug | Fremont Tug | 1 | Propulsion | Ford | | 1999 | ULSD | 135 | 500 | 0.31 |
| 527549 | Lela Joy | Harbor Tug | Harley Marir | 1 | Propulsion | Cummins | QSKTA38- | | ULSD | 1200 | 3521 | 0.31 |
| 527549 | Lela Joy | Harbor Tug | Harley Marir | 2 | Propulsion | Cummins | QSKTA38- | | ULSD | 1200 | 3591 | 0.31 |
| 527549 | Lela Joy | Harbor Tug | Harley Marir | 3 | auxiliary | John Deere | 4045TFM01 | | ULSD | 95 | 4171 | 0.43 |
| 527549 | Lela Joy | Harbor Tug | Harley Marir | 4 | auxiliary | John Deere | 4045TFM01 | | ULSD | 95 | 4553 | 0.43 |
| 507942 | Lisa M | Harbor Tug | Manson Cor | 1 | Propulsion | Detroit Dies | 8V71 | 1993 | ULSD | 318 | 434 | 0.31 |
| 507942 | Lisa M | Harbor Tug | Manson Cor | 2 | Propulsion | Detroit Dies | 8V71 | 1993 | ULSD | 318 | 447 | 0.31 |
| 507942 | Lisa M | Harbor Tug | Manson Cor | 3 | Propulsion | Detroit Dies | 471 | 1993 | ULSD | 140 | 0 | 0.31 |
| 571211 | Olympic Scout | Harbor Tug | Harley Marir | 1 | Propulsion | Caterpillar | D-399 | | ULSD | | 2003 | 0.31 |
| 571211 | Olympic Scout | Harbor Tug | Harley Marir | 2 | Propulsion | Caterpillar | D-399 | | ULSD | | 2007 | 0.31 |
| 571211 | Olympic Scout | Harbor Tug | Harley Marir | 3 | auxiliary | John Deere | 4045TFM75 | | ULSD | | 4230 | 0.43 |
| 571211 | Olympic Scout | Harbor Tug | Harley Marir | 4 | auxiliary | John Deere | 4045TFM75 | | ULSD | | 4531 | 0.43 |
| 522088 | Pacific | Harbor Tug | Western Tov | 1 | Propulsion | CAT | 3508 | 1999 | ULSD | 775 | 3000 | 0.31 |
| 522088 | Pacific | Harbor Tug | Western Tov | 2 | Propulsion | CAT | 3508 | 1999 | ULSD | 775 | 3000 | 0.31 |
| 522088 | Pacific | Harbor Tug | Western Tov | 3 | auxiliary | CAT | | 2000 | ULSD | 120 | 1750 | 0.43 |
| 522088 | Pacific | Harbor Tug | Western Tov | 4 | auxiliary | CAT | C 4.4 | 2006 | ULSD | 80 | 1750 | 0.43 |
| 5072905 | Patricia S | Harbor Tug | Island Tug & | 1 | Propulsion | CAT | 3512 | 1999 | ULSD | 1200 | 1200 | 0.31 |
| 5072905 | Patricia S | Harbor Tug | Island Tug & | 2 | Propulsion | CAT | 3512 | 1999 | ULSD | 1200 | 1200 | 0.31 |
| 5072905 | Patricia S | Harbor Tug | Island Tug & | 3 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 5072905 | Patricia S | Harbor Tug | Island Tug & | 4 | auxiliary | GM | 671 | 1999 | ULSD | 100 | 600 | 0.43 |
| 1072688 | Peter M | Harbor Tug | Manson Cor | 1 | Propulsion | Caterpillar | 3516B | 1997 | ULSD | 2000 | 1550 | 0.31 |
| 1072688 | Peter M | Harbor Tug | Manson Cor | 2 | Propulsion | Caterpillar | 3516B | 1997 | ULSD | 2000 | 1551 | 0.31 |
| 1072688 | Peter M | Harbor Tug | Manson Cor | 3 | Propulsion | Detroit Dies | Jun-71 | | ULSD | 180 | 1226 | 0.31 |
| 1072688 | Peter M | Harbor Tug | Manson Cor | 4 | auxiliary | Detroit Dies | Jun-71 | | ULSD | 180 | 1203 | 0.43 |
| 1072688 | Peter M | Harbor Tug | Manson Cor | 5 | auxiliary | Detroit Dies | Apr-71 | | ULSD | 140 | 0 | 0.43 |
| 572463 | Port Gardner | Harbor Tug | Dunlap Tow | 1 | Propulsion | Detroit Dies | 8v71 | 1972 | ULSD | 220 | 600 | 0.31 |
| 928453 | Port Susan | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3408 DITA | 1984 | ULSD | 365 | 2496 | 0.31 |
| 530828 | Pull-and-Be-Damned | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3306DITA | 1985 | ULSD | 220 | 1248 | 0.31 |
| 275287 | Quilceda | Harbor Tug | Dunlap Tow | 1 | Propulsion | Detroit Dies | 12v71 | 1976 | ULSD | 340 | 2080 | 0.31 |
| 275287 | Quilceda | Harbor Tug | Dunlap Tow | 2 | Propulsion | Detroit Dies | 12v71 | 1976 | ULSD | 340 | 2080 | 0.31 |
| 585319 | Rosario | Harbor Tug | Dunlap Tow | 1 | Propulsion | Cummins | KTA38 | 2002 | ULSD | 850 | 2560 | 0.31 |
| 585319 | Rosario | Harbor Tug | Dunlap Tow | 2 | Propulsion | Cummins | KTA38 | 2002 | ULSD | 850 | 2560 | 0.31 |
| 585319 | Rosario | Harbor Tug | Dunlap Tow | 3 | auxiliary | Perkins | 6354 | 1980 | ULSD | 95 | 1855 | 0.43 |
| 585319 | Rosario | Harbor Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 371 | 1980 | ULSD | 52 | 705 | 0.43 |
| 247040 | Ruby VIII | Harbor Tug | Campbell M | 1 | Propulsion | | | | ULSD | 500 | 500 | 0.31 |
| 247040 | Ruby VIII | Harbor Tug | Campbell M | 2 | auxiliary | | | | ULSD | 10 | 500 | 0.43 |
| 578032 | Samish | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3508 | 1977 | ULSD | 855 | 4000 | 0.31 |
| 578032 | Samish | Harbor Tug | Dunlap Tow | 2 | Propulsion | CAT | 3508 | 1977 | ULSD | 855 | 4000 | 0.31 |
| 578032 | Samish | Harbor Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304NA | 1977 | ULSD | 70 | 2500 | 0.43 |
| 578032 | Samish | Harbor Tug | Dunlap Tow | 4 | auxiliary | Perkins | 6-354 | 1976 | ULSD | 95 | 1500 | 0.43 |
| 1038778 | Southport | Harbor Tug | Manson Cor | 1 | auxiliary | Caterpillar | 3208 | 1995 | ULSD | 230 | 0 | 0.43 |
| 571411 | Taurus | Harbor Tug | Dunlap Tow | 1 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 105 | 115 | 0.43 |
| 571411 | Taurus | Harbor Tug | Dunlap Tow | 2 | auxiliary | Detroit Dies | 471 | 1975 | ULSD | 60 | 1289 | 0.43 |
| 571411 | Taurus | Harbor Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 471 | 1975 | ULSD | 60 | 546 | 0.43 |
| 571411 | Taurus | Harbor Tug | Dunlap Tow | 4 | Propulsion | CAT | 399 | 1975 | ULSD | 1125 | 1392 | 0.31 |
| 571411 | Taurus | Harbor Tug | Dunlap Tow | 5 | Propulsion | CAT | 399 | 1975 | ULSD | 1125 | 1392 | 0.31 |
| PSHTV | Vulcan | Harbor Tug | Dunlap Tow | 1 | Propulsion | CAT | 3508 | 1977 | ULSD | 705 | 5000 | 0.31 |
| PSHTV | Vulcan | Harbor Tug | Dunlap Tow | 2 | Propulsion | CAT | 3508 | 1977 | ULSD | 705 | 5000 | 0.31 |
| PSHTV | Vulcan | Harbor Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304NA | 1998 | ULSD | 140 | 3500 | 0.43 |
| PSHTV | Vulcan | Harbor Tug | Dunlap Tow | 4 | auxiliary | Perkins | 6-354 | 1977 | ULSD | 95 | 1500 | 0.43 |
| 514329 | Wasp | Harbor Tug | Western Tov | 1 | Propulsion | CAT | 3408 | 1982 | ULSD | 800 | 2500 | 0.31 |
| 514329 | Wasp | Harbor Tug | Western Tov | 2 | Propulsion | CAT | 3408 | 1982 | ULSD | 800 | 2500 | 0.31 |
| 514329 | Wasp | Harbor Tug | Western Tov | 3 | auxiliary | John Deere | | 2000 | ULSD | 55 | 2500 | 0.43 |
| 984759 | West Point | Harbor Tug | Western Tov | 1 | Propulsion | CAT | 3412 | 1992 | ULSD | 600 | 2000 | 0.31 |
| 984759 | West Point | Harbor Tug | Western Tov | 2 | Propulsion | CAT | 3412 | 1992 | ULSD | 600 | 2000 | 0.31 |
| 984759 | West Point | Harbor Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 1992 | ULSD | 120 | 1000 | 0.43 |
| 918736 | Westrac | Harbor Tug | Western Tov | 1 | Propulsion | CAT | 3512 | 1987 | ULSD | 1200 | 4000 | 0.31 |
| 918736 | Westrac | Harbor Tug | Western Tov | 2 | Propulsion | CAT | 3512 | 1987 | ULSD | 1200 | 4000 | 0.31 |
| 918736 | Westrac | Harbor Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 1987 | ULSD | 120 | 2000 | 0.43 |
| 918736 | Westrac | Harbor Tug | Western Tov | 4 | auxiliary | Duetz | | 1987 | ULSD | 120 | 2000 | 0.43 |
| 1033438 | Westrac II | Harbor Tug | Western Tov | 1 | Propulsion | CAT | 3512 | 1995 | ULSD | 1200 | 4500 | 0.31 |
| 1033438 | Westrac II | Harbor Tug | Western Tov | 2 | Propulsion | CAT | 3512 | 1995 | ULSD | 1200 | 4500 | 0.31 |
| 1033438 | Westrac II | Harbor Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 1995 | ULSD | 120 | 1250 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1033438 | Westrac II | Harbor Tug | Western Tov | 4 | auxiliary | CAT | 3304 | 1995 | ULSD | 120 | 1250 | 0.43 |
| 681479 | Alaska Mariner | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516 | 1985 | ULSD | 2000 | 130 | 0.68 |
| 681479 | Alaska Mariner | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516 | 1985 | ULSD | 2000 | 130 | 0.68 |
| 681479 | Alaska Mariner | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 1985 | ULSD | 120 | 130 | 0.43 |
| 681479 | Alaska Mariner | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3304 | 1985 | ULSD | 120 | 130 | 0.43 |
| 1211332 | Alaska Titan | Ocean Tug | Western Tov | 1 | Propulsion | CAT | C 175 | 2010 | ULSD | 2500 | 130 | 0.68 |
| 1211332 | Alaska Titan | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3306 | 2009 | ULSD | 180 | 130 | 0.43 |
| 1211332 | Alaska Titan | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3306 | 2009 | ULSD | 180 | 130 | 0.43 |
| 1211332 | Alaska Titan | Ocean Tug | Western Tov | 2 | Propulsion | CAT | C 175 | 2010 | ULSD | 2500 | 130 | 0.68 |
| 1090636 | Alert | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090636 | Alert | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090636 | Alert | Ocean Tug | Crowley | 3 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 1090636 | Alert | Ocean Tug | Crowley | 4 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 527280 | American Salvor | Ocean Tug | Crowley | 1 | Propulsion | CAT | D399 | 1980 | ULSD | 1200 | 24 | 0.68 |
| 527280 | American Salvor | Ocean Tug | Crowley | 2 | Propulsion | CAT | D399 | 1980 | ULSD | 1200 | 24 | 0.68 |
| 527280 | American Salvor | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3406 | 1980 | ULSD | 140 | 24 | 0.43 |
| 527280 | American Salvor | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3406 | 1980 | ULSD | 140 | 24 | 0.43 |
| 1165321 | Arctic Titan | Ocean Tug | Western Tov | 1 | Propulsion | CAT | C 175 | 2011 | ULSD | 2500 | 130 | 0.68 |
| 1165321 | Arctic Titan | Ocean Tug | Western Tov | 2 | Propulsion | CAT | C 175 | 2011 | ULSD | 2500 | 130 | 0.68 |
| 1165321 | Arctic Titan | Ocean Tug | Western Tov | 3 | auxiliary | CAT | C 9 | 2011 | ULSD | 240 | 130 | 0.43 |
| 1165321 | Arctic Titan | Ocean Tug | Western Tov | 4 | auxiliary | CAT | C 9 | 2011 | ULSD | 240 | 130 | 0.43 |
| 1090637 | Attentive | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090637 | Attentive | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090637 | Attentive | Ocean Tug | Crowley | 3 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 1090637 | Attentive | Ocean Tug | Crowley | 4 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 1090638 | Aware | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090638 | Aware | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3612B | 2000 | ULSD | 5000 | 24 | 0.68 |
| 1090638 | Aware | Ocean Tug | Crowley | 3 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 1090638 | Aware | Ocean Tug | Crowley | 4 | auxiliary | CAT |  | 2000 | ULSD | 150 | 24 | 0.43 |
| 579789 | Drew Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 12-645-E2 | 1976 | ULSD | 1500 | 3722 | 0.68 |
| 579789 | Drew Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 12-645-E2 | 1976 | ULSD | 1500 | 3722 | 0.68 |
| 579789 | Drew Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | 6V-71 | 1977 | ULSD | 192 | 2867 | 0.43 |
| 579789 | Drew Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | 6V-71 | 1977 | ULSD | 192 | 2524 | 0.43 |
| 579789 | Drew Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | Jun-71 |  | ULSD | 192 | 149 | 0.43 |
| 540227 | Gene Dunlap | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | 3516 | 1994 | ULSD | 1710 | 472 | 0.68 |
| 540227 | Gene Dunlap | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | 3516 | 1994 | ULSD | 1710 | 472 | 0.68 |
| 540227 | Gene Dunlap | Ocean Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 80 | 253 | 0.43 |
| 540227 | Gene Dunlap | Ocean Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 80 | 260 | 0.43 |
| 540227 | Gene Dunlap | Ocean Tug | Dunlap Tow | 5 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 105 | 23 | 0.43 |
| 566429 | Gladiator | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 566429 | Gladiator | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 566429 | Gladiator | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 566429 | Gladiator | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 525855 | Guardian | Ocean Tug | Crowley | 1 | Propulsion | EMD | 16-645-E5 | 1970 | ULSD | 2850 | 24 | 0.68 |
| 525855 | Guardian | Ocean Tug | Crowley | 2 | Propulsion | EMD | 16-645-E5 | 1970 | ULSD | 2850 | 24 | 0.68 |
| 525855 | Guardian | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1970 | ULSD | 140 | 24 | 0.43 |
| 525855 | Guardian | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1970 | ULSD | 140 | 24 | 0.43 |
| 572647 | Guardsman | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 572647 | Guardsman | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 572647 | Guardsman | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 572647 | Guardsman | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 1115109 | Gulf Titan | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516B | 2001 | ULSD | 2500 | 130 | 0.68 |
| 1115109 | Gulf Titan | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516B | 2001 | ULSD | 2500 | 130 | 0.68 |
| 1115109 | Gulf Titan | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3306 | 2001 | ULSD | 180 | 130 | 0.43 |
| 1115109 | Gulf Titan | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3306 | 2001 | ULSD | 180 | 130 | 0.43 |
| 559404 | Invader | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 559404 | Invader | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 559404 | Invader | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 559404 | Invader | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 584331 | Iver Foss | Ocean Tug | Foss | 1 | Propulsion | Caterpillar | D-399 | 1977 | ULSD | 1200 | 1823 | 0.68 |
| 584331 | Iver Foss | Ocean Tug | Foss | 2 | Propulsion | Caterpillar | D-399 | 1977 | ULSD | 1200 | 1823 | 0.68 |
| 584331 | Iver Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | Jun-71 | 1973 | ULSD | 192 | 2274 | 0.43 |
| 584331 | Iver Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 1692 | 0.43 |
| 584331 | Iver Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | Apr-71 | 1977 | ULSD | 126 | 89 | 0.43 |
| 1037412 | James Dunlap | Ocean Tug | Dunlap Tow | 1 | Propulsion | EMD | 16-645E2 | 1995 | ULSD | 1950 | 0 | 0.68 |
| 1037412 | James Dunlap | Ocean Tug | Dunlap Tow | 2 | Propulsion | EMD | 16-645E2 | 1995 | ULSD | 1950 | 0 | 0.68 |
| 1037412 | James Dunlap | Ocean Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304B | 1995 | ULSD | 140 | 0 | 0.43 |

# Puget Sound Emissions Inventory
## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1037412 | James Dunlap | Ocean Tug | Dunlap Tow | 4 | auxiliary | CAT | 3304B | 1995 | ULSD | 140 | 0 | 0.43 |
| 526844 | Jeffrey Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 12-645-E7 | 1970 | ULSD | 2150 | 667 | 0.68 |
| 526844 | Jeffrey Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 12-645-E7 | 1970 | ULSD | 2150 | 653 | 0.68 |
| 526844 | Jeffrey Foss | Ocean Tug | Foss | 3 | auxiliary | John Deere | 6068 TFM5 | 2000 | ULSD | 159 | 556 | 0.43 |
| 526844 | Jeffrey Foss | Ocean Tug | Foss | 4 | auxiliary | John Deere | 6068 TFM5 | 2000 | ULSD | 159 | 503 | 0.43 |
| 526844 | Jeffrey Foss | Ocean Tug | Foss | 5 | auxiliary | Caterpillar | D330-C4 | | ULSD | 159 | 7 | 0.43 |
| 575361 | Justine Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 12-645-E7 | 1981 | ULSD | 2150 | 3498 | 0.68 |
| 575361 | Justine Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 12-645-E7 | 1981 | ULSD | 2150 | 3503 | 0.68 |
| 575361 | Justine Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | 6V-71 | 1982 | ULSD | 192 | 2993 | 0.43 |
| 575361 | Justine Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | 6V-71 | 1982 | ULSD | 192 | 2819 | 0.43 |
| 575361 | Justine Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | 6V-71 | | ULSD | 192 | 107 | 0.43 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 1 | Propulsion | Fairbanks M | Alco 16-251 | 1981 | ULSD | 4100 | 266 | 0.68 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 2 | Propulsion | Fairbanks M | Alco 16-251 | 1981 | ULSD | 4100 | 258 | 0.68 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 3 | auxiliary | Cummins | 6CTA8.3-D | 1982 | ULSD | 228 | 851 | 0.43 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 4 | auxiliary | Cummins | 6CTA8.3-D | 1982 | ULSD | 228 | 572 | 0.43 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 5 | auxiliary | Cummins | N-14 | 2002 | ULSD | 228 | 16 | 0.43 |
| 1134122 | Lauren Foss | Ocean Tug | Foss | 6 | auxiliary | John Deere | 4045TF250 | 2001 | ULSD | 107 | 0 | 0.43 |
| 569517 | Malolo | Ocean Tug | Dunlap Tow | 1 | Propulsion | Cat | 3516 | 1986 | ULSD | 1710 | 1041 | 0.68 |
| 569517 | Malolo | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | 3516 | 1986 | ULSD | 1710 | 1041 | 0.68 |
| 569517 | Malolo | Ocean Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304NA | 1995 | ULSD | 85 | 605 | 0.43 |
| 569517 | Malolo | Ocean Tug | Dunlap Tow | 4 | auxiliary | CAT | 3304NA | 1995 | ULSD | 85 | 564 | 0.43 |
| 569517 | Malolo | Ocean Tug | Dunlap Tow | 5 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 105 | 84 | 0.43 |
| 506243 | Manfred Nystrom | Ocean Tug | Dunlap Tow | 1 | Propulsion | EMD | 16-645 | 1966 | ULSD | 1950 | 490 | 0.68 |
| 506243 | Manfred Nystrom | Ocean Tug | Dunlap Tow | 2 | Propulsion | EMD | 16-645 | 1966 | ULSD | 1950 | 490 | 0.68 |
| 506243 | Manfred Nystrom | Ocean Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 671 | 1966 | ULSD | 80 | 250 | 0.43 |
| 506243 | Manfred Nystrom | Ocean Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 671 | 1966 | ULSD | 80 | 250 | 0.43 |
| 526607 | Mars | Ocean Tug | Crowley | 1 | Propulsion | EMD | 16-645-E5 | 1970 | ULSD | 2850 | 24 | 0.68 |
| 526607 | Mars | Ocean Tug | Crowley | 2 | Propulsion | EMD | 16-645-E5 | 1970 | ULSD | 2850 | 24 | 0.68 |
| 526607 | Mars | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1970 | ULSD | 140 | 24 | 0.43 |
| 526607 | Mars | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1970 | ULSD | 140 | 24 | 0.43 |
| 566082 | Mike O'Leary | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | D399 | 1975 | ULSD | 1125 | 1331 | 0.68 |
| 566082 | Mike O'Leary | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | D399 | 1975 | ULSD | 1125 | 1331 | 0.68 |
| 566082 | Mike O'Leary | Ocean Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 70 | 623 | 0.43 |
| 566082 | Mike O'Leary | Ocean Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 70 | 919 | 0.43 |
| 566082 | Mike O'Leary | Ocean Tug | Dunlap Tow | 5 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 105 | 116 | 0.43 |
| 562688 | Navigator | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 562688 | Navigator | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 562688 | Navigator | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 562688 | Navigator | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 662872 | Ocean Mariner | Ocean Tug | Western To | 1 | Propulsion | CAT | 3516B | 1984 | ULSD | 1600 | 130 | 0.68 |
| 662872 | Ocean Mariner | Ocean Tug | Western To | 2 | Propulsion | CAT | 3516B | 1984 | ULSD | 1600 | 130 | 0.68 |
| 662872 | Ocean Mariner | Ocean Tug | Western To | 3 | auxiliary | GM | 4 71 | 1984 | ULSD | 75 | 130 | 0.43 |
| 662872 | Ocean Mariner | Ocean Tug | Western To | 4 | auxiliary | GM | 6 71 | 1984 | ULSD | 75 | 130 | 0.43 |
| 693814 | Ocean Navigator | Ocean Tug | Western To | 1 | Propulsion | CAT | 3516B | 1986 | ULSD | 1550 | 130 | 0.68 |
| 693814 | Ocean Navigator | Ocean Tug | Western To | 2 | Propulsion | CAT | 3516B | 1986 | ULSD | 1550 | 130 | 0.68 |
| 693814 | Ocean Navigator | Ocean Tug | Western To | 3 | auxiliary | CAT | 3306 | 1986 | ULSD | 120 | 130 | 0.43 |
| 693814 | Ocean Navigator | Ocean Tug | Western To | 4 | auxiliary | CAT | 3306 | 1986 | ULSD | 120 | 130 | 0.43 |
| 961922 | Ocean Ranger | Ocean Tug | Western To | 1 | Propulsion | CAT | 3516B | 1990 | ULSD | 2100 | 130 | 0.68 |
| 961922 | Ocean Ranger | Ocean Tug | Western To | 2 | Propulsion | CAT | 3516B | 1990 | ULSD | 2100 | 130 | 0.68 |
| 961922 | Ocean Ranger | Ocean Tug | Western To | 3 | auxiliary | CAT | 3306 | 1990 | ULSD | 120 | 130 | 0.43 |
| 961922 | Ocean Ranger | Ocean Tug | Western To | 4 | auxiliary | CAT | 3306 | 1990 | ULSD | 120 | 130 | 0.43 |
| 1160544 | Ocean Titan | Ocean Tug | Western To | 1 | Propulsion | CAT | 3516B | 2010 | ULSD | 2500 | 130 | 0.68 |
| 1160544 | Ocean Titan | Ocean Tug | Western To | 2 | Propulsion | CAT | 3516B | 2010 | ULSD | 2500 | 130 | 0.68 |
| 1160544 | Ocean Titan | Ocean Tug | Western To | 3 | auxiliary | CAT | 3306 | 2004 | ULSD | 190 | 130 | 0.43 |
| 1160544 | Ocean Titan | Ocean Tug | Western To | 4 | auxiliary | CAT | 3306 | 2004 | ULSD | 190 | 130 | 0.43 |
| 500126 | Pacific Eagle | Ocean Tug | Sea Coast Tr | 1 | Propulsion | CAT | D 398 | 1980 | ULSD | 900 | 5326 | 0.68 |
| 500126 | Pacific Eagle | Ocean Tug | Sea Coast Tr | 2 | Propulsion | CAT | D 398 | 1980 | ULSD | 900 | 5326 | 0.68 |
| 500126 | Pacific Eagle | Ocean Tug | Sea Coast Tr | 3 | auxiliary | Detroit | Jun-71 | 1981 | ULSD | 180 | 7132 | 0.43 |
| 500126 | Pacific Eagle | Ocean Tug | Sea Coast Tr | 4 | auxiliary | Detroit | Jun-71 | 1977 | ULSD | 180 | 1582 | 0.43 |
| 1092436 | Pacific Titan | Ocean Tug | Western To | 1 | Propulsion | CAT | 3516B | 2000 | ULSD | 2250 | 130 | 0.68 |
| 1092436 | Pacific Titan | Ocean Tug | Western To | 2 | Propulsion | CAT | 3516B | 2000 | ULSD | 2250 | 130 | 0.68 |
| 1092436 | Pacific Titan | Ocean Tug | Western To | 3 | auxiliary | CAT | 3306 | 2000 | ULSD | 180 | 130 | 0.43 |
| 1092436 | Pacific Titan | Ocean Tug | Western To | 4 | auxiliary | CAT | 3306 | 2000 | ULSD | 180 | 130 | 0.43 |
| 1117884 | Phyllis Dunlap | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | 3606 | 2001 | ULSD | 5100 | 324 | 0.68 |
| 1117884 | Phyllis Dunlap | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | 3606 | 2001 | ULSD | 5100 | 324 | 0.68 |
| 1117884 | Phyllis Dunlap | Ocean Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304T | 2001 | ULSD | 140 | 180 | 0.43 |
| 1117884 | Phyllis Dunlap | Ocean Tug | Dunlap Tow | 4 | auxiliary | CAT | 3304T | 2001 | ULSD | 140 | 177 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1117884 | Phyllis Dunlap | Ocean Tug | Dunlap Tow | 5 | auxiliary | CAT | 3306DITA | 2001 | ULSD | 185 | 6 | 0.43 |
| 648865 | Pt. Barrow | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648865 | Pt. Barrow | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648865 | Pt. Barrow | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 648865 | Pt. Barrow | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 648866 | Pt. Oliktok | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648866 | Pt. Oliktok | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648866 | Pt. Oliktok | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 648866 | Pt. Oliktok | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 648710 | Pt. Thompson | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648710 | Pt. Thompson | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3512 | 1982 | ULSD | 1000 | 24 | 0.68 |
| 648710 | Pt. Thompson | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 648710 | Pt. Thompson | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1982 | ULSD | 140 | 24 | 0.43 |
| 571909 | Ranger | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 571909 | Ranger | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 571909 | Ranger | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 571909 | Ranger | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 571854 | Sandra Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 8-645-E7 | 1974 | ULSD | 1450 | 2364 | 0.68 |
| 571854 | Sandra Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 8-645-E7 | 1974 | ULSD | 1450 | 2364 | 0.68 |
| 571854 | Sandra Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | Jun-71 | 2003 | ULSD | 192 | 2373 | 0.43 |
| 571854 | Sandra Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | Jun-71 | 2004 | ULSD | 192 | 1839 | 0.43 |
| 571854 | Sandra Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | Jun-71 |  | ULSD | 192 | 64 | 0.43 |
| 516870 | Sea Flyer | Ocean Tug | Crowley | 1 | Propulsion | EMD | 16-645-E5 | 1968 | ULSD | 2850 | 24 | 0.68 |
| 516870 | Sea Flyer | Ocean Tug | Crowley | 2 | Propulsion | EMD | 16-645-E5 | 1968 | ULSD | 2850 | 24 | 0.68 |
| 516870 | Sea Flyer | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1968 | ULSD | 140 | 24 | 0.43 |
| 516870 | Sea Flyer | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1968 | ULSD | 140 | 24 | 0.43 |
| 555271 | Sea Prince | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3606 | 1974 | ULSD | 2500 | 24 | 0.68 |
| 555271 | Sea Prince | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3606 | 1974 | ULSD | 2500 | 24 | 0.68 |
| 555271 | Sea Prince | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1974 | ULSD | 150 | 24 | 0.43 |
| 555271 | Sea Prince | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1974 | ULSD | 150 | 24 | 0.43 |
| 569925 | Sea Ranger | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3606 | 1975 | ULSD | 2500 | 24 | 0.68 |
| 569925 | Sea Ranger | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3606 | 1975 | ULSD | 2500 | 24 | 0.68 |
| 569925 | Sea Ranger | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1975 | ULSD | 150 | 24 | 0.43 |
| 569925 | Sea Ranger | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1975 | ULSD | 150 | 24 | 0.43 |
| 568498 | Sea Venture | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1975 | ULSD | 3500 | 24 | 0.68 |
| 568498 | Sea Venture | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1975 | ULSD | 3500 | 24 | 0.68 |
| 568498 | Sea Venture | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 8V71 | 1975 | ULSD | 150 | 24 | 0.43 |
| 568498 | Sea Venture | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 8V71 | 1975 | ULSD | 150 | 24 | 0.43 |
| 561652 | Sea Victory | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 561652 | Sea Victory | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 561652 | Sea Victory | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 8V71 | 1976 | ULSD | 150 | 24 | 0.43 |
| 561652 | Sea Victory | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 8V71 | 1976 | ULSD | 150 | 24 | 0.43 |
| 568790 | Sea Viking | Ocean Tug | Crowley | 1 | Propulsion | CAT | 3606 | 1975 | ULSD | 2500 | 24 | 0.68 |
| 568790 | Sea Viking | Ocean Tug | Crowley | 2 | Propulsion | CAT | 3606 | 1975 | ULSD | 2500 | 24 | 0.68 |
| 568790 | Sea Viking | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1975 | ULSD | 150 | 24 | 0.43 |
| 568790 | Sea Viking | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1975 | ULSD | 150 | 24 | 0.43 |
| 526717 | Seneca | Ocean Tug | Crowley | 1 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 526717 | Seneca | Ocean Tug | Crowley | 2 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 526717 | Seneca | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| 526717 | Seneca | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| 1029298 | Siku | Ocean Tug | Crowley | 1 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 1029298 | Siku | Ocean Tug | Crowley | 2 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 1029298 | Siku | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| 1029298 | Siku | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| 527409 | Sioux | Ocean Tug | Crowley | 1 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 527409 | Sioux | Ocean Tug | Crowley | 2 | Propulsion | EMD | 8-645-E5 | 1970 | ULSD | 1450 | 24 | 0.68 |
| 527409 | Sioux | Ocean Tug | Crowley | 3 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| 527409 | Sioux | Ocean Tug | Crowley | 4 | auxiliary | Detroit | 671 | 1970 | ULSD | 150 | 24 | 0.43 |
| PSOTS | Siuattle | Ocean Tug | Dunlap Tow | 1 | Propulsion | EMD | 16-645 | 1981 | ULSD | 3070 | 1423 | 0.68 |
| PSOTS | Siuattle | Ocean Tug | Dunlap Tow | 2 | Propulsion | EMD | 16-645 | 1981 | ULSD | 3070 | 1423 | 0.68 |
| PSOTS | Siuattle | Ocean Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 671 | 1981 | ULSD | 130 | 485 | 0.43 |
| PSOTS | Siuattle | Ocean Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 671 | 1981 | ULSD | 130 | 1265 | 0.43 |
| 527071 | Sneeoosh | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | 343 | 1978 | ULSD | 365 | 2080 | 0.68 |
| 540290 | Snohomish | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | 3516 | 1994 | ULSD | 1710 | 532 | 0.68 |
| 540290 | Snohomish | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | 3516 | 1994 | ULSD | 1710 | 532 | 0.68 |
| 540290 | Snohomish | Ocean Tug | Dunlap Tow | 3 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 80 | 312 | 0.43 |
| 540290 | Snohomish | Ocean Tug | Dunlap Tow | 4 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 80 | 212 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 540290 | Snohomish | Ocean Tug | Dunlap Tow | 5 | auxiliary | Detroit Dies | 671 | 1975 | ULSD | 105 | 16 | 0.43 |
| 571855 | Stacey Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 8-645-E7 | 1974 | ULSD | 1450 | 2386 | 0.68 |
| 571855 | Stacey Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 8-645-E7 | 1974 | ULSD | 1450 | 2386 | 0.68 |
| 571855 | Stacey Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 2291 | 0.43 |
| 571855 | Stacey Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 2267 | 0.43 |
| 571855 | Stacey Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 73 | 0.43 |
| 256829 | Swinomish | Ocean Tug | Dunlap Tow | 1 | Propulsion | CAT | D398 | 1974 | ULSD | 850 | 5000 | 0.68 |
| 256829 | Swinomish | Ocean Tug | Dunlap Tow | 2 | Propulsion | CAT | D398 | 1974 | ULSD | 850 | 5000 | 0.68 |
| 256829 | Swinomish | Ocean Tug | Dunlap Tow | 3 | auxiliary | CAT | 3304B | 1974 | ULSD | 120 | 2500 | 0.43 |
| 256829 | Swinomish | Ocean Tug | Dunlap Tow | 4 | auxiliary | CAT | 3304B | 1974 | ULSD | 120 | 2500 | 0.43 |
| CG639650 | Sydney Foss | Ocean Tug | Foss | 1 | Propulsion | EMD | 8-645-E7 | 1981 | ULSD | 1500 | 3043 | 0.68 |
| CG639650 | Sydney Foss | Ocean Tug | Foss | 2 | Propulsion | EMD | 8-645-E7 | 1981 | ULSD | 1500 | 3045 | 0.68 |
| CG639650 | Sydney Foss | Ocean Tug | Foss | 3 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 2764 | 0.43 |
| CG639650 | Sydney Foss | Ocean Tug | Foss | 4 | auxiliary | Detroit Dies | Jun-71 | 1982 | ULSD | 192 | 2682 | 0.43 |
| CG639650 | Sydney Foss | Ocean Tug | Foss | 5 | auxiliary | Detroit Dies | Jun-71 |  | ULSD | 192 | 56 | 0.43 |
| 513840 | Triumph | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3508 | 2006 | ULSD | 1000 | 130 | 0.68 |
| 513840 | Triumph | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3508 | 2006 | ULSD | 1000 | 130 | 0.68 |
| 513840 | Triumph | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 2006 | ULSD | 120 | 130 | 0.43 |
| 513840 | Triumph | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3304 | 2006 | ULSD | 120 | 130 | 0.43 |
| 565291 | Warrior | Ocean Tug | Crowley | 1 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 565291 | Warrior | Ocean Tug | Crowley | 2 | Propulsion | EMD | 20-645-E5 | 1976 | ULSD | 3500 | 24 | 0.68 |
| 565291 | Warrior | Ocean Tug | Crowley | 3 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 565291 | Warrior | Ocean Tug | Crowley | 4 | auxiliary | CAT | 3304 | 1976 | ULSD | 140 | 24 | 0.43 |
| 656807 | Western Mariner | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516 | 1995 | ULSD | 1500 | 130 | 0.68 |
| 656807 | Western Mariner | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516 | 1995 | ULSD | 1500 | 130 | 0.68 |
| 656807 | Western Mariner | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 2006 | ULSD | 120 | 130 | 0.43 |
| 656807 | Western Mariner | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3304 | 2000 | ULSD | 120 | 130 | 0.43 |
| 973968 | Western Navigator | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516B | 1991 | ULSD | 1550 | 130 | 0.68 |
| 973968 | Western Navigator | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516B | 1991 | ULSD | 1550 | 130 | 0.68 |
| 973968 | Western Navigator | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3304 | 1991 | ULSD | 120 | 130 | 0.43 |
| 973968 | Western Navigator | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3304 | 1991 | ULSD | 120 | 130 | 0.43 |
| 516924 | Western Ranger | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516B | 1968 | ULSD | 1700 | 130 | 0.68 |
| 516924 | Western Ranger | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516B | 1968 | ULSD | 1700 | 130 | 0.68 |
| 516924 | Western Ranger | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3306 | 1968 | ULSD | 100 | 130 | 0.43 |
| 516924 | Western Ranger | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3306 | 1968 | ULSD | 100 | 130 | 0.43 |
| 1052805 | Western Titan | Ocean Tug | Western Tov | 1 | Propulsion | CAT | 3516B | 1997 | ULSD | 2250 | 130 | 0.68 |
| 1052805 | Western Titan | Ocean Tug | Western Tov | 2 | Propulsion | CAT | 3516B | 1997 | ULSD | 2250 | 130 | 0.68 |
| 1052805 | Western Titan | Ocean Tug | Western Tov | 3 | auxiliary | CAT | 3306 | 1997 | ULSD | 180 | 130 | 0.43 |
| 1052805 | Western Titan | Ocean Tug | Western Tov | 4 | auxiliary | CAT | 3306 | 1997 | ULSD | 180 | 130 | 0.43 |
| 1120139 | Juan de Fuca | Pilot Boat | Puget Sound | 1 | Propulsion |  |  | 2001 | ULSD | 1100 | 763 | 0.51 |
| 1120139 | Juan de Fuca | Pilot Boat | Puget Sound | 2 | Propulsion |  |  | 2001 | ULSD | 1100 | 763 | 0.51 |
| 1120139 | Juan de Fuca | Pilot Boat | Puget Sound | 3 | auxiliary | Northern Lig | 984 | 2001 | ULSD | 43 | 327 | 0.43 |
| 1120139 | Juan de Fuca | Pilot Boat | Puget Sound | 4 | auxiliary | Northern Lig | 984 | 2001 | ULSD | 43 | 327 | 0.43 |
| 1088139 | Puget Sound | Pilot Boat | Puget Sound | 1 | Propulsion |  |  | 1999 | ULSD | 1100 | 834 | 0.51 |
| 1088139 | Puget Sound | Pilot Boat | Puget Sound | 2 | Propulsion |  |  | 1999 | ULSD | 1100 | 834 | 0.51 |
| 1088139 | Puget Sound | Pilot Boat | Puget Sound | 3 | auxiliary | Northern Lig | 984 | 1999 | ULSD | 50 | 357 | 0.43 |
| 1088139 | Puget Sound | Pilot Boat | Puget Sound | 4 | auxiliary | Northern Lig | 984 | 1999 | ULSD | 50 | 357 | 0.43 |
| 1235165 | Betsy Arntz | Tank Barge | Harley Marir | 1 | auxiliary | IHI Shibaura | N84-D-8601 |  | ULSD | 185 | 280 | 0.43 |
| 1235165 | Betsy Arntz | Tank Barge | Harley Marir | 2 | auxiliary | Detroit | 6064TK33 |  | ULSD | 185 | 116 | 0.43 |
| 1235165 | Betsy Arntz | Tank Barge | Harley Marir | 3 | auxiliary | Detroit | 6064TK33 |  | ULSD | 185 | 161 | 0.43 |
| 1109007 | Dottie | Tank Barge | Harley Marir | 1 | auxiliary | Cummins | N-14-P | 2001 | ULSD | 185 | 446 | 0.43 |
| 1109007 | Dottie | Tank Barge | Harley Marir | 2 | auxiliary | Cummins | N-14-P | 2001 | ULSD | 185 | 545 | 0.43 |
| 1109007 | Dottie | Tank Barge | Harley Marir | 3 | auxiliary | Cummins | 6BT5.9-G6 | 2001 | ULSD | 185 | 3586 | 0.43 |
| 1109007 | Dottie | Tank Barge | Harley Marir | 4 | auxiliary | Cummins | 6BT5.9-G6 | 2001 | ULSD | 185 | 1173 | 0.43 |
| 1208933 | Dugan Pearsall | Tank Barge | Harley Marir | 1 | auxiliary | Detroit | Series 60 |  | ULSD | 185 | 905 | 0.43 |
| 1208933 | Dugan Pearsall | Tank Barge | Harley Marir | 2 | auxiliary | Detroit | Series 60 |  | ULSD | 185 | 1183 | 0.43 |
| 1208933 | Dugan Pearsall | Tank Barge | Harley Marir | 3 | auxiliary | John Deere | 4045HF285 |  | ULSD | 185 | 2437 | 0.43 |
| TB248 | Foss 248-P2 | Tank Barge | Foss | 1 | auxiliary | Detroit Dies | Feb-71 | 1987 | ULSD | 80 | 500 | 0.43 |
| TB248 | Foss 248-P2 | Tank Barge | Foss | 2 | auxiliary | Detroit Dies | Jun-71 |  | ULSD | 192 | 500 | 0.43 |
| TB248 | Foss 248-P2 | Tank Barge | Foss | 3 | auxiliary | Detroit Dies | Jun-71 |  | ULSD | 192 | 500 | 0.43 |
| 1026330 | HMS 2000 | Tank Barge | Harley Marir | 1 | auxiliary | Detroit | Jun-71 | 1987 | ULSD | 185 | 1015 | 0.43 |
| 1026330 | HMS 2000 | Tank Barge | Harley Marir | 2 | auxiliary | Detroit | Jun-71 | 1987 | ULSD | 185 | 985 | 0.43 |
| 1026330 | HMS 2000 | Tank Barge | Harley Marir | 3 | auxiliary | John Deere | 4045 | 1987 | ULSD | 185 | 1200 | 0.43 |
| 1218201 | Lily Blair | Tank Barge | Harley Marir | 1 | auxiliary | Detroit | 6064HV33 |  | ULSD | 185 | 1535 | 0.43 |
| 1218021 | Lily Blair | Tank Barge | Harley Marir | 2 | auxiliary | Detroit | 6064HV33 |  | ULSD | 185 | 1454 | 0.43 |
| 1218021 | Lily Blair | Tank Barge | Harley Marir | 3 | auxiliary | IHI Shibaura |  |  | ULSD | 185 | 2486 | 0.43 |
| 1205217 | Lovel Briere | Tank Barge | Harley Marir | 1 | auxiliary | Detroit | 6064HV33 |  | ULSD | 185 | 1297 | 0.43 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1205217 | Lovel Briere | Tank Barge | Harley Marin | 2 | auxiliary | Detroit | 6064HV33 | | ULSD | 185 | 1316 | 0.43 |
| 1205217 | Lovel Briere | Tank Barge | Harley Marin | 3 | auxiliary | John Deere | 6068TF275 | | ULSD | 185 | 1264 | 0.43 |
| 1205217 | Lovel Briere | Tank Barge | Harley Marin | 4 | auxiliary | John Deere | 6068TF275 | | ULSD | 185 | 2143 | 0.43 |
| 1219418 | Nathan Schmidt | Tank Barge | Harley Marin | 1 | auxiliary | Detroit | 6064HV33 | | ULSD | 185 | 1124 | 0.43 |
| 1219418 | Nathan Schmidt | Tank Barge | Harley Marin | 2 | auxiliary | Detroit | 6064HV33 | | ULSD | 185 | 1161 | 0.43 |
| 1219418 | Nathan Schmidt | Tank Barge | Harley Marin | 3 | auxiliary | IHI Shibaur | N844-C-860 | | ULSD | 185 | 1746 | 0.43 |
| 981972 | Puget Sounder | Tank Barge | Sea Coast Tr | 1 | auxiliary | Detroit | Aug-71 | 1991 | ULSD | 240 | 661 | 0.43 |
| 981972 | Puget Sounder | Tank Barge | Sea Coast Tr | 3 | auxiliary | Detroit | Aug-71 | 1991 | ULSD | 240 | 429 | 0.43 |
| 981972 | Puget Sounder | Tank Barge | Sea Coast Tr | 4 | auxiliary | Detroit | Apr-71 | 1992 | ULSD | 180 | 2537 | 0.43 |
| 1101122 | Shauna Kay | Tank Barge | Harley Marin | 1 | auxiliary | Cummins | N14-P | 1987 | ULSD | 185 | 1199 | 0.43 |
| 1101122 | Shauna Kay | Tank Barge | Harley Marin | 2 | auxiliary | Cummins | N14-P | 1987 | ULSD | 185 | 179 | 0.43 |
| 1101122 | Shauna Kay | Tank Barge | Harley Marin | 3 | auxiliary | Cummins | 6BT5.9-G2 | 1987 | ULSD | 185 | 971 | 0.43 |
| 1101122 | Shauna Kay | Tank Barge | Harley Marin | 4 | auxiliary | Cummins | 6BT5.9-G6 | 1987 | ULSD | 185 | 2087 | 0.43 |
| 1190801 | Stoddard Sea | Tank Barge | Harley Marin | 1 | auxiliary | John Deere | 6068HF475 | 1987 | ULSD | 185 | 746 | 0.43 |
| 1190801 | Stoddard Sea | Tank Barge | Harley Marin | 2 | auxiliary | John Deere | 6068HF475 | 1987 | ULSD | 185 | 727 | 0.43 |
| 1190801 | Stoddard Sea | Tank Barge | Harley Marin | 3 | auxiliary | John Deere | 6068HF475 | 1987 | ULSD | 185 | 18 | 0.43 |
| 1190801 | Stoddard Sea | Tank Barge | Harley Marin | 4 | auxiliary | John Deere | 6068TF275F | 1987 | ULSD | 185 | 643 | 0.43 |
| 1190801 | Stoddard Sea | Tank Barge | Harley Marin | 5 | auxiliary | John Deere | 6068TF275F | 1987 | ULSD | 185 | 641 | 0.43 |
| 628604 | Washington | Tank Barge | Foss | 1 | auxiliary | | | 1980 | ULSD | 185 | 500 | 0.43 |
| CG001716 | Andrew | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | S-60 | 2004 | ULSD | 400 | 106 | 0.38 |
| CG001716 | Andrew | Workboat | Manson Cor | 2 | Propulsion | Caterpillar | C18 | 2011 | ULSD | 600 | 0 | 0.38 |
| CG001919 | Bob Lofgren | Workboat | Manson Cor | 1 | Propulsion | Caterpillar | 3512B | 1996 | ULSD | 1910 | 0 | 0.38 |
| CG001919 | Bob Lofgren | Workboat | Manson Cor | 2 | Propulsion | E M D | 16V567C | 1955 | ULSD | 1500 | 0 | 0.38 |
| CG001919 | Bob Lofgren | Workboat | Manson Cor | 3 | Propulsion | E M D | 16V567C | 1955 | ULSD | 1500 | 0 | 0.38 |
| CG001919 | Bob Lofgren | Workboat | Manson Cor | 4 | Propulsion | E M D | 16V567C | 1955 | ULSD | 1500 | 0 | 0.38 |
| 527467 | Cheyenne Arrow | Workboat | Arrow Laun | 1 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 370 | 1000 | 0.38 |
| 527467 | Cheyenne Arrow | Workboat | Arrow Laun | 2 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 370 | 1000 | 0.38 |
| 274237 | Crow Arrow | Workboat | Arrow Laun | 1 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 392 | 350 | 0.38 |
| 657491 | Derrick 24 | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | S-60 | 2004 | ULSD | 400 | 2814 | 0.38 |
| 657491 | Derrick 24 | Workboat | Manson Cor | 2 | Propulsion | Caterpillar | 3406C | 1997 | ULSD | 450 | 673 | 0.38 |
| 657491 | Derrick 24 | Workboat | Manson Cor | 3 | Propulsion | John Deere | 4045TF150 | 2004 | ULSD | 130 | 721 | 0.38 |
| 657491 | Derrick 24 | Workboat | Manson Cor | 4 | auxiliary | Detroit Dies | Apr-71 | 1969 | ULSD | 140 | 32 | 0.32 |
| 657491 | Derrick 24 | Workboat | Manson Cor | 5 | auxiliary | Detroit Dies | Apr-71 | | ULSD | 140 | 15 | 0.32 |
| DB3 | Derrick 3 | Workboat | Manson Cor | 1 | Propulsion | John Deere | 6090HF485 | 2008 | ULSD | 384 | 479 | 0.38 |
| DB3 | Derrick 3 | Workboat | Manson Cor | 2 | Propulsion | Detroit Dies | 8V71 | 1969 | ULSD | 318 | 462 | 0.38 |
| DB3 | Derrick 3 | Workboat | Manson Cor | 3 | auxiliary | John Deere | 4045HF475 | 2005 | ULSD | 130 | 1403 | 0.32 |
| DB6 | Derrick 6 | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | 8V71 (7087- | 1963 | ULSD | 318 | 160 | 0.38 |
| DB6 | Derrick 6 | Workboat | Manson Cor | 2 | Propulsion | John Deere | 6466TF00 | 1986 | ULSD | 154 | 1658 | 0.38 |
| DB6 | Derrick 6 | Workboat | Manson Cor | 3 | auxiliary | Detroit Dies | 6-71 (1063-7 | 1971 | ULSD | 180 | 442 | 0.32 |
| DB6 | Derrick 6 | Workboat | Manson Cor | 4 | auxiliary | Detroit Dies | 6-71 (1063-7 | 1975 | ULSD | 180 | 46 | 0.32 |
| DB6 | Derrick 6 | Workboat | Manson Cor | 5 | auxiliary | Detroit Dies | 4-71 (1043-7 | 1967 | ULSD | 140 | 401 | 0.32 |
| DB8 | Derrick 8 | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | S-60 | 2003 | ULSD | 400 | 52 | 0.38 |
| DB8 | Derrick 8 | Workboat | Manson Cor | 2 | Propulsion | Detroit Dies | 12V71 | 1965 | ULSD | 365 | 567 | 0.38 |
| CG059573 | Lester M | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | 6V71 | 1988 | ULSD | 180 | 1858 | 0.38 |
| PB10 | Police Boat (10) | Workboat | Port of Seatt | 1 | Propulsion | | | 1987 | Gasolin | 100 | 500 | 0.38 |
| D691320 | Scandia | Workboat | Manson Cor | 1 | Propulsion | Detroit Dies | S-60 | 2003 | ULSD | 400 | 1294 | 0.38 |
| D691320 | Scandia | Workboat | Manson Cor | 2 | Propulsion | Caterpillar | 3406 | 1985 | ULSD | 420 | 2115 | 0.38 |
| D691320 | Scandia | Workboat | Manson Cor | 3 | auxiliary | Caterpillar | 3306 | 1977 | ULSD | 230 | 62 | 0.32 |
| D691320 | Scandia | Workboat | Manson Cor | 4 | auxiliary | Detroit Dies | Apr-71 | 1979 | ULSD | 140 | 154 | 0.32 |
| D691320 | Scandia | Workboat | Manson Cor | 5 | auxiliary | Detroit Dies | Apr-71 | 1979 | ULSD | 140 | 189 | 0.32 |
| 537094 | Sioux Arrow | Workboat | Arrow Laun | 1 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 600 | 1000 | 0.38 |
| 537094 | Sioux Arrow | Workboat | Arrow Laun | 2 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 600 | 1000 | 0.38 |
| SB97 | Small Boat (97) | Workboat | Port of Seatt | 1 | Propulsion | | | 1979 | Gasolin | 50 | 500 | 0.38 |
| 1131954 | Southman | Workboat | Manson Cor | 1 | Propulsion | Caterpillar | 3408 | 1989 | ULSD | 402 | 2226 | 0.38 |
| 1131954 | Southman | Workboat | Manson Cor | 2 | Propulsion | Detroit Dies | Jun-71 | | ULSD | 180 | 25 | 0.38 |
| 1177801 | Viking | Workboat | Manson Cor | 1 | Propulsion | Caterpillar | C15 | 2006 | ULSD | 619 | 338 | 0.38 |
| 1177801 | Viking | Workboat | Manson Cor | 2 | Propulsion | Caterpillar | 3512 | 1983 | ULSD | 1200 | 7360 | 0.38 |
| 1177801 | Viking | Workboat | Manson Cor | 3 | auxiliary | Caterpillar | C9 | 2005 | ULSD | 275 | 1125 | 0.32 |
| 1177801 | Viking | Workboat | Manson Cor | 4 | auxiliary | Detroit Dies | 8V71 | 1976 | ULSD | 318 | 301 | 0.32 |
| 1177801 | Viking | Workboat | Manson Cor | 5 | auxiliary | Detroit Dies | 8V71 | 1976 | ULSD | 318 | 0 | 0.32 |
| 1177801 | Viking | Workboat | Manson Cor | 6 | auxiliary | Caterpillar | 3306 | 2000 | ULSD | 230 | 0 | 0.32 |
| CG747195 | Warrior | Workboat | Arrow Laun | 1 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 330 | 75 | 0.38 |
| CG747195 | Warrior | Workboat | Arrow Laun | 2 | Propulsion | Detroit | 8V71 | 1971 | ULSD | 330 | 75 | 0.38 |
| W1 | Workboat #1 | Workboat | Port of Seatt | 1 | Propulsion | | | 1980 | Gasolin | 50 | 500 | 0.38 |
| W2 | Workboat #2 | Workboat | Port of Seatt | 1 | Propulsion | | | 1983 | Gasolin | 50 | 500 | 0.38 |
| W3 | Workboat #3 | Workboat | Port of Seatt | 1 | Propulsion | | | 1983 | Gasolin | 50 | 500 | 0.38 |
| W100 | Workboat (100) | Workboat | Port of Seatt | 1 | Propulsion | | | 1983 | Gasolin | 50 | 500 | 0.38 |

# Puget Sound Emissions Inventory

## Commercial Harbor Vessel Data

| Vessel ID | Vessel Name | Type | Owner Name | Engine ID User | Engine Type | Engine MFR | Engine Model | Engine Year | Fuel | HP | Annual Hours | Load |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W1251 | Workboat (1251) | Workboat | Port of Seatt | 1 | Propulsion | | | 2001 | Gasoline | 50 | 500 | 0.38 |
| W1260 | Workboat (1260) | Workboat | Port of Seatt | 1 | Propulsion | Honda | | 1985 | Gasoline | 45 | 500 | 0.38 |
| ZB12 | Zodiac Boat (12) | Workboat | Port of Seatt | 1 | Propulsion | Honda | | 1995 | Gasoline | 50 | 500 | 0.38 |

# APPENDIX B - SUPPORTING DATA

## CARGO HANDLING EQUIPMENT DATA

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSA010 | Anacortes | Forklift | 8 | Clark | | Continental | 4 cyl | 1970 | 50 | 32 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSA010 | Anacortes | Forklift | 10 | Clark | 2.5 ton | | 4 cyl | 1963 | 50 | 18 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSA010 | Anacortes | Forklift | 11F | | 9 ton | Ford | 351 | 1977 | 200 | 71 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSA010 | Anacortes | Forklift | 12F | CAT | 9 ton | CAT | 3206 | 1982 | 200 | 5 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSA010 | Anacortes | Forklift | 9A | Komatsu | 5 ton | Nissan | 6 cyl | 1995 | 100 | 48 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSA010 | Anacortes | Skid Steer Loader | ST1 | Bobcat | | Kubota | 4 cyl | 1991 | 150 | 22 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 515 | Caterpillar | 966 | Caterpillar | 3306 | 1973 | 177 | 100 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 524 | Wagner | L80 | Cummins | 335 | 1989 | 335 | 200 | Diesel | 1000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 527 | Dart | kw80 | Cummins | 335 | 1976 | 335 | 200 | Diesel | 1000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 531 | Caterpillar | 966 | Caterpillar | 3306 | 1973 | 177 | 1,200 | Diesel | 4500 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 545 | Caterpillar | 980c | Caterpillar | 3306 | 1986 | 177 | 100 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 549 | Caterpillar | 988b | Caterpillar | 3408 | 1987 | 400 | 1,500 | Diesel | 9000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 570 | Caterpillar | 988b | Caterpillar | 3408 | 1991 | 400 | 2,000 | Diesel | 12000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Loader | 578 | Caterpillar | 988b | Caterpillar | 3408 | 1985 | 400 | 500 | Diesel | 3000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Log shovel | 580 | Caterpillar | 330ll | Caterpillar | 3306 | 1994 | 177 | 1,000 | Diesel | 3000 | ULSD | n | na | n | n | na | 1 |
| PSE020 | Everett | Log shovel | 593 | Caterpillar | 330b-l | Caterpillar | 3306 | 2001 | 177 | 1,500 | Diesel | 4500 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Backhoe | 57 | Ford | 455C KF2 | Ford | 201 C.I. 3C | 1988 | 63 | 300 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Compressor | 75 | Ingersol-Ra | 100 | White | G1600X11 | 1978 | 50 | 250 | Gasoline | 150 | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Crane | 71 | Grove | RT59S | Detroit | 4-71 NA | 1968 | 160 | 150 | Diesel | 200 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Crane | C1 | Gottwald | 350 | Cummins | 12 cyl | 2000 | 250 | 280 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Crane | CR1 | Manitowoc | Crane | Cummins | N14 | 1992 | 330 | 150 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 7 | Towmotor | V160 | Caterpillar | 3208 NA, | 1974 | 175 | 250 | Diesel | 250 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 9 | Towmotor | V160 | Caterpillar | 3208, 8 ton | 1974 | 175 | 250 | Diesel | 250 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 12 | Hyster | H130F | Perkins | 4.236 NA, | 1976 | 85 | 300 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 18 | Hyster | H130F | Perkins | 4.236 NA, | 1976 | 85 | 300 | Diesel | 300 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 21 | Clark | 4024 | | | 1953 | | | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 22 | Clark | 4024 | | | 1953 | | | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 26 | Yale | GP3180MOSG | | | | | | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 27 | Hyster | H120C | Continental | F245, 6 ton | 1968 | 76 | 200 | Gasoline | 200 | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 28 | Hyster | H120C | Continental | F245, 6 ton | 1969 | 76 | 200 | Gasoline | 200 | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 45 | Mitsubishi | FGC20 | Mitsubishi | 2.0 Litre 4C | 1982 | 93 | 300 | Propane | 300 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 46 | Mitsubishi | FGC20 | Mitsubishi | 2.0 Litre 4C | 1982 | 93 | 300 | Propane | 300 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 47 | Mitsubishi | FGC20 | Mitsubishi | 2.0 Litre 4C | 1982 | 93 | 300 | Propane | 300 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 48 | Mitsubishi | FGC20 | Mitsubishi | 2.0 Litre 4C | 1982 | 93 | 300 | Propane | 300 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 49 | Mitsubishi | FGC25 | Mitsubishi | 2.0 Litre 4C | 1982 | 93 | 300 | Propane | 300 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Forklift | 60 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 61 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 62 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 63 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 64 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 65 | Nissan | CYMO2L2 | na | 2 ton | 1994 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSE010 | Everett | Forklift | 4F | Towmotor | V160 | Caterpillar | 3208 NA, | 1974 | 175 | 250 | Gasoline | 250 | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Generator | 85 | Onan | 85 KW | Cummins | 6CT 8.3 | 2000 | 210 | 50 | Diesel | 50 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Generator | G1 | DMT | Generator | John Deere | 4039 | 1992 | 71 | 150 | Diesel | 150 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Generator | G2 | Kohler | 400 KW | Volvo Pent | 12.13 Litre | 2006 | 602 | | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSE010 | Everett | Light tower | 76 | Winco | LSC4 | Kubota | D 850 | 1991 | 25 | 300 | Diesel | 150 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Loader | 29 | Bobcat | 600LP | Wisconsin | VF4D | 1968 | 25 | 100 | Propane | 75 | Propane | n | na | n | n | na | 1 |
| PSE010 | Everett | Loader | 35 | Bobcat | 600LP | | | | | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Loader | 11L | Caterpillar | 930 | Caterpillar | 3304 | 1974 | 101 | 200 | Diesel | 200 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Loader | 32L | Caterpillar | 930 | Caterpillar | 41K1189 | 1970 | 101 | 200 | Diesel | 200 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Manlift | 72 | Genie | S-65-2WD | Ford | 2.5 Litre 4C | 1998 | 82 | 300 | Gasoline | 300 | Gasoline | n | na | n | n | na | 1 |
| PSE010 | Everett | Sweeper | 73 | Power Boss | SW90HD | Kubota | V-1702B | 1987 | 36 | 300 | Diesel | 150 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Truck | 56 | Ford | F800 Boom | Ford | MFMO 7.8 | 1992 | 210 | 350 | Diesel | 350 | ULSD | n | na | n | n | na | 1 |
| PSE010 | Everett | Welder | 77 | Lincoln | F245 | Continental | F 245 | 1968 | 76 | 250 | Gasoline | 200 | Gasoline | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 151 | Clark | C500Y155 | 353 Detroit | 7 ton | 1984 | 75 | 92 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 160 | Clark | C500Y155 | 353 Detroit | 7 ton | 1990 | 75 | 32 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 192 | Taylor | TE300S | Detroit | 15 ton | 1984 | 150 | 100 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 193 | Taylor | TE300S | Detroit | 15 ton | 1984 | 150 | 175 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 921 | Clark | C500Y100 | Perkins | 5 ton | 1984 | 75 | 92 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Forklift | 157E | Clark | C500Y155 | 353 Detroit | 7 ton | 1984 | 75 | 168 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Top Handler | T29 | Caterpillar | V925 | 3208Cat | | 1993 | 200 | 25 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T41 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 225 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T42 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 225 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T44 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 225 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T45 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 350 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T46 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 350 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T48 | Ottawa | YT50 | 3208Cat | | 1986 | 175 | 225 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE030 | Everett | Yard Tractor | T56 | Ottawa | YT50 | 3208Cat | | 1993 | 175 | 225 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F1 | Hyster | 3 ton | Perkins | | 1990 | 50 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F2 | Hyster | 7 ton | | | 1990 | 75 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F3 | Hyster | 10 ton | | Cat D320 | 1975 | 150 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F4 | Hyster | 10 ton | | Cat D320 | 1975 | 150 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F5 | Mitsubishi | 15 ton | | | 1995 | 150 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Forklift | F6 | Taylor | 15 ton | Cummins | 155hp | 1995 | 150 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Reach stacker | 10001 | Hyster | | Cummins | | 1995 | 200 | 400 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Reach stacker | RS1 | Taylor | | | | 1995 | 200 | 400 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Yard Tractor | 11YT | Sisu | | | | 1995 | 175 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Yard Tractor | B-54 | Ottawa | YT50 | Caterpillar | 3208 | 1995 | 175 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Yard Tractor | H-962 | AGM | | Caterpillar | 3208 | 1984 | 175 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSE040 | Everett | Yard Tractor | H-963 | AGM | | Caterpillar | 3208 | 1984 | 175 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Forklift | 5918 | Komatsu | FD80T7 | Komatsu | 6 cyl | 2001 | 104 | 54 | Diesel | 38 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Forklift | 5919 | Komatsu | FD80T7 | Komatsu | 6 cyl | 2001 | 104 | 56 | Diesel | 47 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Forklift | 5924 | Kalmar | DCD1366 | Volvo | 6 cyl | 2001 | 159 | 85 | Diesel | 106 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6013 | Komatsu | WA600-1L | Komatsu | 6 cyl | 1990 | 415 | 738 | Diesel | 7054 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6014 | Komatsu | WA600-1L | Komatsu | 6 cyl | 1990 | 415 | 512 | Diesel | 5074 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6015 | Komatsu | WA600-1L | Komatsu | 6 cyl | 1990 | 415 | 254 | Diesel | 2310 | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6016 | Komatsu | WA600-3L | Cummins | 6 cyl | 2000 | 415 | 56 | Diesel | 2267 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6017 | Komatsu | WA600-3L | Cummins | 6 cyl | 2000 | 415 | 60 | Diesel | 4101 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6018 | Komatsu | WA600-3L | Cummins | 6 cyl | 2000 | 415 | 116 | Diesel | 2436 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Loader | 6111L | Wagner | Lumberjack | Internationa | DT466 | 1985 | 220 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory
## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSO010 | Olympia | Loader | 6112L | Komatsu | Bucket Loa | Komatsu | SA6D110 | 1989 | 197 | 245 | Diesel | 253 | ULSD | n | na | n | n | na | 1 |
| PSO010 | Olympia | Manlift | 5819 | Genie | S60 | Ford | LRG-423 | 1997 | 87 | 71 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSO010 | Olympia | Sweeper | 5769 | Elgin | Crosswind | Nissan | 6 cyl | 2010 | 230 | 531 | Diesel | 538 | ULSD | n | na | **Y** | n | na | 1 |
| PSO010 | Olympia | Sweeper | 5770 | Athey | Top Gun | Internationa | DT466 | 1999 | 210 | 8 | Diesel | 0 | ULSD | n | na | **Y** | n | na | 1 |
| PSO010 | Olympia | Sweeper | 5818 | Powerboss | SW9XT | Nissan | 2.5 LITER | 2002 | 130 | 2 | Propane | na | Propane | n | na | **Y** | n | na | 1 |
| PSS020 | Seattle | Crane | CT1 | | | | 5.9L | 1992 | 130 | 60 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT2 | | | | 3.9L | 1998 | 130 | 510 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT3 | | | | 5.9 | 1998 | 130 | 510 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT4 | | | | 3.9 | 1998 | 130 | 270 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT5 | | | | 5.9 | 1998 | 130 | 540 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT6 | | | | 5.9 | 1998 | 130 | 720 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT7 | | | | 5.9 | 1998 | 130 | 720 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Crane | CT8 | | | | 5.9 | 1998 | 130 | 540 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT10 | | | | | | 0 | 324 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Forklift | CT11 | | | | | | 0 | 240 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Forklift | CT12 | | | | | | 0 | 240 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Forklift | CT13 | | | | | | 0 | 240 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Forklift | CT14 | | | | 5 T | 1991 | 85 | 60 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT15 | | | | 5 T | 1991 | 85 | 60 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT16 | | | | 10-15 T | 1995 | 150 | 20 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT17 | | | | 5 T | 1987 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT18 | | | | 5 T | 1987 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT19 | | | | 5 T | 1987 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT20 | | | | 5 T | 1987 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT21 | | | | 4 T | 1989 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT22 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT23 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT24 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT25 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT26 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT27 | | | | 4 T | 1993 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT28 | | | | 4 T | 1996 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT29 | | | | 4 T | 2005 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT30 | | | | 4 T | 2005 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT31 | | | | 4 T | 2005 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT32 | | | | 4 T | 2005 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT33 | | | | 4 T | 2005 | 85 | 480 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT34 | | | | 4 T | 2005 | 85 | 610 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT35 | | | | 4 T | 2005 | 85 | 610 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT36 | | | | 4 T | 2005 | 85 | 610 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT37 | | | | 4 T | 2005 | 85 | 610 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT38 | | | | 4 T | 2005 | 85 | 610 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS020 | Seattle | Forklift | CT9 | | | | | | 0 | 324 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT39 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT40 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS020 | Seattle | Pallet Jacks | CT41 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT42 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT43 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT44 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT45 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT46 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT47 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT48 | | | | | | 0 | 610 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT49 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT50 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT51 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT52 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT53 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT54 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT55 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT56 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT57 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT58 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT59 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS020 | Seattle | Pallet Jacks | CT60 | | | | | | 0 | 480 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS040 | Seattle | Forklift | FS86 | | | | | 1995 | 100 | 1,000 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR1253 | Daewoo | | | | 2001 | 150 | 365 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR308 | Chalmers | | | | 1981 | 150 | 22 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR310 | Chalmers | | | | 1981 | 150 | 30 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR317 | Chalmers | | | | 1981 | 150 | 14 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR323 | Mitsubishi | | | | 1988 | 150 | 25 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR329 | Mitsubishi | | | | 1989 | 150 | 25 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Car Loader | LDR332 | Clark | | | | 1989 | 150 | 121 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | ELT151 | Crown | | | | 1975 | 0 | 24 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS010 | Seattle | Forklift | ELT169 | Clark | | | | 1978 | 0 | 25 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS010 | Seattle | Forklift | GLT201 | | | | | 1988 | 100 | 69 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT203 | | | | | 1988 | 100 | 200 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT205 | | | | | 1988 | 100 | 222 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT208 | | | | | 1989 | 100 | 46 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT216 | | | | | 1989 | 100 | 5 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT217 | | | | | 1990 | 100 | 48 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT218 | | | | | 1990 | 100 | 35 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT221 | | | | | 1990 | 100 | 100 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT222 | | | | | 1990 | 100 | 200 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT273 | | | | | 1976 | 100 | 340 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT275 | | | | | 1993 | 100 | 110 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | GLT276 | | | | | 1994 | 100 | 120 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 1 | Komatsu | 16500# | | | 1992 | 200 | 130 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 12 | Clark | 30000# | | | 1975 | 200 | 259 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 13 | Clark | | | | 1975 | 200 | 70 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS010 | Seattle | Forklift | HLT 14 | Clark | 33000# | | | 1975 | 200 | 47 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 16 | Clark | 30000# | | | 1974 | 200 | 34 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 17 | Hyster | 40000# | | | 1961 | 200 | 37 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 18 | Clark | 30000# | | | 1973 | 200 | 20 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 25 | Towmotor | | | | 1969 | 200 | 146 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 33 | Clark | | | | 1977 | 200 | 72 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Forklift | HLT 34 | Clark | 33000# | | | 1977 | 200 | 53 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Generator | GEN152 | Taylor | | | | 2001 | 210 | 44 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Generator | GEN155 | Taylor | | | | 2001 | 364 | 102 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Generator | GEN157 | Caterpillar | | | | 2003 | 287 | 28 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS010 | Seattle | Generator | GEN160 | Honda | | | | 2005 | 5 | 5 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS010 | Seattle | Generator | GEN162 | | | | | | 20 | 5 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLC3006 | | | Caterpillar | 3208 | 1995 | 125 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLC3007 | | | Caterpillar | 3208 | 1995 | 125 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH1001 | | | Perkins | 2158-2100 | 2005 | 215 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH1002 | | | Perkins | 2158-2100 | 2005 | 215 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH1003 | | | Perkins | 4.5 | 2005 | 215 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH1005 | | | Perkins | 4.5 | 2005 | 215 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH3602 | | | Perkins | PDX4021 | 1995 | 120 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH3603 | | | Perkins | PDX4021 | 1995 | 120 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLH6215 | | | Cummins | 8.3 | 1995 | 215 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT1502 | | | Cummins | QSB6.7 | 2008 | 200 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT3005 | | | Cummins | 6BT5.9-C | 1993 | 135 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT8018 | | | Cummins | QSM-11 | 2006 | 335 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT8019 | | | Cummins | QSM-11 | 2007 | 335 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT8021 | | | Cummins | QSM-11 | 2007 | 335 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT9211 | | | Cummins | QSM-11 | 2006 | 335 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Forklift | FLT9214 | | | Cummins | QSM-11 | 2008 | 335 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Reach Stacker | RS-01 | | | Cummins | M11 | 2002 | 330 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Reach Stacker | RS-02 | | | Cummins | QSM-11 | 2008 | 350 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Yard Tractor | YH103 | | | Caterpillar | 3208 | 1974 | 235 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Yard Tractor | YH105 | | | Cummins | ISC-225 | 1999 | 225 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS030 | Seattle | Yard Tractor | YH106 | | | Cummins | ISC-225 | 1999 | 225 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Container Crane | 8 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 9 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 10 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 11 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 1677 | MHI | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 1678 | MHI | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 1679 | MHI | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 99980 | IHI | 40LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 99981 | IHI | 40LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Container Crane | 100000 | IHI | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS050 | Seattle | Forklift | 8911 | Mitsubishi | FD40K | Mitsubishi | | 2004 | 85 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8912 | Mitsubishi | FD40K | Mitsubishi | | 2004 | 85 | | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS050 | Seattle | Forklift | 8914 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8917 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8918 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8919 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8920 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8921 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 8922 | Mitsubishi | FD40K | Mitsubishi |  | 2004 | 85 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 16900 | Hyster | 155XL2 | Perkins |  | 2001 | 150 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 20900 | Hyster | H200E | Perkins |  | 2000 | 185 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 20920 | Hyster | H190XL | Perkins |  | 2000 | 185 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 30262 | Taylor | TXE 300 | Cummins | B 5.9 | 2006 | 200 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 30918 | Taylor | T 300M | Cummins | B 5.9 | 2005 | 200 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | 30919 | Taylor | T 300S | Cummins | B 5.9 | 2006 | 200 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Forklift | POS 26 | Clark | CY625 | GMC |  | 1982 | 150 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | RTG | 4 | ZPMC |  | Cummins | KTA 19 G | 1995 | 620 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | RTG | 5 | ZPMC |  | Cummins | KTA 19 G | 1995 | 620 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | RTG | 30 | ZPMC |  | Cat | 3412E | 2005 | 947 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | RTG | 31 | ZPMC |  | Cat | 3412E | 2005 | 947 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | RTG | 32 | ZPMC |  | Cat | 3412E | 2005 | 947 |  | Diesel | na | ULSD | n | na | n | **Super Cap** | **2005** | 1 |
| PSS050 | Seattle | RTG | 33 | ZPMC |  | Cat | 3412E | 2005 | 947 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Side Handler | 15902 | Taylor | TECSP 157 | Cummins | B 5.9 | 2001 | 200 | 1,364 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Side Handler | 15903 | Taylor | TECSP 157 | Cummins | QSB 5.9 | 2005 | 205 | 1,826 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Side Handler | 15904 | Taylor | TECSP 157 | Cummins | QSB 5.9 | 2005 | 205 | 882 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Side Handler | 15905 | Taylor | TECSP 157 | Cummins | QSB 5.9 | 2005 | 205 | 1,496 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Side Handler | 15906 | Taylor | TECSP 157 | Cummins | QSB 5.9 | 2006 | 205 | 1,727 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80920 | Taylor | THDC 955 | Cummins | QSM 11 | 2003 | 335 | 1,624 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80921 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 1,431 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80922 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 1,282 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80923 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 1,638 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80925 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 1,469 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80928 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 1,603 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80929 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 1,782 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80930 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 1,922 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80931 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 2,119 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80933 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 2,111 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80934 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 1,723 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80935 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 1,596 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80936 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,078 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80937 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,367 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80938 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,038 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80939 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,035 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80940 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,001 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80941 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,838 | Diesel | na | ULSD | n | na | n | **DPF** | 2010 | 1 |
| PSS050 | Seattle | Top Handler | 80942 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,893 | Diesel | na | ULSD | n | na | n | **DPF** | 2010 | 1 |
| PSS050 | Seattle | Top Handler | 80943 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,938 | Diesel | na | ULSD | n | na | n | **DPF** | 2010 | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS050 | Seattle | Top Handler | 80944 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,984 | Diesel | na | ULSD | n | na | n | **DPF** | 2010 | 1 |
| PSS050 | Seattle | Top Handler | 80945 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,670 | Diesel | na | ULSD | n | na | n | **DPF** | 2010 | 1 |
| PSS050 | Seattle | Top Handler | 80946 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 3,190 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80947 | Taylor | THDC 955 | Cummins | QSM 11 | 2006 | 335 | 2,977 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80948 | Taylor | THDC 955 | Cummins | QSM 11 | 2007 | 335 | 2,985 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80949 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 2,756 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80950 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 2,190 | Diesel | na | ULSD | **YES** | 2010 | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80951 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 2,181 | Diesel | na | ULSD | **YES** | 2010 | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80952 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 2,325 | Diesel | na | ULSD | **YES** | 2010 | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80953 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 1,806 | Diesel | na | ULSD | **YES** | 2010 | n | n | na | 1 |
| PSS050 | Seattle | Top Handler | 80954 | Taylor | THDC 975 | Cummins | QSM 11 | 2007 | 335 | 2,084 | Diesel | na | ULSD | **YES** | 2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 800 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,657 | Diesel | na | ULSD | **YES** | 8/5/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 801 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,514 | Diesel | na | ULSD | **YES** | 8/24/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 802 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,825 | Diesel | na | ULSD | **YES** | 8/23/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 803 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,052 | Diesel | na | ULSD | **YES** | 8/5/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 804 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,192 | Diesel | na | ULSD | **YES** | 8/24/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 805 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,614 | Diesel | na | ULSD | **YES** | 8/25/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 806 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,218 | Diesel | na | ULSD | **YES** | 8/30/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 807 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,007 | Diesel | na | ULSD | **YES** | 9/1/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 808 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,162 | Diesel | na | ULSD | **YES** | 8/25/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 809 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,654 | Diesel | na | ULSD | **YES** | 8/26/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 810 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,818 | Diesel | na | ULSD | **YES** | 8/27/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 811 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,842 | Diesel | na | ULSD | **YES** | 9/1/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 812 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,100 | Diesel | na | ULSD | **YES** | 8/26/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 813 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,063 | Diesel | na | ULSD | **YES** | 5/19/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 814 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,308 | Diesel | na | ULSD | **YES** | 5/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 815 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,000 | Diesel | na | ULSD | **YES** | 5/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 818 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,687 | Diesel | na | ULSD | **YES** | 5/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 819 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,638 | Diesel | na | ULSD | **YES** | 5/21/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 820 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,717 | Diesel | na | ULSD | **YES** | 5/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 821 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 1,780 | Diesel | na | ULSD | **YES** | 7/27/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 822 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,543 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 823 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,757 | Diesel | na | ULSD | **YES** | 5/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 824 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,161 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 825 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,380 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 826 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,806 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 827 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 2,996 | Diesel | na | ULSD | **YES** | 5/22/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 828 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,019 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 829 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,022 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 830 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,300 | Diesel | na | ULSD | **YES** | 7/20/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 831 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 235 | Diesel | na | ULSD | **YES** | 7/21/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 832 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2007 | 173 | 3,574 | Diesel | na | ULSD | **YES** | 5/17/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 833 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,192 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 834 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,714 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 835 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,614 | Diesel | na | ULSD | **YES** | 5/17/2010 | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS050 | Seattle | Yard Tractor | H 836 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,791 | Diesel | na | ULSD | **YES** | 7/26/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 837 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,998 | Diesel | na | ULSD | **YES** | 7/22/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 838 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,396 | Diesel | na | ULSD | **YES** | 7/22/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 839 | Capacity | TJ 7000 | Cummins | QSB 5.9 | 2008 | 173 | 3,527 | Diesel | na | ULSD | **YES** | 7/22/2010 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 929 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,329 | Diesel | na | ULSD | **YES** | 7/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 930 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,699 | Diesel | na | ULSD | **YES** | 12/17/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 931 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,832 | Diesel | na | ULSD | **YES** | 10/18/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 932 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,272 | Diesel | na | ULSD | **YES** | 7/14/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 933 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,791 | Diesel | na | ULSD | **YES** | 7/2/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 934 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,466 | Diesel | na | ULSD | **YES** | 12/18/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 935 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 860 | Diesel | na | ULSD | **YES** | 7/14/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 936 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,494 | Diesel | na | ULSD | **YES** | 7/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 937 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,577 | Diesel | na | ULSD | **YES** | 12/17/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 938 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,041 | Diesel | na | ULSD | **YES** | 7/14/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 939 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,139 | Diesel | na | ULSD | **YES** | 10/2/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 940 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,788 | Diesel | na | ULSD | **YES** | 10/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 941 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,181 | Diesel | na | ULSD | **YES** | 10/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 942 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,175 | Diesel | na | ULSD | **YES** | 7/2/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 943 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,659 | Diesel | na | ULSD | **YES** | 7/11/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 944 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,662 | Diesel | na | ULSD | **YES** | 12/12/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 945 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,752 | Diesel | na | ULSD | **YES** | 10/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 946 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,412 | Diesel | na | ULSD | **YES** | 7/15/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 947 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,872 | Diesel | na | ULSD | **YES** | 9/30/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 948 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,525 | Diesel | na | ULSD | **YES** | 4/5/2006 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 949 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,028 | Diesel | na | ULSD | **YES** | 10/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 951 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 0 | Diesel | na | ULSD | **YES** | 10/1/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 952 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,300 | Diesel | na | ULSD | **YES** | 12/5/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 954 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,548 | Diesel | na | ULSD | **YES** | 12/12/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 955 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,927 | Diesel | na | ULSD | **YES** | 12/5/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 956 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,345 | Diesel | na | ULSD | **YES** | 7/11/2005 | n | n | na | 1 |
| PSS050 | Seattle | Yard Tractor | H 957 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 2,019 | Diesel | na | ULSD | **YES** | 10/2/2005 | n | n | na | 1 |
| PSS060 | Seattle | Container Crane | 5 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Container Crane | 6 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Container Crane | 7 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Container Crane | 261 | Paceco | 40LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Container Crane | 961 | Paceco | 40LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Container Crane | 1260 | Paceco | 40LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS060 | Seattle | Forklift | 8913 | Mitsubishi | FD40K | Mitsubishi | | 2004 | 85 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Forklift | 8915 | Mitsubishi | FD40K | Mitsubishi | | 2004 | 85 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Forklift | 36900 | Hyster | H 360 | Perkins | | 2005 | 190 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Side Handler | 15900 | Taylor | TECSP 157 | Cummins | B 5.9 | 2001 | 200 | 824 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Side Handler | 15901 | Taylor | TECSP 157 | Cummins | B 5.9 | 2001 | 200 | 1,095 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80014 | Taylor | TEC 950L | Cummins | M 11 | 1997 | 260 | 524 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80232 | Taylor | THDC 955 | Cummins | QSM 11 | 2002 | 260 | 572 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80253 | Taylor | THDC 955 | Cummins | QSM 11 | 2001 | 260 | 371 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS060 | Seattle | Top Handler | 80254 | Taylor | THDC 955 | Cummins | QSM 11 | 2001 | 260 | 495 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80910 | Taylor | TEC 950L | Cummins | L 10 | 1996 | 250 | 646 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80911 | Taylor | TEC 950L | Cummins | L 10 | 1996 | 250 | 860 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80912 | Taylor | TEC 950L | Cummins | L 10 | 1996 | 250 | 663 | Diesel | na | ULSD | **YES** | 2004 | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80924 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 2,196 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80926 | Taylor | THDC 955 | Cummins | QSM 11 | 2004 | 335 | 2,343 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80927 | Taylor | THDC 955 | Cummins | QSM 11 | 2005 | 335 | 2,301 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS060 | Seattle | Top Handler | 80957 | Taylor | TEC 950L | Cummins | M 11 | 1997 | 260 | 744 | Diesel | na | ULSD | **YES** | 2008 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 900 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 780 | Diesel | na | ULSD | **YES** | 7/22/2005 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 901 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 760 | Diesel | na | ULSD | **YES** | 5/10/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 902 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 671 | Diesel | na | ULSD | **YES** | 5/10/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 903 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 719 | Diesel | na | ULSD | **YES** | 6/9/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 904 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 456 | Diesel | na | ULSD | **YES** | 5/11/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 905 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 794 | Diesel | na | ULSD | **YES** | 6/4/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 906 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 948 | Diesel | na | ULSD | **YES** | 6/22/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 907 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 869 | Diesel | na | ULSD | **YES** | 5/11/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 908 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 0 | Diesel | na | ULSD | **YES** | 6/15/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 909 | Capacity | TJ 7000 | Cummins | 6BT | 2002 | 174 | 459 | Diesel | na | ULSD | **YES** | 6/16/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 910 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 868 | Diesel | na | ULSD | **YES** | 5/21/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 911 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 560 | Diesel | na | ULSD | **YES** | 6/23/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 912 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 886 | Diesel | na | ULSD | **YES** | 5/12/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 913 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 742 | Diesel | na | ULSD | **YES** | 5/13/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 914 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 873 | Diesel | na | ULSD | **YES** | 6/22/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 915 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 712 | Diesel | na | ULSD | **YES** | 5/17/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 916 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 205 | Diesel | na | ULSD | **YES** | 6/4/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 917 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 1,065 | Diesel | na | ULSD | **YES** | 5/27/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 918 | Capacity | TJ 7000 | Cummins | 6BT | 2003 | 174 | 1,537 | Diesel | na | ULSD | **YES** | 6/16/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 920 | Capacity | TJ 7000 | Cummins | 6BT | 2004 | 173 | 1,137 | Diesel | na | ULSD | **YES** | 6/28/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 921 | Capacity | TJ 7000 | Cummins | 6BT | 2004 | 173 | 943 | Diesel | na | ULSD | **YES** | 6/7/2010 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 922 | Capacity | TJ 7000 | Cummins | 6BT | 2004 | 173 | 1,034 | Diesel | na | ULSD | **YES** | 10/8/2005 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 923 | Capacity | TJ 7000 | Cummins | 6BT | 2004 | 173 | 911 | Diesel | na | ULSD | **YES** | 12/18/2005 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 926 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 1,037 | Diesel | na | ULSD | **YES** | 7/1/2005 | n | n | na | 1 |
| PSS060 | Seattle | Yard Tractor | H 928 | Capacity | TJ 7000 | Cummins | 6BT | 2005 | 173 | 849 | Diesel | na | ULSD | **YES** | 6/30/2005 | n | n | na | 1 |
| PSS070 | Seattle | Container Crane | 1354 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS070 | Seattle | Container Crane | 1472 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS070 | Seattle | Container Crane | J101A-1 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS070 | Seattle | Container Crane | J101A-2 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS070 | Seattle | Container Crane | J101A-3 | ZMPC | 65LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS070 | Seattle | Forklift | 1038 | Hyster | H70C | Continental | 227 | 1966 | 100 | 68 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1054 | Hyster | H70C | Continental | 227 | 1966 | 100 | 190 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1318 | Toyota | FGC30 | fgc35 | | 1994 | 100 | 30 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1701 | CAT | 5 T | CAT | DP40K | 2004 | 100 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1702 | CAT | 5 T | CAT | DP40K | 2004 | 100 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1703 | CAT | 5 T | CAT | DP40K | 2004 | 100 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 1704 | CAT | 5 T | CAT | DP40K | 2004 | 100 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS070 | Seattle | Forklift | 1705 | CAT | 5 T | CAT | DP40K | 2004 | 100 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 2404 | Taylor | TE360L | Cummins | 5.9 | 1994 | 150 | 121 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 2795 | Taylor | TH305L | Cummins | 5.9 | 2005 | 165 | 2,063 | Diesel | na | ULSD | **YES** | 2008 | n | n | na | 1 |
| PSS070 | Seattle | Forklift | 3733 | Taylor | Y-52 | Detroit | 453 | 1970 | 175 | 120 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Side Handler | 7212 | Taylor | | Cummins | 5.9 | 1995 | 152 | 350 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6000 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,675 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6002 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6109 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,715 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6110 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,989 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6111 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,839 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6112 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,711 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6113 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,700 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6114 | Taylor | | Cummins | L-10 | 1995 | 250 | 1,570 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6119 | Taylor | | Cummins | L-10 | 1995 | 250 | 2,772 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6121 | Taylor | | Cummins | L-10 | 1995 | 250 | 2,229 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6124 | Taylor | | Cummins | M-11 | 1997 | 250 | 1,999 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6126 | Taylor | | Cummins | M-11 | 1997 | 250 | 1,999 | Diesel | na | ULSD | **YES** | 2011 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6130 | Taylor | | Cummins | M-11 | 1998 | 250 | 1,999 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6136 | Taylor | | Cummins | M-11 | 1997 | 250 | 2,479 | Diesel | na | ULSD | **YES** | 2011 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6137 | Taylor | | Cummins | M-11 | 1998 | 250 | 3,220 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6176 | Taylor | THDC-955 | Cummins | QSM-11 | 2005 | 250 | 3,280 | Diesel | na | ULSD | **YES** | 2008 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6177 | Taylor | THDC-955 | Cummins | QSM-11 | 2005 | 250 | 3,056 | Diesel | na | ULSD | **YES** | 2008 | n | n | na | 1 |
| PSS070 | Seattle | Top Handler | 6178 | Taylor | THDC-955 | Cummins | QSM-11 | 2005 | 250 | 1,600 | Diesel | na | ULSD | **YES** | 2008 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5310 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,692 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5311 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,692 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5312 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,270 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5313 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,876 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5314 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,865 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5315 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,879 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5316 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,634 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5317 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,749 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5318 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,730 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5319 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,774 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5320 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,784 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5321 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,816 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5323 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,799 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5324 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 2,128 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5325 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 2,102 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5369 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 2,011 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5370 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5371 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5372 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5373 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2002 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5523 | Magnum | Sisu TT-12( | Cummins | 5.9 | 2005 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5524 | Capacity | TJ7000 | CAT | C-7 | 2005 | 240 | 2,095 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS070 | Seattle | Yard Tractor | 5525 | Capacity | TJ7000 | CAT | C-7 | 2005 | 240 | 2,330 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5526 | Capacity | TJ7000 | CAT | C-7 | 2005 | 240 | 2,464 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5527 | Capacity | TJ7000 | CAT | C-7 | 2005 | 240 | 2,265 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5543 | Capacity | TJ7000 | CAT | C-7 | 2006 | 240 | 2,444 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5544 | Capacity | TJ7000 | CAT | C-7 | 2006 | 240 | 2,473 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5614 | Capacity | TJ9000 | Cummins | ISB07 | 2007 | 210 | 2,224 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5842 | Magnum | Sisu TT-12 | Cummins | 5.9 | 2000 | 174 | 1,600 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS070 | Seattle | Yard Tractor | 5919 | Magnum | Sisu TT-12 | Cummins | 5.9 | 2005 | 174 | 1,991 | Diesel | na | ULSD | **YES** | 2007 | n | n | na | 1 |
| PSS080 | Seattle | Container Crane | 1261 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Container Crane | 1262 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Container Crane | 1263 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Container Crane | 1264 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Container Crane | 1355 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Container Crane | 1473 | Paceco | 50LT | | | na | 0 | na | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Forklift | EMRF101 | Taylor | 47510 Lbs | | | 1978 | 215 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF548 | Mitsubishi | 5000 Lbs | | | 1982 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF565 | Mitsubishi | 5000 Lbs | | | 1987 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF568 | Taylor | 30000 Lbs | | | 1986 | 215 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF571 | Mitsubishi | 15000 Lbs | | | 1986 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF573 | Mitsubishi | 15000 Lbs | | | 1986 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF574 | Clark | 5000 Lbs | | | 1990 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF575 | Clark | 5000 Lbs | | | 1990 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF576 | Clark | 5000 Lbs | | | 1990 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF577 | Taylor | 15000 Lbs | | | 1988 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF578 | Clark | 10000 Lbs | | | 1991 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF579 | Clark | 10000 Lbs | | | 1991 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF581 | Hyster | 8000 Lbs | | | 1992 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF583 | Hyster | 8000 Lbs | | | 1992 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF584 | Hyster | 8000 Lbs | | | 1992 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF586 | Hyster | 44000 Lbs | | | 1992 | 215 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF587 | Hyster | 36000 Lbs | | | 1992 | 215 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF588 | Hyster | 8000 Lbs | | | 1993 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF589 | Hyster | 8000 Lbs | | | 1993 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF616 | Clark | 5000 Lbs | | | 1996 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF617 | Clark | 5000 Lbs | | | 1996 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF618 | Clark | 5000 Lbs | | | 1996 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF619 | Clark | 5000 Lbs | | | 1996 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF621 | Hyster | 12000 Lbs | | | 1996 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF622 | Hyster | 12000 Lbs | | | 1996 | 125 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF623 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF624 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF625 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF626 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF627 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF628 | Hyster | 15500 Lbs | | | 1997 | 125 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS080 | Seattle | Forklift | EMSF648 | Mitsubishi | 5000 Lbs | | | 1998 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Forklift | EMSF649 | Mitsubishi | 5000 Lbs | | | 1998 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PSS080 | Seattle | Forklift | EMSF677 | Mitsubishi | 8000 Lbs | | | 2005 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF678 | Nissan | 4700 Lbs | | | | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF680 | Nissan | 5000 Lbs | | | 2006 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF681 | Nissan | 5000 Lbs | | | 2006 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF682 | Nissan | 5000 Lbs | | | 2006 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Forklift | EMSF683 | Nissan | 5000 Lbs | | | 2006 | 85 | 800 | Propane | na | Propane | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ047 | MI-JACK | MJ450H4 | | | 1997 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ049 | MI-JACK | MJ450H4 | | | 1997 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ050 | MI-JACK | MJ450H4 | | | 1997 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ051 | MI-JACK | MJ450H4 | | | 1997 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ284 | Fantuzzi | FDC 500G5 | | | 2005 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ285 | Fantuzzi | FDC 500G5 | | | 2005 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ286 | Fantuzzi | FDC 500G5 | | | 2005 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ287 | Fantuzzi | FDC 500G5 | | | 2005 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ295 | Taylor | TXC-975 | | | 2007 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ300 | Taylor | TXC-976 | | | 2008 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ301 | Taylor | TXC-976 | | | 2008 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ302 | Taylor | TXC-976 | | | 2008 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Top Handler | EMSZ303 | Taylor | TXC-976 | | | 2008 | 330 | 4,300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | APST183 | Capacity | | | | 2000 | 174 | 1,200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | APST184 | Capacity | | | | 2000 | 174 | 1,200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | APST185 | Capacity | | | | 2000 | 174 | 1,200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST302 | Capacity | TJ5000 | | | 1996 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST303 | Capacity | TJ5000 | | | 1996 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST305 | Capacity | TJ5000 | | | 1996 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST323 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST324 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST327 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST342 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST351 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST354 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST372 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST392 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST396 | Capacity | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST406 | Ottawa | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST407 | Ottawa | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST408 | Ottawa | | | | 1997 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST462 | Capacity | TJ7000 | | | 1999 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST463 | Capacity | TJ7000 | | | 1999 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST464 | Capacity | TJ7000 | | | 1999 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST465 | Capacity | TJ7000 | | | 1999 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST466 | Capacity | TJ7000 | | | 1999 | 174 | 1,200 | Diesel | na | ULSD | **YES** | 2006 | n | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST684 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |

# Puget Sound Emissions Inventory
## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS080 | Seattle | Yard Tractor | EMST685 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST686 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST687 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST688 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST689 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST690 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST691 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST692 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST693 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST694 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST695 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST696 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST697 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST716 | Capacity | TJ7000 | Cat | C-7 | 2004 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST717 | Capacity | TJ7000 | Cat | C-7 | 2005 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST718 | Capacity | TJ7000 | Cat | C-7 | 2005 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST719 | Capacity | TJ7000 | Cat | C-7 | 2005 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST720 | Capacity | TJ7000 | Cat | C-7 | 2005 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST742 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST743 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST744 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST745 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST746 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST747 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST748 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST749 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST750 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST751 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST752 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST753 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST754 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST755 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST756 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST757 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST758 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST759 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST760 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST761 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST762 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST763 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST764 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST765 | Capacity | TJ7000 | Cat | C-7 | 2006 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST826 | Capacity | TJ7000 | Cat | C-7 | 2007 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST827 | Capacity | TJ7000 | Cat | C-7 | 2007 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST828 | Capacity | TJ7000 | Cat | C-7 | 2007 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSS080 | Seattle | Yard Tractor | EMST829 | Capacity | TJ7000 | Cat | C-7 | 2007 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST830 | Capacity | TJ7000 | Cat | C-7 | 2007 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST899 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST900 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST901 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST902 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST903 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST904 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST905 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST906 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST907 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST908 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST909 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PSS080 | Seattle | Yard Tractor | EMST910 | Capacity | TJ7000 | Cat | C-7 | 2008 | 210 | 1,200 | Diesel | na | ULSD | n | na | **Yes** | n | na | 1 |
| PST050 | Tacoma | Forklift | 2247 | Nissan | PHO2A25V | Nissan | 4 CYL | 1988 | 120 | 4 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 2333 | Caterpillar | DP40KL | Mitsubishi | 6 CYL | 2003 | 120 | 163 | Diesel | 408 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 2334 | Caterpillar | DP40KL | Mitsubishi | 6 CYL | 2003 | 120 | 168 | Diesel | 420 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 2349 | Caterpillar | DP40KL | Mitsubishi | 6 CYL | 2005 | 120 | 187 | Diesel | 468 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 2350 | Caterpillar | DP40KL | Mitsubishi | 6 CYL | 2005 | 120 | 232 | Diesel | 580 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 7078 | Kalmar | DCE160-6 | Cummins | QSB5.9 | 2003 | 185 | 106 | Diesel | 270 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Forklift | 7085 | Taylor | T-200S | Cummins | QSB5.9 | 2006 | 185 | 121 | Diesel | 303 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Manlift | 1097 | Genie | S125 | Cummins | 4B3.9L | 2005 | 185 | 99 | Diesel | 248 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Reach Stacker | 6149 | Sisu | RSD45315T | Cummins | M11 | 1998 | 330 | 9 | Diesel | 23 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Reach Stacker | 6298 | Kalmar | DRS4531-S | Cummins | QSMII | 2006 | 335 | 111 | Diesel | 278 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Reach Stacker | 6299 | Kalmar | DRS4531-S | Cummins | QSMII | 2006 | 335 | 68 | Diesel | 170 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Reach Stacker | 6324 | Kalmar | DRS4531-S | Cummins | QSMII | 2006 | 335 | 262 | Diesel | 655 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Sweeper | 1056 | Elgin | Crosswind J | Cummins | ISB | 2000 | 205 | 162 | Diesel | 405 | ULSD | n | na | **YES** | n | na | 1 |
| PST050 | Tacoma | Top Handler | 6232 | Kalmar | Full Cont/F | Cummins | M11 | 2002 | 330 | 11 | Diesel | 28 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4580 | Ottawa | Commando | Cummins | 6BTA | 2000 | 174 | 92 | Diesel | 230 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4582 | Ottawa | Commando | Cummins | 6BTA | 2000 | 174 | 205 | Diesel | 513 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4585 | Ottawa | Commando | Cummins | 6BTA | 2000 | 174 | 122 | Diesel | 305 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4586 | Ottawa | Commando | Cummins | 6BTA | 2000 | 174 | 285 | Diesel | 713 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4687 | Ottawa | Commando | Cummins | 6BTA | 2001 | 174 | 358 | Diesel | 895 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4688 | Ottawa | Commando | Cummins | 6BTA | 2001 | 174 | 260 | Diesel | 650 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4689 | Ottawa | Commando | Cummins | 6BTA | 2001 | 174 | 342 | Diesel | 855 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4690 | Ottawa | Commando | Cummins | 6BTA | 2001 | 174 | 327 | Diesel | 818 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4751 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 700 | Diesel | 1,750 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4752 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 512 | Diesel | 1,280 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4753 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 625 | Diesel | 1,250 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4754 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 554 | Diesel | 1,385 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4755 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 688 | Diesel | 1,720 | ULSD | **YES** | 2011 | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4756 | Ottawa | Commando | Cummins | 6CT | 2003 | 215 | 527 | Diesel | 1,318 | ULSD | n | na | n | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4895 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 860 | Diesel | 2,150 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4896 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 0 | Diesel | 0 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4897 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 940 | Diesel | 2,350 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST050 | Tacoma | Yard Tractor | 4898 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 875 | Diesel | 2,188 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4899 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,175 | Diesel | 1,925 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4900 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 946 | Diesel | 2,365 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4901 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 913 | Diesel | 2,282 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4902 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,062 | Diesel | 2,655 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4903 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 893 | Diesel | 2,233 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4904 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 979 | Diesel | 2,715 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4905 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 345 | Diesel | 863 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4906 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,246 | Diesel | 3,115 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4921 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,002 | Diesel | 2,505 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4922 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 0 | Diesel | 0 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4923 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 905 | Diesel | 2,263 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4924 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,112 | Diesel | 2,780 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4925 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 670 | Diesel | 1,675 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4927 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 848 | Diesel | 2,120 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4928 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,217 | Diesel | 3,043 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4929 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 674 | Diesel | 1,685 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4930 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,029 | Diesel | 2,573 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST050 | Tacoma | Yard Tractor | 4931 | Ottawa | Commando | Cummins | ISB | 2005 | 245 | 1,005 | Diesel | 2,513 | ULSD | **YES** | 2011 | **YES** | n | na | 1 |
| PST110 | Tacoma | Forklift | R50 | Caterpillar |  |  |  | 1989 |  |  | Propane | na | Propane | n | na | n | n | na | 1 |
| PST110 | Tacoma | Loader | 938 | Komatsu | WA360 |  |  | 1987 |  |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST110 | Tacoma | Loader | 941 | Komatsu | WA360 |  |  | 1989 |  |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST110 | Tacoma | Loader | 945 | Komatsu | WA360 |  |  | 1986 |  |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST110 | Tacoma | Loader | 948 | Komatsu | WA360 |  |  | 1990 |  |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST110 | Tacoma | Truck | WT | Ford |  |  |  | 1972 | 150 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Backhoe | #603 | Case Backh | 580E | Cummins | 6 cyl | 1991 | 65 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #118 | Linkbelt | LS2800Q | Isuzu | 6 cyl | 2000 | 120 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #124 | Doosan Lo | 225S | Doosan | 6 cyl | 2007 | 150 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #125 | Linkbelt | 240LXTL | Isuzu | 6 cyl | 2007 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #130 | Doosan Lo | DX300LLC | Doosan | 6 cyl | 2011 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #131 | Linkbelt | 240LXTL | Isuzu | 6 cyl | 2011 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #511 | Wagner Sta | L90 | Cummins | 6 cyl |  | 440 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #512 | Wagner Sta | L90 | Cummins | 6 cyl |  | 440 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #514 | Cat Log Sta | 988-B | Caterpillar | 6 cyl |  | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #517 | Cat Log Sta | 988-B | Caterpillar | 6 cyl |  | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #518 | Wagner Sta | L80 | Cummins | 6 cyl |  | 415 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #520 | Wagner Sta | L80 | Cummins | 6 cyl |  | 415 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #522 | Cat Log Sta | 988-B | Caterpillar | 6 cyl | 1987 | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #608 | Cat Wheel I | 966-C | Caterpillar | 6 cyl |  | 170 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #610 | Komatsu W | WA380 | Cummins | 6 cyl |  | 192 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Loader | #611 | Cat Skid Ste | 216B CN | Caterpillar | 4 cyl | 2007 | 51 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST120 | Tacoma | Truck | #853 | Ford | L8000 | Cummins | 6 cyl | 1995 | 210 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8249 | 1976 CATE | T-30B | Cummins | CPH01A-1 | 1976 | 50 | 500 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8394 | 1983 CLAR | C500 Y90 | Cummins | C500-Y90 | 1983 | 100 | 360 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8498 | 1987 NISS | PH-50 |  |  | 1987 | 50 | 443 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST055 | Tacoma | Forklift | H8508 | 1987 NISS | 50-P | | | 1987 | 50 | 132 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8510 | 1988 CATE | V-150 | CAT | V-150 | 1988 | 100 | 170 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8511 | 1989 CATE | V-150 | CAT | V-150 | 1989 | 100 | 73 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8513 | 1988 CATE | V-80E | CAT | V-80E | 1988 | 100 | 500 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8515 | 1988 NISS | CUM01L-1 | Cummins | | 1988 | 55 | 333 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST055 | Tacoma | Forklift | H8516 | 1988 NISS | CUM01L-1 | Cummins | | 1988 | 55 | 1,199 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST055 | Tacoma | Forklift | H8518 | 1988 NISS | CUM01L-1 | Cummins | | 1988 | 55 | 285 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST055 | Tacoma | Forklift | H8520 | 1988 NISS | PH02A-25 | | | 1988 | 55 | 500 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8522 | 1988 NISS | PH02A-25V | | | 1988 | 55 | 602 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8539 | 1988 NISS | PH02A-25V | | | 1988 | 55 | 500 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8586 | 1990 NISS | PH02A-25V | | | 1990 | 55 | 524 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8590 | 1990 NISS | CPH01A-18V | | | 1990 | 55 | 832 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8591 | 1990 NISS | CPH01A-18V | | | 1990 | 55 | 863 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8593 | 1990 NISS | CPH01A-18V | | | 1990 | 55 | 981 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8829 | MITSUBIS | FG25N-LP | | | 2009 | 55 | 352 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8830 | MITSUBIS | FG25N-LP | | | 2009 | 55 | 391 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8831 | MITSUBISHI | | | | 2009 | 55 | 542 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST055 | Tacoma | Forklift | H8832 | MITSUBISHI | | | | 2009 | 55 | 121 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST055 | Tacoma | Top Handler | H9616 | TAYLOR | TOPPICK | Cummins | M-11 | 2007 | 330 | 1,271 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST055 | Tacoma | Top Handler | H9704 | Fantuzzi | CS 45KM | Cat | | 2000 | 330 | 407 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5213 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5214 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5215 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5216 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5217 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5218 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | 1,500 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5219 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5220 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5226 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5227 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5229 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST055 | Tacoma | Yard Tractor | H5230 | CAPACITY | TJ5000 | Cummins | ISB 5.9L | 2006 | 174 | | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST030 | Tacoma | Forklift | FL11 | Taylor | TY3005 | | | 1982 | | 41 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Forklift | FL27 | KALMAR | DCE120-12 | | | 2004 | | 2,100 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Forklift | FL28 | KALMAR | DCE120-12 | | | 2004 | | 1,996 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Forklift | FL29 | MITSUBIS | FO30N | | | 2006 | 57 | 463 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Forklift | FL30 | MITSUBIS | FO30N | | | 2006 | 57 | 436 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT1 | MITSUI PACECO | | | | 1988 | 300 | 44 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT2 | MITSUI PACECO | | | | 1988 | 300 | 11 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT3 | PACECO | | | | 1984 | 300 | 0 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT4 | PACECO | | | | 1989 | 300 | 0 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT5 | MITSUI PACECO | | | | 2005 | 300 | 78 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | RTG | TT6 | MITSUI PACECO | | | | 2005 | 300 | 78 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Top Handler | TP23 | TAYLOR | TEC950L | | | 1996 | 300 | 1,264 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Top Handler | TP24 | TAYLOR | TEC950L | | | 1997 | 300 | 1,017 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST030 | Tacoma | Top Handler | TP25 | TAYLOR | THDC955 | | | 2002 | 300 | 1,164 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Top Handler | TP26 | TAYLOR | THDC955 | | | 2002 | 300 | 1,586 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Top Handler | TP27 | KALMAR | DCD450 | | | 2004 | 300 | 1,717 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP28 | KALMAR | DCD450 | | | 2004 | 300 | 105 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP29 | TAYLOR | THDC955 | | | 2006 | 300 | 2,231 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP30 | KALMAR | DCF410CSG | | | 2006 | 300 | 2,243 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP31 | KALMAR | DCF410CSG | | | 2006 | 300 | 2,220 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP32 | KALMAR | DCD450CSG | | | 2004 | 300 | 1,500 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Top Handler | TP33 | KALMAR | DCF410CSG | | | 2005 | 300 | 1,500 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Yard Tractor | YT1 | CAPACITY | TJ7000 | | | 2004 | 174 | 385 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT10 | CAPACITY | TJ7000 | | | 2004 | 174 | 483 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT11 | CAPACITY | TJ7000 | | | 2004 | 174 | 535 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT12 | CAPACITY | TJ7000 | | | 2004 | 174 | 223 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT13 | CAPACITY | TJ7000 | | | 2004 | 174 | 227 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT14 | CAPACITY | TJ7000 | | | 2004 | 174 | 219 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT15 | CAPACITY | TJ7000 | | | 2004 | 174 | 589 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT16 | OTTAWA | MODEL 50 | | | 2004 | 174 | 793 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT17 | OTTAWA | MODEL 50 | | | 2004 | 174 | 569 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT18 | OTTAWA | MODEL 50 | | | 2004 | 174 | 449 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT19 | OTTAWA | MODEL 50 | | | 2004 | 174 | 839 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT2 | CAPACITY | TJ7000 | | | 2004 | 174 | 664 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT20 | OTTAWA | MODEL 50 | | | 2004 | 174 | 1,328 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT21 | OTTAWA | MODEL 50 | | | 2004 | 174 | 1,019 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT22 | OTTAWA | MODEL 50 | | | 2004 | 174 | 821 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT23 | OTTAWA | MODEL 50 | | | 2004 | 174 | 1,272 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT24 | OTTAWA | MODEL 50 | | | 2004 | 174 | 1,073 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT25 | OTTAWA | MODEL 50 | | | 2004 | 174 | 924 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT26 | OTTAWA | MODEL 50 | | | 2004 | 174 | 1,034 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT3 | CAPACITY | TJ7000 | | | 2004 | 174 | 555 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT39 | OTTAWA | MODEL 50 | | | 2004 | 173 | 1,226 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT4 | CAPACITY | TJ7000 | | | 2004 | 174 | 85 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT40 | OTTAWA | MODEL 50 | | | 2004 | 173 | 1,290 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT41 | OTTAWA | MODEL 50 | | | 2004 | 173 | 1,536 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT42 | OTTAWA | MODEL 50 | | | 2004 | 173 | 1,358 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT43 | OTTAWA | MODEL 50 | | | 2004 | 173 | 1,574 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT44 | OTTAWA | MODEL 50 | | | 2005 | 173 | 1,081 | Diesel | na | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST030 | Tacoma | Yard Tractor | YT45 | OTTAWA | MODEL 50 | | | 2005 | 173 | 1,479 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT46 | OTTAWA | MODEL 50 | | | 2005 | 173 | 773 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT47 | OTTAWA | MODEL 50 | | | 2005 | 173 | 1,274 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT48 | OTTAWA | MODEL 50 | | | 2005 | 173 | 948 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT49 | KALMAR | 4x2 | | | 2006 | 173 | 2,017 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT5 | CAPACITY | TJ7000 | | | 2004 | 174 | 353 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT50 | KALMAR | 4x2 | | | 2006 | 173 | 850 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT51 | KALMAR | 4x2 | | | 2006 | 173 | 1,545 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT52 | KALMAR | 4x2 | | | 2006 | 173 | 1,769 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST030 | Tacoma | Yard Tractor | YT53 | KALMAR | 4x2 | | | 2006 | 173 | 1,180 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT54 | KALMAR | 4x2 | | | 2006 | 173 | 1,034 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT55 | KALMAR | 4x2 | | | 2006 | 173 | 1,594 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT56 | KALMAR | 4x2 | | | 2006 | 173 | 1,457 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT57 | KALMAR | 4x2 | | | 2006 | 173 | 1,898 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT58 | KALMAR | 4x2 | | | 2006 | 173 | 1,080 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT6 | CAPACITY | TJ7000 | | | 2004 | 174 | 366 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT7 | CAPACITY | TJ7000 | | | 2004 | 174 | 198 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT8 | CAPACITY | TJ7000 | | | 2004 | 174 | 311 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST030 | Tacoma | Yard Tractor | YT9 | CAPACITY | TJ7000 | | | 2004 | 174 | 869 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST130 | Tacoma | Forklift | 16 | HYSTER | 210XL | PERKINS | 6165 | 1990 | 165 | 2,000 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST130 | Tacoma | Forklift | 17 | HYSTER | 50XL | NISSAN | 4CYL | 1997 | 80 | 200 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST130 | Tacoma | Forklift | 19 | HYSTER | 210XL | PERKINS | 6165 | 1998 | 165 | 2,000 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST130 | Tacoma | Reach Stacker | 45/40 LS | TEREX | 45/40LS | Cummins | M11 | 2001 | 325 | 2,000 | Diesel | 12000 | ULSD | n | na | n | **DPF** | na | 1 |
| PST130 | Tacoma | Reach Stacker | HR45/25 | TEREX | 45/25 | Cummins | M11 | 2001 | 325 | 2,000 | Diesel | 12000 | ULSD | n | na | n | **DPF** | na | 1 |
| PST070 | Tacoma | Forklift | 1014 | Hyster | H80XL | Cont | | 1992 | 70 | 176 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST070 | Tacoma | Forklift | 1056 | Hyster | H70C | Cont | | 1967 | 80 | 200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST070 | Tacoma | Forklift | 1061 | Hyster | H70C | Cont | | 1969 | 80 | 53 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST070 | Tacoma | Forklift | 2106 | Hyster | H360 | Perkins | | 1998 | 200 | 1,501 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST070 | Tacoma | Side Handler | 7011 | Hyster | H-400 | CUMMINS | | 2000 | 210 | 185 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Side Handler | 7012 | Hyster | H-400 | CUMMINS | | 2000 | 210 | 294 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Side Handler | 7013 | Hyster | H-400 | CUMMINS | | 2000 | 210 | 642 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Top Handler | 6120 | Taylor | TEC-950L | CUMMINS | | 1995 | 300 | 60 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Yard Tractor | 5293 | Sisu | TT-120 | CUMMINS | | 2001 | 174 | 272 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Yard Tractor | 5295 | Sisu | TT-120 | CUMMINS | | 2001 | 174 | 571 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST070 | Tacoma | Yard Tractor | 5296 | Sisu | TT-120 | CUMMINS | | 2001 | 174 | 857 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Forklift | 49832 | Mitsubishi | FG-25 | Mitsubishi | 4g-63 | 1989 | 45 | 24 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST100 | Tacoma | Manlift | 48731 | Snorkelift | A-42-50 | Wisconsin | W-4-1770 | 1987 | 30 | 25 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PST100 | Tacoma | Top Handler | 79305 | Taylor | | Cummins | L-10C | 1993 | 250 | 1,500 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Top Handler | 89306 | Taylor | | Cummins | NTA-855 | 1993 | 335 | 480 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Top Handler | 89408 | Taylor | | Cummins | L-10C | 1994 | 250 | 480 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10352 | Ottawa | | Cummins | 6BT5.9 | 2003 | 148 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10519 | Ottawa | | Cummins | QSB | 2005 | 155 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10522 | Ottawa | | Cummins | QSB | 2005 | 155 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10575 | Ottawa | | Cummins | QSB | 2005 | 155 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10893 | Ottawa | | Cummins | QSB6.7 | 2008 | 160 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 10895 | Ottawa | | Cummins | QSB6.7 | 2008 | 160 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 108113 | Ottawa | | Cummins | QSB6.7 | 2008 | 160 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST100 | Tacoma | Yard Tractor | 108129 | Ottawa | | Cummins | QSB6.7 | 2008 | 160 | 1,300 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST020 | Tacoma | Crane | CC-1 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Crane | CC-2 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Crane | CC-3 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Crane | CC-4 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Crane | CC-5 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Crane | CC-6 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST020 | Tacoma | Crane | CC-7 | ZPMC | 50-60LT | ELECTRIC | N/A | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST020 | Tacoma | Forklift | F-01 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 225 | Propane | 387 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | F-02 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 243 | Propane | 418 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | F-03 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 245 | Propane | 421 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | F-04 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 269 | Propane | 463 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | F-05 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 117 | Propane | 201 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | F-06 | MITSUBIS | 3EM7B | MITSUBIS | 3200 | 2005 | 155 | 89 | Propane | 153 | Propane | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | L-01 | FANTUZZ | 18 TON 7 | CUMMINS | 6BT | 2005 | 180 | 276 | Diesel | 726 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Forklift | L-02 | FANTUZZ | 18 TON 7 | CUMMINS | 6BT | 2005 | 180 | 83 | Diesel | 218 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-01 | FANTUZZ | FDC25K8 | CUMMINS | 6CT | 2005 | 210 | 620 | Diesel | 1,736 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-02 | FANTUZZ | FDC25K8 | CUMMINS | 6CT | 2005 | 210 | 496 | Diesel | 1,389 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-03 | FANTUZZ | FDC25K8 | CUMMINS | 6CT | 2005 | 210 | 395 | Diesel | 1,106 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-04 | FANTUZZ | FDC25K8 | CUMMINS | 6CT | 2005 | 210 | 607 | Diesel | 1,700 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-05 | FANTUZZ | FDC25K8 | CUMMINS | 6CT | 2005 | 210 | 478 | Diesel | 1,338 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-06 | FANTUZZ | FDC25K9 | CUMMINS | 6CT | 2006 | 210 | 983 | Diesel | 2,752 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Side Handler | S-07 | FANTUZZ | FDC25K10 | CUMMINS | 6CT | 2006 | 210 | 1,244 | Diesel | 3,483 | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST020 | Tacoma | Side Handler | S-08 | FANTUZZ | FDC25K11 | CUMMINS | 6CT | 2006 | 210 | 638 | Diesel | 1,786 | ULSD | n | na | n | **DPF** | 2011 | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-01 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,807 | Diesel | 5,276 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-02 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,820 | Diesel | 5,314 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-03 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,980 | Diesel | 5,782 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-04 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,197 | Diesel | 3,495 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-05 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,244 | Diesel | 6,552 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-06 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,000 | Diesel | 2,920 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-07 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,704 | Diesel | 4,976 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-08 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,295 | Diesel | 6,701 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-09 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,210 | Diesel | 3,533 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-10 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,142 | Diesel | 3,335 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-11 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,333 | Diesel | 6,812 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-12 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,019 | Diesel | 5,895 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-13 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 3,086 | Diesel | 9,011 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-14 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 3,666 | Diesel | 10,705 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-15 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 3,210 | Diesel | 9,373 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-16 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,866 | Diesel | 8,369 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-17 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,282 | Diesel | 3,743 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-18 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,822 | Diesel | 5,320 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-19 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 703 | Diesel | 2,053 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-20 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,592 | Diesel | 4,649 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-21 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 660 | Diesel | 1,927 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-22 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 962 | Diesel | 2,809 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-23 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,470 | Diesel | 4,292 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-24 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,519 | Diesel | 7,355 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-25 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,001 | Diesel | 5,843 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-26 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,877 | Diesel | 5,481 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-27 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,805 | Diesel | 5,271 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-28 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 3,084 | Diesel | 9,005 | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST020 | Tacoma | Straddle Carrier | SC-29 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 3,122 | Diesel | 9,116 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-30 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 669 | Diesel | 1,953 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-31 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 1,835 | Diesel | 5,358 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-32 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,434 | Diesel | 7,107 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-34 | NOELL | 534ESW | CATERPIL | C-12 | 2004 | 455 | 2,028 | Diesel | 5,922 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-35 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 1,629 | Diesel | 4,757 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-36 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 1,654 | Diesel | 4,830 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-37 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,667 | Diesel | 7,788 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-38 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,262 | Diesel | 6,605 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-39 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 1,350 | Diesel | 3,942 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-40 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,440 | Diesel | 7,125 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-41 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,044 | Diesel | 5,968 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-42 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,195 | Diesel | 6,409 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-43 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,039 | Diesel | 5,954 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-44 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,237 | Diesel | 6,532 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-45 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,423 | Diesel | 7,075 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-46 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 1,719 | Diesel | 5,019 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-47 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,297 | Diesel | 6,707 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-48 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,379 | Diesel | 6,947 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-49 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 2,104 | Diesel | 6,144 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-50 | NOELL | 534ESW | CATERPIL | C-12 | 2005 | 455 | 1,947 | Diesel | 5,685 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Straddle Carrier | SC-51 | NOELL | 534ESW | CATERPIL | C-13 | 2005 | 455 | 2,256 | Diesel | 6,588 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Yard Tractor | H-01 | CAPACITY | Y-50R | CUMMINS | 6BT | 2005 | 180 | 200 | Diesel | 262 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Yard Tractor | H-02 | CAPACITY | Y-50R | CUMMINS | 6BT | 2005 | 180 | 929 | Diesel | 1,215 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Yard Tractor | H-03 | CAPACITY | Y-50R | CUMMINS | 6BT | 2005 | 180 | 790 | Diesel | 1,033 | ULSD | n | na | n | n | na | 1 |
| PST020 | Tacoma | Yard Tractor | H-04 | CAPACITY | Y-50R | CUMMINS | 6BT | 2006 | 180 | 489 | Diesel | 640 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Backhoe | 4535 | Case | 580E |  | 12",18",24" | 1985 | 350 | 65 | Diesel | 69 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Backhoe | 5491 | JohnDeere | 310SE LOADER |  | 17940 LBS | 1998 | 350 | 271 | Diesel | 455 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 4263 | Saylor B | 703-COMPRESSOR |  |  | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Compressor | 4464 | ING Rand | P185WJD |  | 185CF | 1982 | 10 | 17 | Diesel | 16 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 4528 | ING Rand | P185WJD |  | 185CF | 1984 | 10 | 61 | Diesel | 85 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 4542 | ING Rand | P100AWD |  |  | 1985 | 10 | 4 | Diesel | 5 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 5407 | Speedair | 324206 |  | 165 PSI | 1992 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Compressor | 5461 | ING Rand | T-30 |  |  | 1996 | 10 |  | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 5488 | Speedair | 5F219B |  |  | 1998 | 10 |  | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 5511 | Speedair | 57219C |  | 8 HP/8 GA | 1999 | 10 |  | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 5543 | ING Rand | 2475F11GHED |  |  | 2001 | 10 |  | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 10097 | Thomas | T2820ST |  |  | 2003 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Compressor | 10339 | ING Rand | P185WIR |  |  | 2004 | 10 |  | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 10340 | ING Rand | P185WIR |  |  | 2004 | 10 |  | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Compressor | 10574 | EMGLO | R5B120 |  |  | 1977 | 10 |  | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Crane | 2077 | Sumitomo | RN26 |  | 55 TN | 1986 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2078 | IHI | 6021-989 |  | 50 TN | 1979 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2241 | Washington | 28KN |  | 40 TN | 1941 | 0 | 14 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2301 | Kone |  |  | 66 TN | 1989 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST010 | Tacoma | Crane | 2302 | Kone | | | 66 TN | 1989 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2403 | Sumitomo | RN26 | | 55 TN | 1986 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2405 | Z.P.M.C. | Quayside CC | | 60 LT | 1996 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2406 | Z.P.M.C. | | | 50 LT sprea | 2001 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2512 | Klyde | 3337 | | 27.5 TN | 1974 | 0 | 195 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4349 | DEMAG | | | 20 Ton Stra | 1976 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4425 | American | | | 15 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4426 | American | | | 15 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4431 | Edder | | | 7.5 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4432 | Edder | | | 7.5 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4433 | American | | | 7.5 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4435 | Niles | | | 10 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4436 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4438 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4440 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4441 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4442 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4443 | Robbins | | | 7.5 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4444 | Robbins | 1-ER-46 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4445 | Budget | 309828-52 | | 1 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4446 | American | | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 4447 | Monck | 221-5426 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5367 | DEMAG | EZD520H20KN2 | | 7.5 TN | 1990 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5415 | Abelhowe | J-904-140-12FS | | 2 TN | 1993 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5434 | Yale Hoi | TRTB-20-79D | | 10 TN | 1995 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5435 | Yale Hoi | TRTB-20-79D | | 5 TN | 1995 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5443 | Kone | XL400 | | 7.5 TN | 1995 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5504 | American | 4K CHAIN FALL | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5505 | Coffing | EC4 | | 2 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5506 | Coffing | CHAIN FALL | | 3 TN | 1974 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5513 | F.T. Crow | | | 5 TN | 1995 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5531 | Davit Cran | 5124M2 | | 2000 lbs | 2000 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 5537 | Venturo | CT2004FB | | 800 LB | 2000 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Crane | 2404T | Sumitomo | RN26 | | 55 TN | 1986 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Forklift | 1105 | Hyster | S50C | | 5,000 cap | 1971 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1107 | Taylor | Y62WO | | 62,000 cap | 2011 | 174 | 37 | Diesel | 108 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1108 | Taylor | Y45WO | | 45,000 cap | 2011 | 174 | 27 | Diesel | 95 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1117 | Taylor | Y30WO | | 30,000 cap | 2011 | 174 | 10 | Diesel | 5 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1118 | Taylor | Y52WO/471 eng | | 52,000 cap | 2011 | 174 | 72 | Diesel | 107 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1119 | Taylor | Y52WO | | 52,000 cap | 2011 | 174 | 106 | Diesel | 73 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1168 | Hyster | H60HP | | 6,000 cap | 1977 | 60 | 33 | Propane | 40 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1174 | Hyster | H60HP | | 6,000 cap | 1977 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1175 | Hyster | H60HP | | 6,000 cap | 1977 | 60 | 36 | Propane | 18 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1176 | Hyster | H60HP | | 6,000 cap | 1977 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1178 | Hyster | H60HP | | 6,000 cap | 1977 | 60 | 49 | Propane | 49 | Propane | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST010 | Tacoma | Forklift | 1180 | Hyster | H60HP |  | 6,000 cap | 1977 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1183 | Hyster | H150 |  | 15,000 cap | 1977 | 200 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1190 | Hyster | H60HP |  | 6,000 cap | 1977 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1193 | Taylor | Y52WOM |  | 52,000 cap | 1978 | 200 | 59 | Diesel | 54 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1194 | CAT | V140 |  | 14,000 cap | 1979 | 200 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1195 | CAT | V140 |  | 14,000 cap | 1979 | 200 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1204 | CAT | V80D |  | 8,000 cap | 1979 | 200 | 34 | Diesel | 30 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1206 | CAT | V80D |  | 8,000 cap | 1979 | 200 | 130 | Diesel | 17 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1207 | CAT | V80D |  | 8,000 cap | 1979 | 200 | 48 | Diesel | 11 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1212 | Taylor | TY620L |  | 62,000 cap | 1979 | 200 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1215 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1216 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1217 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1221 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1224 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1226 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 0 | Propane | 0 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1227 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 24 | Propane | 49 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1230 | CAT | V60B/cont eng |  | 6,000 cap | 1980 | 60 | 19 | Propane | 17 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1231 | CAT | V60B |  | 6,000 cap | 1980 | 60 | 15 | Propane | 10 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1233 | CAT | V150 |  | 15,000 cap | 1981 | 200 | 1 | Diesel | 36 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1234 | CAT | V150 |  | 15,000 cap | 1981 | 200 | 19 | Diesel | 15 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1235 | CAT | V150 |  | 15,000 cap | 1981 | 200 | 18 | Diesel | 5 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1236 | CAT | V150 |  | 15,000 cap | 1981 | 200 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1240 | Valmet | 4212 |  | 92,000 cap | 2011 | 375 | 181 | Diesel | 332 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1241 | TCM | FD70Z7 |  | 15,000 cap | 1998 | 200 | 25 | Diesel | 21 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1242 | Hyster | X80XLBCS |  | 8,000 cap | 1989 | 80 | 19 | Propane | 60 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1243 | Hyster | X80XLBCS |  | 8,000 cap | 1989 | 80 | 30 | Propane | 53 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1244 | Hyster | X80XLBCS/boxcar |  | 8,000 cap | 1989 | 80 | 76 | Propane | 141 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1245 | Hyster | X80XLBCS |  | 8,000 cap | 1989 | 80 | 91 | Propane | 225 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1246 | Hyster | X80XLBCS |  | 8,000 cap | 1989 | 80 | 83 | Propane | 135 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1247 | Hyster | X80XLBCS |  | 8,000 cap | 1989 | 80 | 109 | Propane | 204 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1248 | Hyster | H190XL |  | 19,000 cap | 1989 | 200 | 87 | Diesel | 85 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1249 | Hyster | H190XL |  | 19,000 cap | 1989 | 200 | 32 | Diesel | 39 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1250 | Hyster | H190XL |  | 19,000 cap | 1989 | 200 | 75 | Diesel | 84 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1251 | Hyster | H190XL |  | 19,000 cap | 1989 | 200 | 83 | Diesel | 94 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1252 | Hyster | H190XL |  | 19,000 cap | 1989 | 200 | 288 | Diesel | 456 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 1255 | CAT | V925 |  | 95,000 cap | 2001 | 200 | 101 | Diesel | 196 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 10055 | CAT | V925 |  | 95,000 cap | 2001 | 200 | 79 | Diesel | 154 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Forklift | 10196 | Wiggins | W360YXL |  | 30,000 cap | 2004 | 200 | 497 | Diesel | 1512 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 4101 | Taylor | 0275DSPS |  | 250KW | 1996 |  | 0 | Diesel | 0 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 4501 | ONAN | 600DYA15R14J |  | 60 KW | 1982 | 50 | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 4506 | Sears | 580.32826 |  | 7.5 KW | 1982 | 50 | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 5486 | Honda | EM3500SXKI |  | 3546972 | 1998 | 50 | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 5549 | Honda | EM3000C |  |  | 2001 | 50 | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 5552 | Honda | 3000 |  |  | 2002 | 50 | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST010 | Tacoma | Generator | 10261 | Olympian | 97A067A06459-S | | | 1997 | | 0 | Diesel | 0 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 10460 | ONAN | 150DGFA-148 | | 150 KW | 1999 | 100 | 401 | Gasoline | 1133 | Gasoline | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 10843 | Honda | EU6500 | | | 2007 | | 1,264 | Gasoline | 165 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 10891 | Honda | EU300cka | | | 2008 | | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Generator | 11324 | Luminite | C-00221 | | | 2011 | | 0 | Gasoline | 0 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 4583 | Simon | MP60 | | 500 LB | 1984 | 60 | 52 | Gasoline | 79 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 5418 | Genie | Z601342WD | | 500 LB | 1993 | 60 | 226 | Gasoline | 284 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 5530 | GMC | 7C7H042ECH50 | | 600 LB | 2000 | 60 | 218 | Propane | 420 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 10341 | Genie | GS2632 | | 500/250 L | 2005 | 0 | 0 | Electric | 0 | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Manlift | 10620 | JLG | 3394RT | | 500LB | 2006 | | 54 | Diesel | 30 | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 11308 | JLG | 135OSJ | | 500LB | 2011 | | 146 | Diesel | 223 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Manlift | 11335 | Genie | S60 | | 500LB | 2004 | | 52 | Gasoline | 30 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Straddle Carrier | 1541 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 147 | Diesel | 649 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1542 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 213 | Diesel | 931 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1543 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 275 | Diesel | 1206 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1544 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 267 | Diesel | 1257 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1545 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 332 | Diesel | 1546 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1546 | Valmet | 401093678T | | 88,200 lbs | 1991 | 185 | 276 | Diesel | 1282 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1547 | Valmet | 401093678T | | 88,200 lbs | 1992 | 185 | 372 | Diesel | 1841 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1548 | Valmet | 401093678T | | 88,200 lbs | 1992 | 185 | 522 | Diesel | 2634 | ULSD | **YES** | na | n | n | na | **2** |
| PST010 | Tacoma | Straddle Carrier | 1553 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 2,102 | Diesel | 12505 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1554 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 2,239 | Diesel | 14881 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1555 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 2,330 | Diesel | 17224 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1556 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 0 | Diesel | 0 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1557 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 1,192 | Diesel | 7703 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1558 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 1,604 | Diesel | 10177 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1559 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 1,567 | Diesel | 9968 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1560 | Kalmar | CSC340 | | 40 LT | 2002 | 185 | 1,513 | Diesel | 10133 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1561 | Kalmar | CSC340 | | 40 LT | 2004 | 185 | 1,777 | Diesel | 14691 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1562 | Kalmar | CSC340 | | 40 LT | 2004 | 185 | 1,838 | Diesel | 17059 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1563 | Kalmar | CSC340 | | 40 LT | 2004 | 185 | 2,023 | Diesel | 13725 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1564 | Kalmar | CSC340 | | 40 LT | 2004 | 185 | 1,715 | Diesel | 12694 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1565 | Kalmar | CSC340 | | 40 LT | 2004 | 185 | 1,749 | Diesel | 12002 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1566 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,523 | Diesel | 14857 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1567 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,528 | Diesel | 14651 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1568 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,622 | Diesel | 14834 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1569 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,347 | Diesel | 13680 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1570 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,516 | Diesel | 14324 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1571 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,472 | Diesel | 14625 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Straddle Carrier | 1572 | Kalmar | CSC340 | | 40 LT | 2008 | 185 | 1,505 | Diesel | 15262 | ULSD | n | na | n | **DPF** | 2010 | **2** |
| PST010 | Tacoma | Sweeper | 4599 | PWRBOSS | SW90HD | | | 1989 | 50 | 8 | Propane | 10 | Propane | n | na | n | n | na | 1 |
| PST010 | Tacoma | Sweeper | 5428 | Elgin | SERIES P (PELICAN) | | 3 Cubic Yar | 1994 | 175 | 82 | Diesel | 173 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Sweeper | 10259 | TENNAN | Power Sweeper/Rider | | 20,000 lb | 2004 | 50 | 219 | Diesel | 630 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 3284 | | Water Tank Truck | | | 1984 | | 47 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 3293 | | Dump Truck | | | 1985 | | 8 | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST010 | Tacoma | Truck | 3373 | | Fuel Truck | | | 1996 | | 13 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 3408 | | Fuel Truck | | | 1999 | | 47 | Gasoline | na | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 3420 | | | | | 2001 | 0 | 0 | Electric | na | Electric | n | na | n | n | na | 0 |
| PST010 | Tacoma | Truck | 10040 | Ford | F550 V/10 ENG | | 19500 GVW | 2003 | 130 | 1,665 | Gasoline | 9480 | Gasoline | n | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 10644 | | Dump Truck | | | 1996 | | 203 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 10696 | | Fuel Truck | | | 2000 | | 4 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 10864 | | Rollback | | | 1999 | | 70 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Truck | 10893 | | Vactor | | | 1994 | | 53 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Yard Tractor | 3303 | Ottowa | YTD50TANDEM AX | | 30000 | 1987 | 110 | 16 | Diesel | 22 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Yard Tractor | 3348 | Capacity | TJ5500 | | | 1991 | 110 | 43 | Diesel | 43 | ULSD | **YES** | na | n | n | na | 1 |
| PST010 | Tacoma | Yard Tractor | 10066 | Ottowa | COMMANDO59 4629 | | 170,000 pul | 2003 | 110 | 65 | Gasoline | 131 | Gasoline | **YES** | na | n | n | na | 1 |
| PST080 | Tacoma | Forklift | 1F | | | | | 2002 | | 660 | Propane | na | Propane | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 139 | Ottawa | Commando | CAT | 3208 | 1998 | 210 | 600 | Diesel | 1080 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 140 | Ottawa | Commando | CAT | 3208 | 1998 | 210 | 300 | Diesel | 588 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 149 | Ottawa | Commando | CAT | 3208 | 1994 | 210 | 400 | Diesel | 920 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 150 | Ottawa | Commando | CAT | 3208 | 1994 | 210 | 400 | Diesel | 872 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 153 | Ottawa | Commando | CAT | 3208 | 1995 | 210 | 420 | Diesel | 938 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 156 | Ottawa | Commando | CAT | 3208 | 1996 | 210 | 316 | Diesel | 760 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 157 | Ottawa | Commando | CAT | 3208 | 1996 | 210 | 336 | Diesel | 676 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 158 | Ottawa | Commando | CAT | 3208 | 1996 | 210 | 336 | Diesel | 564 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 169 | Ottawa | Commando | CAT | 3208 | 1997 | 210 | 444 | Diesel | 1052 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 170 | Ottawa | Commando | CAT | 3208 | 1998 | 210 | 372 | Diesel | 984 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 171 | Ottawa | Commando | CAT | 3208 | 1998 | 210 | 324 | Diesel | 848 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 172 | Ottawa | Commando | CAT | 3208 | 1999 | 210 | 444 | Diesel | 1158 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 173 | Ottawa | Commando | CAT | 3208 | 1999 | 210 | 396 | Diesel | 914 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 174 | Ottawa | Commando | CAT | 3208 | 1999 | 210 | 160 | Diesel | 982 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 175 | Ottawa | Commando | CAT | 3208 | 1999 | 210 | | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 178 | Ottawa | Commando | CAT | 3208 | 2000 | 210 | 660 | Diesel | 1186 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 179 | Ottawa | Commando | CAT | 3208 | 1998 | 210 | 576 | Diesel | 986 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 301 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 168 | Diesel | 642 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 305 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 372 | Diesel | 1040 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 306 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 328 | Diesel | 1190 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 307 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 388 | Diesel | 920 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 309 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 476 | Diesel | 980 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 311 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 480 | Diesel | 924 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 312 | Ottawa | Commando | CUM | C8.3 | 1999 | 210 | 408 | Diesel | 964 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 315 | Ottawa | Commando | CUM | C8.3 | 1998 | 210 | 472 | Diesel | 916 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 318 | Ottawa | Commando | CUM | C8.3 | 1999 | 210 | 376 | Diesel | 1236 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 319 | Ottawa | Commando | CUM | C8.3 | 1999 | 210 | 640 | Diesel | 908 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 322 | Ottawa | Commando | CUM | C8.3 | 2000 | 210 | 444 | Diesel | 1044 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 324 | Ottawa | Commando | CUM | C8.3 | 2000 | 210 | 496 | Diesel | 1216 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 325 | Ottawa | Commando | CUM | QSB6.7 | 2008 | 210 | 1,032 | Diesel | 1748 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 326 | Ottawa | Commando | CUM | QSB6.7 | 2008 | 220 | 717 | Diesel | 2012 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 328 | Ottawa | Commando | CUM | QSB6.7 | 2009 | 220 | 453 | Diesel | 2044 | ULSD | n | na | n | n | na | 1 |
| PST040 | Tacoma | Yard Tractor | 329 | Ottawa | Commando | CUM | QSB6.7 | 2009 | 220 | 785 | Diesel | 1940 | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

| Terminal ID | Port | Equip Type | Equip ID | Equip Manufacturer | Equip Model | Engine Make | Engine Model | Engine Year | HP | Annual Hours | Fuel Type | Total Fuel Consumed (gallons) | Alt. Fuel Used (Emulsified Fuel, ULSD) | DOC Installed (y or n) | Year DOC Installed | On-road Engine (y or n) | Other Emission Control | Date Implemented (Mo/Yr) | Number of Engines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST060 | Tacoma | Forklift | 721 | Mitsubishi | F15C-5006 | Mitsubishi | N/A | 1999 | 130 | 54 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Forklift | 722 | Hyster | D019D017 | Perkins | N/A | 1964 | 130 | 30 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Reach Stacker | 201 | Kalmar | DRD450-8 | Volvo | TWD1231 | 1998 | 375 | 946 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Reach Stacker | 202 | Kalmar | DRD450-8 | Volvo | TWD1231 | 1998 | 375 | 615 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Reach Stacker | 203 | Kalmar | DRD450-8 | Volvo | TWD1231 | 1998 | 375 | 679 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Reach Stacker | 204 | Sisu | RSD4540-5 | Cummins | M11 | 1999 | 330 | 1,149 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Reach Stacker | 205 | Kalmar | DRS4531-S | Cummins | M11 | 1999 | 330 | 1,321 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Reach Stacker | 206 | Kalmar | DRD450-8 | Cummins | M11 | 2001 | 375 | 815 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Side Handler | 301 | Kalmar | DCD80-40 | Volvo | TWD731M | 1998 | 228 | 171 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Top Handler | 207 | Hyster | 1150HD-C | Cummins | QSM11 | 2005 | 365 | 1,502 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Top Handler | 208 | Hyster | 1150HD-C | Cummins | QSM11 | 2010 | 365 | 474 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Top Handler | 209 | Hyster | 1150HD-C | Cummins | QSM11 | 2007 | 365 | 1,787 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 501 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 452 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 502 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 680 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 503 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 457 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 504 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 739 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 505 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 777 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 506 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 723 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 507 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 770 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 508 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 630 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 509 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 497 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 510 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,049 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 511 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 754 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 512 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,139 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 513 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 925 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 514 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 2,550 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 516 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 466 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 517 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 389 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 518 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,961 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 519 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 996 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 520 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 979 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 521 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 976 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 522 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 646 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 523 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 705 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 524 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 991 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 525 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 569 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 526 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 946 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 527 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,311 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 528 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,138 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 529 | Ottawa | Commando | Cummins | 6BT5.9 | 1998 | 174 | 1,404 | Diesel | na | ULSD | **YES** | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 531 | Ottawa | Commando | Cummins | QSB5.9 | 2005 | 175 | 1,303 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 532 | Ottawa | Commando | Cummins | QSB5.9 | 2005 | 175 | 1,446 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 533 | Ottawa | Commando | Cummins | QSB5.9 | 2005 | 175 | 1,339 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 534 | Ottawa | Commando | Cummins | QSB5.9 | 2005 | 175 | 1,029 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 535 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 1,876 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PST060 | Tacoma | Yard Tractor | 536 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 1,682 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 537 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 1,172 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 538 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 1,727 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 539 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 1,220 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 540 | Ottawa | Commando | Cummins | QSB5.9 | 2006 | 175 | 2,259 | Diesel | na | ULSD | n | na | n | **DPF** | na | 1 |
| PST060 | Tacoma | Yard Tractor | 541 | Ottawa | Commando | Cummins | ISB02 | 2006 | 200 | 520 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 542 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 1,288 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 543 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 2,049 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 544 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 1,712 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 545 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 1,188 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 546 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 1,729 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 547 | Ottawa | 4X2 Off Rc | Cummins | ISB07 | 2008 | 200 | 1,542 | Diesel | na | ULSD | n | na | **YES** | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 548 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1998 | 215 | 149 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 549 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1998 | 215 | 392 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 550 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1998 | 215 | 229 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 551 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1998 | 215 | 263 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 552 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1999 | 215 | 292 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 553 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1999 | 215 | 350 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 554 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1999 | 215 | 360 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PST060 | Tacoma | Yard Tractor | 555 | Ottawa | YT 50 | Cummins | 6CT8.3 | 1999 | 215 | 427 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Loader |  | Titan-Taylo | 994 |  |  | 1997 | 355 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Loader |  | Titan-Taylo | 994 |  |  | 1997 | 355 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Loader |  | Titan-Taylo | 994 |  |  | 2003 | 355 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Loader |  | Titan-Taylo | 994 |  |  | 2005 | 355 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Side Handler |  | Taylor | 950 |  |  | 1993 | 250 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Side Handler |  | Taylor | 950 |  |  | 1991 | 250 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Side Handler |  | Taylor | 950 |  |  | 1993 | 250 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Side Handler |  | Taylor | 950 |  |  | 1993 | 250 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Side Handler |  | Taylor | 950 |  |  | 2000 | 250 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Yard Tractor |  | Ottawa |  |  |  | 2008 | 155 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Yard Tractor |  | Ottawa |  |  |  | 2008 | 155 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Yard Tractor |  | Ottawa |  |  |  | 2008 | 155 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| SIG Yard | BNSF | Yard Tractor |  | Ottawa |  |  |  | 2004 | 155 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Loader | #118 | Linkbelt | LS2800Q | Isuzu | 6 cyl | 2000 | 120 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Loader | #124 | Doosan Lo | 225S | Doosan | 6 cyl | 2007 | 150 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Loader | #125 | Linkbelt | 240LXTL | Isuzu | 6 cyl | 2007 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Loader | #130 | Doosan Lo | DX300LLC | Doosan | 6 cyl | 2011 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Loader | #131 | Linkbelt | 240LXTL | Isuzu | 6 cyl | 2011 | 197 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #511 | Wagner Sta | L90 | Cummins | 6 cyl |  | 440 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #512 | Wagner Sta | L90 | Cummins | 6 cyl |  | 440 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #514 | Cat Log Sta | 988-B | Caterpillar | 6 cyl |  | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #517 | Cat Log Sta | 988-B | Caterpillar | 6 cyl |  | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #518 | Wagner Sta | L80 | Cummins | 6 cyl |  | 415 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #520 | Wagner Sta | L80 | Cummins | 6 cyl |  | 415 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Log Stacker | #522 | Cat Log Sta | 988-B | Caterpillar | 6 cyl | 1987 | 375 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |

# Puget Sound Emissions Inventory

## Cargo-handling Equipment Data

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PSO020 | Olympia | Backhoe | #603 | Case Backh | 580E | Cummins | 6 cyl | 1991 | 65 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Skid Steer Loader | #608 | Cat Wheel I | 966-C | Caterpillar | 6 cyl |  | 170 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Skid Steer Loader | #610 | Komatsu W | WA380 | Cummins | 6 cyl |  | 192 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Skid Steer Loader | #611 | Cat Skid Ste | 216B CN | Caterpillar | 4 cyl | 2007 | 51 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO020 | Olympia | Skid Steer Loader | #853 | Ford | L8000 | Cummins | 6 cyl | 1995 | 210 |  | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 15 | Letourneau | SL3592 | Cummins | 6 cyl | 2000 | 475 | 500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 16 | Letourneau | SL3592 | Cummins | 6 cyl | 2000 | 475 | 1000 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 21 | Letourneau | 4592 | Caterpillar | 6 cyl | 1994 | 425 | 500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 22 | Letourneau | 4592 | Caterpillar | 6 cyl | 1995 | 425 | 1800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 23 | Letourneau | 4592 | Caterpillar | 6 cyl | 1996 | 425 | 1500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 24 | Letourneau | SL3592 | Detriot | 6 cyl | 2007 | 425 | 1800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 25 | Letourneau | SL3592 | Detriot | 6 cyl | 2000 | 425 | 1500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 19 | Caterpillar | 988H | Caterpillar | 6 cyl | 2007 | 500 | 1200 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Stacker | 20 | Caterpillar | 988H | Caterpillar | 6 cyl | 2011 | 500 | 2000 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 53 | Komatsu | PC300-6 | Cummins | 6 cyl | 2000 | 200 | 500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 54 | Komatsu | PC300-6 | Cummins | 6 cyl | 2001 | 200 | 800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 55 | Komatsu | PC300-6 | Cummins | 6 cyl | 2001 | 200 | 1500 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 132 | Komatsu | PC300-6 | Cummins | 6 cyl | 2000 | 200 | 1800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 134 | Komatsu | PC300-6 | Cummins | 6 cyl | 2001 | 200 | 1800 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Log Handler | 919 | Komatsu | PC300-6 | Cummins | 6 cyl | 2001 | 200 | 100 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Skid Steer Loader | 13 | Volvo | 120 | Volvo | 4 cyl | 1998 | 200 | 300 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Skid Steer Loader |  | Bobcat |  | Kubota | 4 cyl | 1994 | 100 | 75 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Forklift |  | Hyster |  | GM | 4 cyl |  | 120 | 250 | Propane | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Crane |  | Drott |  | Perkins | 4 cyl |  | 100 | 20 | Diesel | na | ULSD | n | na | n | n | na | 1 |
| PSO030 | Olympia | Truck |  | Kenworth |  | Cummins | 6 cyl | 1995 | 460 | 50 | Diesel | na | ULSD | n | na | YES | n | na | 1 |
| PSO030 | Olympia | Truck |  | Kenworth |  | Cummins | 6 cyl | 1991 | 400 | 250 | Diesel | na | ULSD | n | na | YES | n | na | 1 |

# APPENDIX B - SUPPORTING DATA

## HEAVY-DUTY VEHICLE DATA

**MEMORANDUM** April 20, 2012

**To:** Ron Stuart, Port of Tacoma

**From:** Kelly McGourty
Program Manager

**Subject:** 2011 Puget Sound Emissions Inventory Update – On-Road Heavy-Duty Diesel Vehicle Emissions

This memo transmits the methodology and estimated on-road emissions from port-related heavy duty diesel vehicle traffic in the Puget Sound region for calendar year 2011. This documentation is provided as part of the 2011 Puget Sound Emissions Inventory Update.

## BACKGROUND AND METHODOLOGY

PSRC participated with the "HDV LDV Technical Work Group" for the 2011 Puget Sound Emissions Inventory Update since November 2011. Related to on-road emissions, the group discussed the appropriate models to be used, the methodology for estimating port-related vehicle miles traveled (VMT), and the pollutants to be analyzed.

The methodology is similar to that used for the 2005 emissions inventory, with two exceptions: 1) the estimation of port-related VMT and 2) the potential use of the Environmental Protection Agency's new Motor Vehicle Emission Simulator (MOVES).

### Vehicle Miles Traveled (VMT)

In 2005, PSRC utilized our current travel demand model at that time to estimate on-road heavy duty diesel VMT related to port traffic. This methodology is described in the August 25, 2006 memo, "Estimating Regional Heavy Truck VMT for 2000 associated with Port traffic." A growth factor was used to forecast calendar year 2000 VMT to 2005 for the emissions inventory. Also, since certain port-related trips were considered to be underrepresented in the model, an additional adjustment was applied as described in the above referenced memo.

Since that time, PSRC has made improvements to our travel demand model, with specific improvements made based on information provided by the Ports on special generators. As such, for the 2011 update there was no need to make any additional adjustments to the model output. Since 2010 is an existing model analysis year, and since it was determined that there would be little to no differences in port-related VMT between 2010 and 2011, the decision was made to use the 2010 analysis year as a surrogate for the 2011 emissions inventory data. This decision was discussed with the Technical Workgroup.

### Emissions Models

Per discussions with the Technical Workgroup, PSRC and the Washington State Department of Ecology were to prepare emission factors using both the existing EPA software, MOBILE6.2, as well as the new MOVES model. The MOVES model is significantly different from MOBILE6.2, designed around a database and graphical user interface, and containing the most up to date estimation of vehicle emissions. The comparison of emissions between the two models varies depending on the pollutant, with MOVES estimating higher emissions for some pollutants but lower for others compared to MOBILE6.2. However, based on preliminary research, the trend between years by pollutant are similar between the two models. Given the complexity of MOVES, EPA has granted an additional one year extension before the new model must be used for transportation conformity analyses.

Both Ecology and PSRC are continuing to transition to MOVES, which is a very complicated and time consuming process. As such, we are not yet prepared to perform emissions estimations using MOVES at this time. For the 2011 emissions inventory, MOBILE6.2 was used to estimate on-road emissions from port-related traffic. In addition, emission factors were prepared and forwarded to Starcrest Consulting Group for their use in estimating on-port emissions. We are committed, however, to continue to work towards the use of MOVES. By the time of the next update to the emissions inventory, we expect to be fully transitioned to the MOVES model. In addition, we will continue to work towards accelerating this schedule to the extent possible; if we are able to do so in the next several months, we will provide estimated emissions for the 2011 emissions inventory using MOVES, to be included as an appendix to the main report.

### Modeling Parameters

Starcrest Consulting Group provided updated vehicle distribution data for the Ports of Seattle, Tacoma and Olympia, representing Class 8 heavy duty diesel vehicles. In consultation with Ecology, the variation between the data representing just the Ports of Seattle and Tacoma (within the Puget Sound region) and the data for all three ports was considered to be minimal and would not produce any significant differences in emissions output. Also, the majority of the truck trips were to and from the Seattle and Tacoma ports. Therefore, the all ports distribution was used for this analysis.

Using MOBILE6.2, the following pollutants were analyzed for Class 8 heavy duty vehicles:

- carbon monoxide (CO)
- nitrogen oxides (NOx)
- volatile organic compounds (VOC)
- carbon dioxide ($CO_2$)
- sulfur dioxide ($SO_2$)
- fine particulates ($PM_{2.5}$) and coarse particulates ($_{PM10}$)
  - brake wear particulate (Brake)
  - tire wear particulate (Tire)
  - diesel particulate matter
    - elemental carbon portion of diesel exhaust particulate (ECARBON)
    - organic carbon portion of diesel exhaust particulate (OCARBON)
    - sulfate portion of exhaust particulate (SO4)

Emission factors for CO, NOx and VOCs were created for speeds between 2.5 and 65 miles per hour. MOBILE6.2 produces emission factors for $CO_2$, $SO_2$ and particulate matter that are the same regardless of speed. These emission factors were then applied to the output from PSRC's travel demand model for on-road port-related traffic. The results of the analysis are provided in the tables below.

### TABLE 1: ESTIMATED 2011 DAILY ON-ROAD PORT-RELATED TRUCK VMT

**DAILY VMT**

| Location | Everett | Seattle | Tacoma |
|---|---|---|---|
| Distribution Centers | 1,577.18 | 16,198.1 | 8,520.2 |
| I-5 South | 7,317.41 | 7,823.6 | 7,570.3 |
| I-90 | 3,617.75 | 4,875.8 | 8,543.4 |
| I-5 North | 1,265.10 | 4,496.4 | 8,724.1 |
| other externals | 682.39 | 854.3 | 877.2 |
| Rest of King County | 12,955.98 | 97,218.8 | 88,182.5 |
| Snohomish County | 1,723.24 | 45,829.5 | 24,934.9 |
| Rest of Pierce County | 4,528.55 | 54,359.5 | 13,275.6 |
| Kitsap County | 1,330.16 | 22,909.6 | 13,116.9 |
| Rail yards | 0.00 | 0.00 | 0.00 |
| Total VMT | 34,997.76 | 254,565.50 | 173,745.10 |
| TOTAL Daily VMT | 463,308.36 | | |

## Table 2: Estimated 2011 Daily On-Road Port-Related Diesel Truck Emissions

**DAILY EMISSIONS**

| Pollutant | Everett | Seattle | Tacoma | 2011 Emissions (grams/day) | 2011 Emissions (tons/day) |
|---|---|---|---|---|---|
| **CO** | 81,473.60 | 727,107.64 | 424,715.31 | 1,233,296.55 | 1.36 |
| **VOC** | 18,509.87 | 158,686.24 | 95,801.08 | 272,997.19 | 0.30 |
| **NOx** | 351,110.21 | 2,445,764.76 | 1,753,167.73 | 4,550,042.69 | 5.02 |
| **$CO_2$** | 56,073,131.09 | 407,862,759.51 | 278,372,977.22 | 742,308,867.82 | 818.26 |
| **$SO_2$** | 523.22 | 3,805.75 | 2,597.49 | 6,926.46 | 0.01 |
| **TOTAL $PM_{10}$** | 8,261.89 | 60,095.02 | 41,015.83 | 109,372.73 | 0.12 |
| Brake | 437.47 | 3,182.07 | 2,171.81 | 5,791.35 | 0.01 |
| Tire | 1,259.92 | 9,164.36 | 6,254.82 | 16,679.10 | 0.02 |
| ECARBON | 4,689.35 | 34,109.23 | 23,280.10 | 62,078.68 | 0.07 |
| OCARBON | 1,837.38 | 13,364.69 | 9,121.62 | 24,323.69 | 0.03 |
| $SO_4$ | 37.76 | 274.68 | 187.47 | 499.91 | 0.00 |
| **TOTAL $PM_{2.5}$** | 6,543.85 | 47,598.40 | 32,486.68 | 86,628.92 | 0.10 |
| Brake | 185.49 | 1,349.20 | 920.85 | 2,455.53 | 0.00 |
| Tire | 314.98 | 2,291.09 | 1,563.71 | 4,169.77 | 0.00 |
| ECARBON | 4,315.22 | 31,387.92 | 21,422.77 | 57,125.91 | 0.06 |
| OCARBON | 1,690.39 | 12,295.51 | 8,391.89 | 22,377.79 | 0.02 |
| $SO_4$ | 37.76 | 274.68 | 187.47 | 499.91 | 0.00 |

## Table 3: Estimated 2011 Annual On-Road Port-Related Diesel Truck Emissions

**ANNUAL EMISSIONS**

| Pollutant | 2011 Emissions (tons) |
|---|---|
| **CO** | 496.04 |
| **VOC** | 109.83 |
| **NOx** | 1,830.66 |
| **$CO_2$** | 298,663.08 |
| **$SO_2$** | 2.79 |
| **TOTAL $PM_{10}$** | 44.00 |
| **TOTAL $PM_{2.5}$** | 34.82 |

Some key differences to note between the 2005 and 2011 analyses include the updated VMT estimation for port-related traffic, as well as the updated port-related vehicle distribution data provided by Starcrest Consulting Group. These have resulted in greater emissions estimated in 2011 for all pollutants with the exception of $SO_2$.

Please contact Kelly McGourty at (206)971-3601 or kmcgourty@psrc.org if you have any questions or would like additional information regarding this analysis.

cc: Sally Otterson, Ecology
Joseph Ray, Starcrest Consulting Group

# Puget Sound Emissions Inventory

## On-Terminal HDV Data and Driving Emissions, tpy

| | | | | | Driving Emissions, tpy | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Terminal ID** | **Avg. Speed (mph)** | **Driving Per Trip (hours)** | **Driving Per Trip (miles)** | **Driving All Trips (miles)** | **$NO_x$** | **VOC** | **CO** | **$SO_2$** | **$PM_{10}$** | **$PM_{2.5}$** | **DPM** | **$CO_2$** | **$N_2O$** | **$CH_4$** | **$CO_2E$** |
| PSS070 | 15 | 0.07 | 1.00 | 301,444 | 4.12 | 0.31 | 1.65 | 0.005 | 0.062 | 0.057 | 0.062 | 532 | 0.0016 | 0.0017 | 533 |
| PSS050 | 15 | 0.12 | 1.75 | 1,126,416 | 15.38 | 1.17 | 6.15 | 0.019 | 0.233 | 0.214 | 0.233 | 1,989 | 0.0060 | 0.0063 | 1,991 |
| PSS060 | 15 | 0.13 | 1.90 | 168,562 | 2.30 | 0.18 | 0.92 | 0.003 | 0.035 | 0.032 | 0.035 | 298 | 0.0009 | 0.0009 | 298 |
| PSS080 | 15 | 0.07 | 1.00 | 320,268 | 4.37 | 0.33 | 1.75 | 0.005 | 0.066 | 0.061 | 0.066 | 566 | 0.0017 | 0.0018 | 566 |
| PSS030 | 10 | 0.05 | 0.50 | 19,240 | 0.30 | 0.02 | 0.15 | 0.000 | 0.004 | 0.004 | 0.004 | 34 | 0.0001 | 0.0001 | 34 |
| PSS020A | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| PSS020B | na | na | na | na | na | na | na | na | na | na | na | na | na | na | na |
| PST070 | 15 | 0.02 | 0.28 | 25,704 | 0.35 | 0.03 | 0.14 | 0.000 | 0.005 | 0.005 | 0.005 | 45 | 0.0001 | 0.0001 | 45 |
| PST030 | 10 | 0.10 | 0.95 | 51,937 | 0.81 | 0.07 | 0.39 | 0.001 | 0.011 | 0.010 | 0.011 | 92 | 0.0003 | 0.0003 | 92 |
| PST050 | 15 | 0.07 | 1.00 | 144,300 | 1.97 | 0.15 | 0.79 | 0.002 | 0.030 | 0.027 | 0.030 | 255 | 0.0008 | 0.0008 | 255 |
| PST020 | 15 | 0.04 | 0.66 | 137,280 | 1.87 | 0.14 | 0.75 | 0.002 | 0.028 | 0.026 | 0.028 | 243 | 0.0007 | 0.0008 | 243 |
| PST040 | 15 | 0.05 | 0.68 | 63,158 | 0.86 | 0.07 | 0.35 | 0.001 | 0.013 | 0.012 | 0.013 | 112 | 0.0003 | 0.0004 | 112 |
| PST060 | 15 | 0.10 | 1.53 | 194,266 | 2.65 | 0.20 | 1.06 | 0.003 | 0.040 | 0.037 | 0.040 | 343 | 0.0010 | 0.0011 | 343 |
| PST100 | 25 | 0.04 | 1.04 | 78,000 | 0.90 | 0.06 | 0.25 | 0.001 | 0.016 | 0.015 | 0.016 | 138 | 0.0004 | 0.0004 | 138 |
| PST010 | 8 | 0.03 | 0.25 | 1,795 | 0.03 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 3 | 0.0000 | 0.0000 | 3 |
| PST090 | 15 | 0.03 | 0.50 | 2,031 | 0.03 | 0.00 | 0.01 | 0.000 | 0.000 | 0.000 | 0.000 | 4 | 0.0000 | 0.0000 | 4 |
| PST120 | 5 | 0.06 | 0.30 | 4,500 | 0.08 | 0.01 | 0.05 | 0.000 | 0.001 | 0.001 | 0.001 | 8 | 0.0000 | 0.0000 | 8 |
| PST110 | 10 | 0.02 | 0.24 | 2,430 | 0.04 | 0.00 | 0.02 | 0.000 | 0.001 | 0.000 | 0.001 | 4 | 0.0000 | 0.0000 | 4 |
| PST130 | 5 | 0.08 | 0.40 | 15,840 | 0.29 | 0.03 | 0.17 | 0.000 | 0.003 | 0.003 | 0.003 | 28 | 0.0001 | 0.0001 | 28 |
| PSA010 | 5 | 0.05 | 0.25 | 1,999 | 0.04 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 4 | 0.0000 | 0.0000 | 4 |
| PSE010 | 8 | 0.13 | 1.00 | 4,025 | 0.07 | 0.01 | 0.03 | 0.000 | 0.001 | 0.001 | 0.001 | 7 | 0.0000 | 0.0000 | 7 |
| PSO010 | 5 | 0.05 | 0.25 | 1,902 | 0.04 | 0.00 | 0.02 | 0.000 | 0.000 | 0.000 | 0.000 | 3 | 0.0000 | 0.0000 | 3 |
| BNSF SIG | 15 | 0.07 | 1.00 | 217,264 | 2.97 | 0.23 | 1.19 | 0.004 | 0.045 | 0.041 | 0.045 | 384 | 0.0011 | 0.0012 | 384 |
| UP Argo | 15 | 0.07 | 1.00 | 193,333 | 2.64 | 0.20 | 1.06 | 0.003 | 0.040 | 0.037 | 0.040 | 342 | 0.0010 | 0.0011 | 342 |

# Puget Sound Emissions Inventory

## HDV Composite Emission Factors, HDDV8A, HDDV8B, grams/mile (g/hr for idle)

| Speed | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|
| Idle (g/hr) | 46.4647 | 4.2577 | 30.5090 | 0.0374 | 0.4690 | 0.4318 | 0.4690 | 4,005 | 0.0120 | 0.0128 |
| 2.5 | 18.5859 | 1.7031 | 12.2036 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 3 | 18.0035 | 1.6346 | 11.4568 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 4 | 17.2753 | 1.5487 | 10.5229 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 5 | 16.8378 | 1.4968 | 9.9626 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 6 | 15.9569 | 1.3895 | 8.9312 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 7 | 15.3278 | 1.3132 | 8.1952 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 8 | 14.8553 | 1.2555 | 7.6424 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 9 | 14.4879 | 1.2109 | 7.2131 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 10 | 14.1942 | 1.1752 | 6.8697 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 11 | 13.7011 | 1.1117 | 6.3477 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 12 | 13.2908 | 1.0585 | 5.9136 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 13 | 12.9428 | 1.0142 | 5.5452 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 14 | 12.6453 | 0.9765 | 5.2305 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 15 | 12.3866 | 0.9427 | 4.9567 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 16 | 12.0843 | 0.9004 | 4.6538 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 17 | 11.8178 | 0.8636 | 4.3864 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 18 | 11.5804 | 0.8299 | 4.1482 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 19 | 11.3677 | 0.8001 | 3.9351 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 20 | 11.1771 | 0.7739 | 3.7440 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 21 | 10.9963 | 0.7440 | 3.5569 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 22 | 10.8318 | 0.7170 | 3.3870 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 23 | 10.6812 | 0.6918 | 3.2319 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 24 | 10.5431 | 0.6697 | 3.0899 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 25 | 10.4167 | 0.6485 | 2.9587 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 26 | 10.3244 | 0.6273 | 2.8411 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 27 | 10.2397 | 0.6078 | 2.7321 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 28 | 10.1609 | 0.5896 | 2.6298 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 29 | 10.0870 | 0.5722 | 2.5354 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 30 | 10.0181 | 0.5558 | 2.4475 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 31 | 10.0005 | 0.5405 | 2.3732 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 32 | 9.9831 | 0.5259 | 2.3037 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 33 | 9.9676 | 0.5123 | 2.2382 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 34 | 9.9528 | 0.4997 | 2.1763 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |

## Puget Sound Emissions Inventory
### HDV Composite Emission Factors, HDDV8A, HDDV8B, grams/mile (g/hr for idle)

| Speed | $NO_x$ | VOC | CO | $SO_2$ | $PM_{10}$ | $PM_{2.5}$ | DPM | $CO_2$ | $N_2O$ | $CH_4$ |
|---|---|---|---|---|---|---|---|---|---|---|
| 35 | 9.9384 | 0.4873 | 2.1186 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 36 | 9.9889 | 0.4757 | 2.0741 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 37 | 10.0375 | 0.4652 | 2.0326 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 38 | 10.0832 | 0.4554 | 1.9930 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 39 | 10.1270 | 0.4458 | 1.9555 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 40 | 10.1677 | 0.4362 | 1.9197 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 41 | 10.2914 | 0.4284 | 1.8976 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 42 | 10.4091 | 0.4208 | 1.8772 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 43 | 10.5218 | 0.4138 | 1.8570 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 44 | 10.6286 | 0.4062 | 1.8379 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 45 | 10.7317 | 0.3995 | 1.8203 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 46 | 10.9407 | 0.3947 | 1.8165 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 47 | 11.1401 | 0.3889 | 1.8137 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 48 | 11.3325 | 0.3841 | 1.8109 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 49 | 11.5163 | 0.3793 | 1.8087 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 50 | 11.6925 | 0.3743 | 1.8059 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 51 | 12.0104 | 0.3705 | 1.8213 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 52 | 12.3156 | 0.3677 | 1.8349 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 53 | 12.6101 | 0.3639 | 1.8493 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 54 | 12.8932 | 0.3609 | 1.8628 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 55 | 13.1655 | 0.3581 | 1.8754 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 56 | 13.6310 | 0.3561 | 1.9102 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 57 | 14.0795 | 0.3551 | 1.9439 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 58 | 14.5131 | 0.3531 | 1.9767 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 59 | 14.9320 | 0.3521 | 2.0076 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 60 | 15.3366 | 0.3503 | 2.0384 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 61 | 16.0122 | 0.3503 | 2.0983 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 62 | 16.6655 | 0.3503 | 2.1560 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 63 | 17.2977 | 0.3503 | 2.2111 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 64 | 17.9112 | 0.3503 | 2.2660 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |
| 65 | 18.5052 | 0.3503 | 2.3181 | 0.0150 | 0.2361 | 0.1870 | 0.2361 | 1,602 | 0.0048 | 0.0051 |

# APPENDIX B - SUPPORTING DATA

## FLEET VEHICLE DATA

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Anacortes | PSA010 | A1 | 1970 | Ford | F800 | Gasoline | 15 | 864 | |
| Anacortes | PSA010 | A2 | 1990 | Chevrolet | 3/4 ton | Gasoline | 15 | 1274 | |
| Anacortes | PSA010 | A3 | 1994 | Chevrolet | 1/2 ton | Gasoline | 15 | 733 | |
| Anacortes | PSA010 | A4 | 1995 | Chevrolet | 1 ton Van | Gasoline | 15 | 177 | |
| Anacortes | PSA010 | A5 | 1995 | Chevrolet | 1 ton | Gasoline | 15 | 3145 | |
| Anacortes | PSA010 | A6 | 2006 | Ford | truck | Gasoline | 15 | 2947 | |
| Anacortes | PSA010 | A7 | 1995 | Taurus | V6 | Gasoline | 25 | 653 | |
| Anacortes | PSA010 | A8 | 1999 | Jeep | | Gasoline | 15 | 2165 | |
| Anacortes | PSA010 | A9 | 2007 | Taurus | V6 | Gasoline | 25 | 2237 | |
| Anacortes | PSA010 | A10 | 2008 | Ford | F250 | Gasoline | 15 | 3800 | |
| Anacortes | PSA010 | A11 | 2011 | Ford | F350 | Gasoline | 15 | 2675 | |
| Anacortes | PSA010 | A12 | 1995 | Ford | F150 | Gasoline | 15 | 6664 | |
| Everett | PSE010 | 1 | 1984 | International | 2 Ton Flatbed | Diesel | 10 | 2500 | 250 |
| Everett | PSE010 | 41 | 1989 | Chevrolet | 1 Ton | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 42 | 1989 | Chevrolet | 1 Ton | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 44 | 1991 | Chevrolet | 1 Ton | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 50 | 1983 | Ford | F100 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 51 | 1983 | Ford | F100 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 52 | 1983 | Ford | F100 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 53 | 1996 | Ford | F250 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 54 | 1992 | Ford | Ranger | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 55 | 1992 | Ford | F350 1 Ton | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 58 | 1994 | Chevrolet | S10 SC | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 59 | 1995 | Ford | Crown Victory | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 66 | 1996 | Ford | F350 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 67 | 1997 | Ford | F100 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 68 | 1997 | Ford | F250 4WD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 69 | 1997 | Ford | F250 | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 70 | 1998 | Chevrolet | 1 Ton | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 81 | 1999 | Chevrolet | Sonoma | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 135 | 2008 | Ford | Escape | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 136 | 2008 | Ford | Escape | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 137 | 2008 | Ford | Escape | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 124 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 125 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 126 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 127 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 128 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 129 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 130 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 131 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 132 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 133 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 134 | 2008 | Ford | F350SD | Gasoline | 10 | 4000 | 400 |
| Everett | PSE010 | 82 | 1999 | Ford | F150 Ect cab | Gasoline | 10 | 5000 | 500 |
| Everett | PSE010 | 84 | 2000 | GMC | Seerra 1500 | Gasoline | 10 | 5000 | 500 |
| Everett | PSE010 | 121 | 2008 | Dodge | Sprinter | Gasoline | 10 | 5000 | 500 |
| Everett | PSE010 | 33 | 1981 | Travel Lift | 30 AMO | Gasoline | 10 | 6000 | 600 |
| Everett | PSE010 | 118 | 2008 | Ford | Escape Hybrid | Gasoline | 10 | 10000 | 1000 |
| Everett | PSE010 | 119 | 2008 | Ford | Escape Hybrid | Gasoline | 10 | 10000 | 1000 |
| Everett | PSE010 | 103 | 2007 | Linde | C4535 | Gasoline | 10 | 11000 | 1100 |
| Everett | PSE010 | 104 | 2007 | Linde | C4535 | Gasoline | 10 | 11000 | 1100 |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Everett | PSE010 | 138 | 2007 | Ford | F350SD | Gasoline | 10 | 11000 | 1100 |
| Everett | PSE010 | 122 | 2007 | Hyster | H400HD | Gasoline | 10 | 12500 | 1250 |
| Everett | PSE010 | 2 | 1991 | Chevrolet | 1/2 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 3 | 1991 | Ford | Ranger | Gasoline | 10 | | |
| Everett | PSE010 | 5 | 1991 | Ford | F250 | Gasoline | 10 | | |
| Everett | PSE010 | 6 | 1978 | GMC | 1 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 8 | 1991 | Ford | F250 | Gasoline | 10 | | |
| Everett | PSE010 | 10 | 1994 | GMC | 1 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 13 | 1986 | Ford | Ranger | Gasoline | 10 | | |
| Everett | PSE010 | 14 | 1992 | Ford | Ranger SC | Gasoline | 10 | | |
| Everett | PSE010 | 15 | 1986 | Ford | Ranger | Gasoline | 10 | | |
| Everett | PSE010 | 16 | 1992 | Ford | Ranger SC | Gasoline | 10 | | |
| Everett | PSE010 | 20 | 1989 | Chevrolet | S10 | Gasoline | 10 | | |
| Everett | PSE010 | 23 | 1989 | Ford | LTD | Gasoline | 10 | | |
| Everett | PSE010 | 24 | 1989 | Chevrolet | S10 | Gasoline | 10 | | |
| Everett | PSE010 | 25 | 1989 | Chevrolet | S10 | Gasoline | 10 | | |
| Everett | PSE010 | 30 | 1981 | Mercury | Marque | Gasoline | 10 | | |
| Everett | PSE010 | 31 | 1994 | GMC | 3500 1 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 34 | 1991 | Chevrolet | 1 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 36 | 1991 | Chevrolet | 1 Ton | Gasoline | 10 | | |
| Everett | PSE010 | 37 | 1991 | Chevrolet | Astro | Gasoline | 10 | | |
| Everett | PSE010 | 38 | 1988 | Chevrolet | Celebrity Sedan | Gasoline | 10 | | |
| Everett | PSE010 | 39 | 1983 | Travel Lift | 35BFM | Gasoline | 10 | | |
| Everett | PSE010 | 40 | 1994 | GMC | Safari XT | Gasoline | 10 | | |
| Everett | PSE010 | 43 | 1981 | GMC | 1/2 Ton | Gasoline | 10 | | |
| Olympia | PSO010 | 04953C | 1998 | Chevrolet | Astro | Gasoline | 15 | 40 | |
| Olympia | PSO010 | 30143C | 1995 | Ford | Taurus | Gasoline | 15 | 130 | |
| Olympia | PSO010 | 43669C | 1997 | Chevrolet | Lumina | Gasoline | 15 | 32 | |
| Olympia | PSO010 | 46343C | 1993 | Ford | Cube Van | Gasoline | 15 | 370 | |
| Olympia | PSO010 | 07785C | 1969 | GMC | Fuel Truck | Gasoline | 15 | 9 | |
| Olympia | PSO010 | C56359 | 1981 | International | Dump/Water Truck | Gasoline | 15 | 34 | |
| Olympia | PSO010 | 66034C | 1996 | International | Service Truck 4700 | Gasoline | 15 | 480 | |
| Olympia | PSO010 | 13154C | *1990* | *Chevrolet* | *3/4 Ton Pickup* | Gasoline | 15 | 216 | |
| Olympia | PSO010 | 15857E | 2005 | Ford | Ext Cab Pickup F350 | Gasoline | 15 | 501 | |
| Olympia | PSO010 | 43693C | 1998 | Chevrolet | Pickup 2500 | Gasoline | 15 | 38 | |
| Olympia | PSO010 | 13155C | 1990 | Chevrolet | 1/2 Ton Pickup | Gasoline | 15 | 12 | |
| Olympia | PSO010 | 46344C | 1993 | Ford | Cube Van | Gasoline | 15 | 3 | |
| Olympia | PSO010 | 19142C | 1991 | GMC | Sierra | Gasoline | 15 | 52 | |
| Olympia | PSO010 | 30141C | 1986 | Chevrolet | S-10 | Gasoline | 15 | 0 | |
| Seatlle | PSS050 | T 902 | 2003 | Ford | F 150 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 903 | 1991 | Ford | F 700 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 904 | 2000 | Ford | Taurus | Gasoline | 15 | | |
| Seatlle | PSS050 | T 905 | 1994 | Ford | E 350 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 906 | 1996 | Ford | E 350 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 907 | 2004 | Ford | F 150 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 908 | 1997 | Chev | 1 Ton | Gasoline | 15 | | |
| Seatlle | PSS050 | T 911 | 2001 | Ford | F 150 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 913 | 2001 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS050 | T 914 | 2007 | Ford | F 150 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 915 | 1992 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS050 | T 917 | 1988 | Ford | F 450 | Gasoline | 15 | | |
| Seatlle | PSS050 | T 918 | 2007 | Ford | F 150 | Gasoline | 15 | | |

# Puget Sound Emissions Inventory
## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS050 | T 920 | 2002 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 921 | 1998 | International | | Diesel | 15 | | |
| Seattle | PSS050 | T 922 | 1985 | International | | Diesel | 15 | | |
| Seattle | PSS050 | T 923 | 1985 | Ford | F 750 | Gasoline | 15 | | |
| Seattle | PSS050 | T 926 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 927 | 1995 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 928 | 2004 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 929 | 2000 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 930 | 2006 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 932 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 933 | 2001 | Chev | CT3 | Gasoline | 15 | | |
| Seattle | PSS050 | T 934 | 2001 | Chev | CT3 | Gasoline | 15 | | |
| Seattle | PSS050 | T 935 | 2007 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 936 | 2001 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 938 | 1998 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 939 | 1995 | Dodge | | Gasoline | 15 | | |
| Seattle | PSS050 | T 940 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 941 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 942 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 943 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 944 | 2006 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 945 | 2007 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 946 | 1997 | Ford | F 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 947 | 1996 | Ford | F 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 949 | 2004 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 950 | 1998 | Ford | E 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 951 | 2002 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 952 | 1994 | Nissan | | Gasoline | 15 | | |
| Seattle | PSS050 | T 953 | 2005 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 954 | 2005 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 955 | 2005 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 956 | 1989 | Ford | LTN | Diesel | 15 | | |
| Seattle | PSS050 | T 957 | 1990 | GMC | V-2 | Diesel | 15 | | |
| Seattle | PSS050 | T 958 | 2000 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 959 | 2000 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 960 | 1999 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 961 | 2001 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 962 | 2006 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 963 | 2001 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 964 | 2002 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 965 | 2000 | Chev | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 966 | 2000 | Chev | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 967 | 1997 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 968 | 2006 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 969 | 1997 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 970 | 1997 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 971 | 1997 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 972 | 2002 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 973 | 2001 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 974 | 2003 | Ford | F 250 | Gasoline | 15 | | |
| Seattle | PSS050 | T 975 | 2007 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 976 | 2001 | Ford | F 150 | Gasoline | 15 | | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS050 | T 978 | 1998 | Chev | 2500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 979 | 1997 | Chev | 2500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 980 | 1996 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 981 | 2001 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 982 | 2001 | Dodge | | Gasoline | 15 | | |
| Seattle | PSS050 | T 983 | 2002 | Dodge | | Gasoline | 15 | | |
| Seattle | PSS050 | T 984 | 2001 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 985 | 2006 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 986 | 2007 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 987 | 1996 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 988 | 1996 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 989 | 1995 | Nissan | | Gasoline | 15 | | |
| Seattle | PSS050 | T 990 | 2001 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 995 | 2004 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 996 | 2005 | Dodge | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 997 | 1999 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 998 | 2000 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 999 | 1999 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 800 | 1991 | Chev | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 801 | 1989 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 802 | 1989 | Chev | S 10 | Gasoline | 15 | | |
| Seattle | PSS050 | T 804 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 805 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 806 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 807 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 809 | 1992 | Chev | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 812 | 1989 | Ford | E 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 813 | 1991 | Ford | E 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 814 | | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 815 | 1996 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 816 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 820 | 2005 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 821 | 2005 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 822 | 2005 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 823 | 2005 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 824 | 1998 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 826 | 1998 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 827 | 1999 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 828 | 2000 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 829 | 2000 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 830 | 2000 | Ford | Ranger | Gasoline | 15 | | |
| Seattle | PSS050 | T 833 | 1996 | Ford | E 350 | Gasoline | 15 | | |
| Seattle | PSS050 | T 834 | 2000 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 835 | 2004 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 836 | 2001 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | T 1227 | 1992 | Chev | 1500 | Gasoline | 15 | | |
| Seattle | PSS050 | T 1240 | | Dodge | | Gasoline | 15 | | |
| Seattle | PSS050 | CM 0 | 2002 | Ford | F 150 | Gasoline | 15 | | |
| Seattle | PSS050 | CM 1 | 1989 | Step Van | | Gasoline | 15 | | |
| Seattle | PSS050 | CM 2 | | Step Van | | Gasoline | 15 | | |
| Seattle | PSS050 | CM 3 | 1979 | Step Van | | Gasoline | 15 | | |
| Seattle | PSS050 | CM 4 | 2000 | Iszusu | NPR | Diesel | 15 | | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seatlle | PSS050 | CM 5 | 1999 | Step Van | WORK | Gasoline | 15 | | |
| Seatlle | PSS050 | CM 6 | 1996 | Step Van | WORK | Gasoline | 15 | | |
| Seatlle | PSS050 | CM 20 | 1999 | Step Van | Frtliner | Diesel | 15 | | |
| Seatlle | PSS050 | CM 21 | 2002 | Step Van | WORK | Gasoline | 15 | | |
| Seatlle | PSS050 | CM 22 | 1999 | Step Van | Frtliner | Diesel | 15 | | |
| Seatlle | PSS050 | CM 23 | 1999 | Step Van | Frtliner | Diesel | 15 | | |
| Seatlle | PSS050 | CM 24 | 1999 | Step Van | Frtliner | Diesel | 15 | | |
| Seatlle | PSS050 | CM 25 | 1999 | Step Van | Frtliner | Diesel | 15 | | |
| Seatlle | PSS050 | CM 69 | 1986 | GMC | | Diesel | 15 | | |
| Seatlle | PSS060 | T 992 | 2004 | Chev | 1500 | Gasoline | 15 | | |
| Seatlle | PSS060 | T 993 | 2006 | Chev | 1500 | Gasoline | 15 | | |
| Seatlle | PSS060 | T 994 | 2002 | Chev | 1500 | Gasoline | 15 | | |
| Seatlle | PSS060 | T 808 | 1994 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS060 | T 811 | 1997 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS060 | T 817 | 2004 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS060 | T 825 | 1998 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS060 | T 831 | 2001 | Ford | Ranger | Gasoline | 15 | | |
| Seatlle | PSS060 | T 832 | | Ford | F 150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU332 | 1998 | Ford | F150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU337 | 1998 | Ford | F150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU397 | 2000 | Ford | F150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU398 | 2000 | Ford | F150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU399 | 2000 | Ford | F150 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU476 | 2005 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU477 | 2005 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU478 | 2005 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU479 | 2005 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU480 | 2005 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU528 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU529 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU530 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU531 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU532 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU533 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU534 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU535 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU536 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU537 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU538 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU539 | 2006 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU581 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU582 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU583 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU584 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU585 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU587 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU588 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU589 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU590 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU591 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU592 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seatlle | PSS080 | EMSU593 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS080 | EMSU594 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU595 | 2007 | Dodge | RAM 1500 | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU619 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU620 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU621 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU622 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU623 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU624 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU625 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU626 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU627 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU628 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU629 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU630 | 2007 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU693 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU694 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU695 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU696 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU697 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU698 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS080 | EMSU699 | 2008 | Chevrolet | Silverado | Gasoline | 15 | | |
| Seattle | PSS010 | 51 | 1992 | DODGE | CARAVAN | Gasoline | 30 | 1047 | |
| Seattle | PSS010 | 289 | 1990 | CHEV | 1-TON UTILITY T | Gasoline | 30 | 913 | |
| Seattle | PSS010 | 359 | 1992 | CHEV | 3/4-TON PICKUP | Gasoline | 30 | 2100 | |
| Seattle | PSS010 | 527 | 1996 | CONDOR | 210' HIGH REACH | B20 | 30 | 180 | |
| Seattle | PSS010 | 612 | 1992 | FORD | EXPLORER | Gasoline | 30 | 1858 | |
| Seattle | PSS010 | 785 | 1991 | CHEV | SUBURBAN 4X4 | Gasoline | 30 | 2131 | |
| Seattle | PSS010 | 791 | 1991 | DODGE | D250 3/4-TON PIC | Gasoline | 30 | 787 | |
| Seattle | PSS010 | 800 | 1992 | FORD | TAURUS WAGON | Gasoline | 30 | 886 | |
| Seattle | PSS010 | 823 | 1993 | IHI | FUEL TRUCK | B20 | 30 | 1243 | |
| Seattle | PSS010 | 852 | 1993 | GMC | SONOMA 1/2 Ton | Gasoline | 30 | 1160 | |
| Seattle | PSS010 | 853 | 1994 | CHEV | 1-TON H/D 3500 F | Gasoline | 30 | 534 | |
| Seattle | PSS010 | 857 | 1994 | NISSAN | ALTIMA 4/DR SD | Gasoline | 30 | 1000 | |
| Seattle | PSS010 | 861 | 1994 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 2552 | |
| Seattle | PSS010 | 862 | 1994 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 2379 | |
| Seattle | PSS010 | 864 | 1994 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 1348 | |
| Seattle | PSS010 | 865 | 1994 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 2204 | |
| Seattle | PSS010 | 871 | 1994 | FORD | AEROSTAR VAN | Gasoline | 30 | 731 | |
| Seattle | PSS010 | 877 | 1994 | JEEP | CHEROKEE 4/DR | Gasoline | 30 | 82 | |
| Seattle | PSS010 | 878 | 1994 | JEEP | CHEROKEE 4/DR | Gasoline | 30 | 837 | |
| Seattle | PSS010 | 880 | 1994 | GMC | SONOMA PICKUP | Gasoline | 30 | 278 | |
| Seattle | PSS010 | 882 | 1994 | GMC | SONOMA PICKUP | Gasoline | 30 | 1472 | |
| Seattle | PSS010 | 891 | 1995 | IHI | ROLLBACK DUAL | B20 | 30 | 2881 | |
| Seattle | PSS010 | 895 | 1995 | CHEV | S-10 CHEV PICKU | Gasoline | 30 | 769 | |
| Seattle | PSS010 | 915 | 1995 | FORD | RANGER PICKUP | Gasoline | 30 | 35 | |
| Seattle | PSS010 | 917 | 1995 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 1711 | |
| Seattle | PSS010 | 922 | 1995 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 3747 | |
| Seattle | PSS010 | 924 | 1996 | FORD | RANGER 1/2 TON | Gasoline | 30 | 3526 | |
| Seattle | PSS010 | 933 | 1996 | CHEV | 1 TON UTILITY | Gasoline | 30 | 2680 | |
| Seattle | PSS010 | 935 | 1996 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 3218 | |
| Seattle | PSS010 | 936 | 1996 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 2216 | |
| Seattle | PSS010 | 938 | 1996 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 48 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS010 | 945 | 1996 | FORD | RANGER 1/2 TON | Gasoline | 30 | 1489 | |
| Seattle | PSS010 | 946 | 1996 | FORD | RANGER 1/2 TON | Gasoline | 30 | 402 | |
| Seattle | PSS010 | 948 | 1996 | FORD | RANGER 1/2 TON | Gasoline | 30 | 1634 | |
| Seattle | PSS010 | 949 | 1996 | FORD | RANGER 1/2 TON | Gasoline | 30 | 215 | |
| Seattle | PSS010 | 955 | 1996 | DODGE | CARGO VAN | Gasoline | 30 | 2465 | |
| Seattle | PSS010 | 971 | 1997 | FORD | H/D E-250 CARGO | Gasoline | 30 | 2811 | |
| Seattle | PSS010 | 972 | 1997 | FORD | H/D E-250 CARGO | Gasoline | 30 | 4033 | |
| Seattle | PSS010 | 994 | 1997 | CHEV | BLAZER S-10 4X4 | Gasoline | 30 | 1821 | |
| Seattle | PSS010 | 1005 | 1998 | FORD | WINSTAR VAN | Gasoline | 30 | 2237 | |
| Seattle | PSS010 | 1006 | 1998 | FORD | WINSTAR VAN | Gasoline | 30 | 2990 | |
| Seattle | PSS010 | 1007 | 1999 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 619 | |
| Seattle | PSS010 | 1009 | 1999 | CHEV | 1-TON H/D 3500 T | Gasoline | 30 | 2573 | |
| Seattle | PSS010 | 1010 | 1999 | CHEV | 1-TON H/D 3500 F | B20 | 30 | 1249 | |
| Seattle | PSS010 | 1011 | 1999 | CHEV | 1-TON H/D 3500 T | B20 | 30 | 1323 | |
| Seattle | PSS010 | 1012 | 1998 | DODGE | 2500-PICKUP 3/4 T | Gasoline | 30 | 1693 | |
| Seattle | PSS010 | 1013 | 1998 | DODGE | 2500-PICKUP 3/4 T | Gasoline | 30 | 1559 | |
| Seattle | PSS010 | 1014 | 1999 | CHEV | 1500-PICKUP TRU | Gasoline | 30 | 641 | |
| Seattle | PSS010 | 1015 | 1998 | CHEV | 3500-CARGO VAN | Gasoline | 30 | 517 | |
| Seattle | PSS010 | 1016 | 1998 | FORD | F-150 1/2 TON PIC | Gasoline | 30 | 8272 | |
| Seattle | PSS010 | 1017 | 1998 | FORD | F-150 1/2 TON PIC | Gasoline | 30 | 3441 | |
| Seattle | PSS010 | 1018 | 1998 | CHEV | 1500 1/2 TON PICK | Gasoline | 30 | 952 | |
| Seattle | PSS010 | 1027 | 1998 | DODGE | CARAVAN VAN | Gasoline | 30 | 4100 | |
| Seattle | PSS010 | 1060 | 1999 | CHEV | BLAZER 4 X 4 | Gasoline | 30 | 4386 | |
| Seattle | PSS010 | 1067 | 1999 | JEEP | CHEROKEE 4 DR | Gasoline | 30 | 1278 | |
| Seattle | PSS010 | 1068 | 1999 | CHEV | 1500 1/5 TON PICK | Gasoline | 30 | 1964 | |
| Seattle | PSS010 | 1069 | 2000 | FORD | F-250 3/4 TON PIC | Gasoline | 30 | 2723 | |
| Seattle | PSS010 | 1070 | 1999 | CHEV | 3500 FLAT BED TR | Gasoline | 30 | 3523 | |
| Seattle | PSS010 | 1071 | 1999 | CHEV | 3500 1 TON UTILIT | Gasoline | 30 | 3983 | |
| Seattle | PSS010 | 1072 | 1999 | CHEV | CARGO VAN | Gasoline | 30 | 2911 | |
| Seattle | PSS010 | 1073 | 1999 | GMC | CARGO VAN | Gasoline | 30 | 5217 | |
| Seattle | PSS010 | 1074 | 1999 | GMC | 3500 UTILITY TRU | Gasoline | 30 | 486 | |
| Seattle | PSS010 | 1075 | 1999 | FORD | F-550 UTILITY TRU | Gasoline | 30 | 3631 | |
| Seattle | PSS010 | 1091 | 1999 | JEEP | CHEROKEE 4 DR | Gasoline | 30 | 481 | |
| Seattle | PSS010 | 1092 | 1999 | JEEP | CHEROKEE 4 DR | Gasoline | 30 | 519 | |
| Seattle | PSS010 | 1099 | 1999 | FORD | WINDSTAR | Gasoline | 30 | 252 | |
| Seattle | PSS010 | 1107 | 1999 | GMC-VOLVO | DUAL-TAMDEM T | B20 | 30 | 3301 | |
| Seattle | PSS010 | 1117 | 1996 | FORD | 3/4-TON CARGO V | Gasoline | 30 | 1915 | |
| Seattle | PSS010 | 1119 | 1999 | CHEV | MAILIBU 4 DR SD | Gasoline | 30 | 3111 | |
| Seattle | PSS010 | 1122 | 2000 | FORD | F-250 PICKUP SUP | Gasoline | 30 | 6353 | |
| Seattle | PSS010 | 1131 | 1996 | FORD | CARGO VAN E 25 | Gasoline | 30 | 1847 | |
| Seattle | PSS010 | 1137 | 2000 | FORD | TAURUS 4 DR STA | FLEX | 30 | 1523 | |
| Seattle | PSS010 | 1138 | 2000 | DODGE | 3/4 TON PICKUP T | Gasoline | 30 | 820 | |
| Seattle | PSS010 | 1139 | 2000 | FORD | F-450 SUPER DUTY | Gasoline | 30 | 1932 | |
| Seattle | PSS010 | 1140 | 2000 | FORD | F-450 SUPER DUTY | Gasoline | 30 | 2197 | |
| Seattle | PSS010 | 1141 | 2001 | FORD | F-450 SUPER DUTY | Gasoline | 30 | 2424 | |
| Seattle | PSS010 | 1142 | 2000 | FORD | F-450 SUPER DUTY | Gasoline | 30 | 3442 | |
| Seattle | PSS010 | 1143 | 2001 | FORD | F-450 SUPER DUTY | Gasoline | 30 | 4288 | |
| Seattle | PSS010 | 1144 | 2000 | CHEV | WORK HORSE, (R | Gasoline | 30 | 193 | |
| Seattle | PSS010 | 1145 | 2000 | DODGE | 3/4 TON PICKUP T | Gasoline | 30 | 1766 | |
| Seattle | PSS010 | 1146 | 2000 | DODGE | 3/4 TON PICKUP T | Gasoline | 30 | 3401 | |
| Seattle | PSS010 | 1147 | 2000 | CHEV | 1/2 TON PICKUP T | Gasoline | 30 | 6445 | |
| Seattle | PSS010 | 1151 | 2000 | JEEP | CHEROKEE 4 DR | Gasoline | 30 | 2210 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS010 | 1157 | 2000 | CHEV | 1/2 TON PICKUP | Gasoline | 30 | 7635 | |
| Seattle | PSS010 | 1158 | 2001 | FORD | 1/2 TON CC PICK | Gasoline | 30 | 1236 | |
| Seattle | PSS010 | 1165 | 2000 | CHEV | BLAZER 4 DR | Gasoline | 30 | 1661 | |
| Seattle | PSS010 | 1169 | 2000 | FORD | F-550 FORD UTIL | DIESEL | 30 | 282 | |
| Seattle | PSS010 | 1182 | 2001 | JOHNSON | JOHNSON 605 TRU | B20 | 30 | 3404 | |
| Seattle | PSS010 | 1183 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 4561 | |
| Seattle | PSS010 | 1184 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 5036 | |
| Seattle | PSS010 | 1185 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 7996 | |
| Seattle | PSS010 | 1187 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 4170 | |
| Seattle | PSS010 | 1188 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 4877 | |
| Seattle | PSS010 | 1189 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 5781 | |
| Seattle | PSS010 | 1190 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 3821 | |
| Seattle | PSS010 | 1191 | 2001 | FORD | F-550 FORD UTIL | DIESEL | 30 | 3984 | |
| Seattle | PSS010 | 1192 | 2001 | FORD | F-450 FORD UTIL | Gasoline | 30 | 2129 | |
| Seattle | PSS010 | 1193 | 2001 | FORD | F-450 FORD UTIL | Gasoline | 30 | 1134 | |
| Seattle | PSS010 | 1194 | 2001 | FORD | F-450 FORD UTIL | B20 | 30 | 1451 | |
| Seattle | PSS010 | 1195 | 2001 | FORD | F-450 FORD UTIL | Gasoline | 30 | 3826 | |
| Seattle | PSS010 | 1196 | 2001 | FORD | F-450 FORD UTIL | Gasoline | 30 | 3693 | |
| Seattle | PSS010 | 1197 | 2001 | FORD | F-450 FORD UTIL | Gasoline | 30 | 3505 | |
| Seattle | PSS010 | 1198 | 2001 | CHEV | PASSENGER VAN | Gasoline | 30 | 220 | |
| Seattle | PSS010 | 1199 | 2001 | DODGE | 2500-PICKUP TRU | Gasoline | 30 | 1233 | |
| Seattle | PSS010 | 1200 | 2001 | DODGE | 2500-PICKUP TRU | Gasoline | 30 | 3049 | |
| Seattle | PSS010 | 1244 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 3192 | |
| Seattle | PSS010 | 1245 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 668 | |
| Seattle | PSS010 | 1246 | 2001 | FORD | TAURUS 4 DR STA | FLEX | 30 | 2111 | |
| Seattle | PSS010 | 1248 | 2001 | CHEV | BLAZER 4X4 4 DO | FLEX | 30 | 2930 | |
| Seattle | PSS010 | 1249 | 2001 | GMC | PICKUP 1500 WHI | FLEX | 30 | 11251 | |
| Seattle | PSS010 | 1250 | 2001 | GMC | PICKUP 1500 PEW | FLEX | 30 | 4015 | |
| Seattle | PSS010 | 1262 | 2003 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 1670 | |
| Seattle | PSS010 | 1263 | 2003 | HONDA | CIVIC HYBRID 4 D | Hybrid | 30 | 7711 | |
| Seattle | PSS010 | 1265 | 2004 | CHEV | SILVERADO EXT | CNG | 30 | 32 | |
| Seattle | PSS010 | 1267 | 2006 | CHEV | SILVERADO EXT | CNG | 30 | 1563 | |
| Seattle | PSS010 | 1283 | 2006 | FORD | F550 SD | Gasoline | 30 | 2673 | |
| Seattle | PSS010 | 1289 | 2006 | FORD | ESCAPE, HYBRID | Hybrid | 30 | 1536 | |
| Seattle | PSS010 | 1290 | 2007 | CHEV | SILVERADO FLAT | B20 | 30 | 4262 | |
| Seattle | PSS010 | 1291 | 2007 | CHEV | SILVERADO FLAT | B20 | 30 | 4074 | |
| Seattle | PSS010 | 1293 | 2006 | JEEP | GRAND CHEROK | Gasoline | 30 | 5400 | |
| Seattle | PSS010 | 1295 | 2007 | CHEV | SILVERADO FLAT | B20 | 30 | 8537 | |
| Seattle | PSS010 | 1296 | 2006 | DODGE | SPRINTER VAN 25 | B20 | 30 | 1823 | |
| Seattle | PSS010 | 1297 | 2006 | DODGE | SPRINTER VAN 25 | B20 | 30 | 3218 | |
| Seattle | PSS010 | 1298 | 2007 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 2448 | |
| Seattle | PSS010 | 1299 | 2007 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 4423 | |
| Seattle | PSS010 | 1303 | 2006 | FORD | CROWN VIC | Gasoline | 30 | 22567 | |
| Seattle | PSS010 | 1322 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 2988 | |
| Seattle | PSS010 | 1323 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 1255 | |
| Seattle | PSS010 | 1324 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 203 | |
| Seattle | PSS010 | 1325 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 380 | |
| Seattle | PSS010 | 1326 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 7473 | |
| Seattle | PSS010 | 1327 | 2004 | CHEV | SILVERADO PICK | Gasoline | 30 | 1575 | |
| Seattle | PSS010 | 1338 | 2007 | HONDA | CIVIC HYBRID 4 D | Hybrid | 30 | 7373 | |
| Seattle | PSS010 | 1342 | 2007 | HONDA | CIVIC HYBRID | Hybrid | 30 | 7125 | |
| Seattle | PSS010 | 1343 | 2007 | HONDA | CIVIC HYBRID | Hybrid | 30 | 7249 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS010 | 1344 | 2007 | HONDA | CIVIC HYBRID | Hybrid | 30 | 8172 | |
| Seattle | PSS010 | 1345 | 2007 | JEEP | GRAND CHEROKI | Gasoline | 30 | 1206 | |
| Seattle | PSS010 | 1346 | 2007 | HONDA | CIVIC HYBRID | Hybrid | 30 | 3213 | |
| Seattle | PSS010 | 1347 | 2005 | DODGE | SPRINTER SHUTTI | B20 | 30 | 969 | |
| Seattle | PSS010 | 1348 | 2007 | DODGE | SPRINTER VAN 35 | B20 | 30 | 75 | |
| Seattle | PSS010 | 1349 | 2007 | CHEV | 1 TON FLATBED | B20 | 30 | 4541 | |
| Seattle | PSS010 | 1350 | 2007 | CHEV | 1 TON FLATBED | B20 | 30 | 3058 | |
| Seattle | PSS010 | 1352 | 2008 | FORD | CROWN VIC | Gasoline | 30 | 16320 | |
| Seattle | PSS010 | 1357 | 2007 | DODGE | SPRINTER VAN 25 | B20 | 30 | 1330 | |
| Seattle | PSS010 | 1358 | 2007 | DODGE | SPRINTER VAN 25 | B20 | 30 | 2876 | |
| Seattle | PSS010 | 1359 | 2007 | CHEV | 1 TON FLATBED | B20 | 30 | 2829 | |
| Seattle | PSS010 | 1360 | 2008 | TOYOTA | PRIUS HYBRID PH | Hybrid | 30 | 3451 | |
| Seattle | PSS010 | 1370 | 2008 | FORD | CROWN VIC | Gasoline | 30 | 25868 | |
| Seattle | PSS010 | 1371 | 2007 | E-RIDE | ELECTRIC TRUCK | ELEC | 30 | 711 | |
| Seattle | PSS010 | 1372 | 2009 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 1716 | |
| Seattle | PSS010 | 1373 | 2008 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 5027 | |
| Seattle | PSS010 | 1374 | 2009 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 948 | |
| Seattle | PSS010 | 1375 | 2009 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 1812 | |
| Seattle | PSS010 | 1376 | 2009 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 1200 | |
| Seattle | PSS010 | 1377 | 2009 | TOYOTA | PRIUS HYBRID | Hybrid | 30 | 1092 | |
| Seattle | PSS010 | 1380 | 2008 | DODGE | SPRINTER | Diesel | 30 | 3122 | |
| Seattle | PSS010 | 1381 | 2008 | DODGE | SPRINTER | Diesel | 30 | 667 | |
| Seattle | PSS010 | 1387 | 2009 | ELGIN | SWEEPER, NISSAN | B20 | 30 | 6888 | |
| Seattle | PSS010 | 1388 | 2009 | HONDA | CIVIC HYBRID | Hybrid | 30 | 6966 | |
| Seattle | PSS010 | 1390 | 2010 | FORD | BUCKET TRUCK | B20 | 30 | 2661 | |
| Seattle | PSS010 | 1391 | 2010 | FORD | BUCKET TRUCK | B20 | 30 | 1067 | |
| Seattle | PSS010 | 1392 | 2010 | DODGE | GRAND CARAVAN | Gasoline | 30 | 1500 | |
| Seattle | PSS010 | 1395 | 2011 | PETERBILT | DUMP TRUCK | B20 | 30 | 13074 | |
| Seattle | PSS010 | 1396 | 2008 | DODGE | SPRINTER VAN | B20 | 30 | 47 | |
| Seattle | PSS010 | 1398 | 2007 | PETERBILT | VACCON INDUSTI | B20 | 30 | 1852 | |
| Seattle | PSS010 | 1399 | 2012 | FORD | ESCAPE HYBRID | Hybrid | 30 | 3804 | |
| Seattle | PSS010 | 1430 | 2011 | MERCEDES | 3500 SPRINTER | diesel | 30 | 1067 | |
| Seattle | PSS010 | 1434 | 2011 | FORD | TRANSIT | Gasoline | 30 | 2000 | |
| Seattle | PSS010 | 1435 | 2011 | FORD | TRANSIT | Gasoline | 30 | 2000 | |
| Seattle | PSS010 | 5016 | 1998 | CHEV | BLAZER | Gasoline | 30 | 2020 | |
| Seattle | PSS010 | 5017 | 1999 | CHEV | BLAZER | Gasoline | 30 | 214 | |
| Seattle | PSS010 | 5018 | 1997 | FORD | EXPLORER | Gasoline | 30 | 4686 | |
| Seattle | PSS010 | 5020 | 1998 | GMC | JIMMY | Gasoline | 30 | 1424 | |
| Seattle | PSS010 | 5022 | 1999 | CHEV | S10 EXTENDED C | Gasoline | 30 | 3329 | |
| Seattle | PSS010 | 5024 | 1999 | CHEV | 4DOOR BLAZER | Gasoline | 30 | 145 | |
| Seattle | PSS010 | 5025 | 2000 | CHEV | 4DOOR BLAZER | Gasoline | 30 | 656 | |
| Seattle | PSS010 | 5028 | 1999 | CHEV | 4DOOR BLAZER | Gasoline | 30 | 1289 | |
| Seattle | PSS010 | 5029 | 1999 | CHEV | 4DOOR BLAZER | Gasoline | 30 | 1345 | |
| Seattle | PSS010 | 5030 | 1999 | CHEV | 4DOOR BLAZER | Gasoline | 30 | 4282 | |
| Seattle | PSS010 | 5033 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 440 | |
| Seattle | PSS010 | 5034 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 444 | |
| Seattle | PSS010 | 5037 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 539 | |
| Seattle | PSS010 | 5039 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 3376 | |
| Seattle | PSS010 | 5040 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 644 | |
| Seattle | PSS010 | 5041 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 343 | |
| Seattle | PSS010 | 5042 | 1999 | FORD | TAURUS 4 DR. SE S | Gasoline | 30 | 94 | |
| Seattle | PSS010 | 5044 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 46 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Seattle | PSS010 | 5045 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1402 | |
| Seattle | PSS010 | 5046 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1640 | |
| Seattle | PSS010 | 5047 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1884 | |
| Seattle | PSS010 | 5048 | 1999 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 2427 | |
| Seattle | PSS010 | 5049 | 1999 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 2524 | |
| Seattle | PSS010 | 5050 | 1999 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 1789 | |
| Seattle | PSS010 | 5056 | 2001 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 1360 | |
| Seattle | PSS010 | 5057 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1663 | |
| Seattle | PSS010 | 5058 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 2746 | |
| Seattle | PSS010 | 5060 | 2000 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 3251 | |
| Seattle | PSS010 | 5061 | 2000 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 1839 | |
| Seattle | PSS010 | 5062 | 2000 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 2436 | |
| Seattle | PSS010 | 5063 | 2000 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 1000 | |
| Seattle | PSS010 | 5069 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 238 | |
| Seattle | PSS010 | 5070 | 2000 | CHEV | BLAZER 4X4 4 DO | Gasoline | 30 | 535 | |
| Seattle | PSS010 | 5071 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1633 | |
| Seattle | PSS010 | 5073 | 2000 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1975 | |
| Seattle | PSS010 | 5076 | 2000 | CHEV | BLAZER 4 X 4 4 DO | Gasoline | 30 | 1474 | |
| Seattle | PSS010 | 5078 | 2001 | CHEV | BLAZER 4 X 4 4 DO | Gasoline | 30 | 1829 | |
| Seattle | PSS010 | 5079 | 2001 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 128 | |
| Seattle | PSS010 | 5080 | 2001 | FORD | RANGER 4X2 PICK | Gasoline | 30 | 1832 | |
| Seattle | PSS010 | 5081 | 2002 | CHEV | TRAILBLAZER 4X4 | Gasoline | 30 | 3272 | |
| Seattle | PSS010 | 5087 | 1999 | FORD | EXPLORER 4X4 4D | Gasoline | 30 | 589 | |
| Seattle | PSS010 | 5088 | 1999 | FORD | EXPLORER 4X4 4D | Gasoline | 30 | 2819 | |
| Seattle | PSS010 | 5089 | 1998 | FORD | EXPLORER 4X4 4D | Gasoline | 30 | 83 | |
| Seattle | PSS010 | 5090 | 2003 | CHEV | TRAILBLAZER 4X4 | Gasoline | 30 | 2798 | |
| Seattle | PSS010 | 5096 | 2010 | FORD | Ford Edge 4DR SEL | Gasoline | 30 | 8000 | |
| Tacoma | PST055 | 59101 | 2002 | Chevrolet | Astro | Gasoline | 15 | 465 | 31 |
| Tacoma | PST055 | 5947 | 2000 | Chevrolet | C1500 | Gasoline | 15 | 1110 | 74 |
| Tacoma | PST055 | 59238 | 2001 | Chevrolet | S10 | Gasoline | 20 | 1500 | 75 |
| Tacoma | PST055 | 5730 | 1990 | Chevrolet | Kodiak | Gasoline | 15 | 1425 | 95 |
| Tacoma | PST055 | 59725 | 2006 | Chevrolet | Silverado | Gasoline | 20 | 2160 | 108 |
| Tacoma | PST055 | 59438 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 2025 | 135 |
| Tacoma | PST055 | 5911 | 2000 | Chevrolet | C1500 | Gasoline | 20 | 3260 | 163 |
| Tacoma | PST055 | 5859 | 2000 | Chevrolet | Silverado | Gasoline | 15 | 2670 | 178 |
| Tacoma | PST055 | 59540 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 2715 | 181 |
| Tacoma | PST055 | 59441 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 4200 | 280 |
| Tacoma | PST055 | 59549 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 4320 | 288 |
| Tacoma | PST055 | 59832 | 2005 | Chevrolet | Express G350 | Gasoline | 15 | 4590 | 306 |
| Tacoma | PST055 | 59842 | 2007 | Ford | Express G350 | Gasoline | 15 | 5085 | 339 |
| Tacoma | PST055 | 59841 | 2008 | Ford | Express G350 | Gasoline | 15 | 7140 | 476 |
| Tacoma | PST055 | 59444 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 9030 | 602 |
| Tacoma | PST055 | 59544 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 9030 | 602 |
| Tacoma | PST055 | 59443 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 10800 | 720 |
| Tacoma | PST055 | 59543 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 10800 | 720 |
| Tacoma | PST055 | 59445 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 11205 | 747 |
| Tacoma | PST055 | 59545 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 11205 | 747 |
| Tacoma | PST055 | 59546 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 13485 | 899 |
| Tacoma | PST055 | 59547 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 13740 | 916 |
| Tacoma | PST055 | 59442 | 2004 | Chevrolet | C1500 | Gasoline | 15 | 14205 | 947 |
| Tacoma | PST055 | 59542 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 14205 | 947 |
| Tacoma | PST055 | 59548 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 15045 | 1003 |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST055 | 59724 | 2007 | Chevrolet | Silverado | Gasoline | 15 | 20025 | 1335 |
| Tacoma | PST055 | 59550 | 2005 | Chevrolet | C3000 | Gasoline | 15 | 28470 | 1898 |
| Tacoma | PST055 | 59541 | 2005 | Chevrolet | C1500 | Gasoline | 15 | 30390 | 2026 |
| Tacoma | PST055 | 59608 | 2006 | Chevrolet | Cororado | Gasoline | 25 | 1181 | |
| Tacoma | PST080 | 1G | 1998 | GMC | Flatbed | Gasoline | | 4800 | |
| Tacoma | PST080 | 2G | 2009 | Chevy | Silverado 1500 | Gasoline | | 14100 | |
| Tacoma | PST120 | #912 | 2000 | Kenworth | T800B | Diesel | 25 | 1500 | |
| Tacoma | PST120 | #915 | 2005 | Kenworth | T800B | Diesel | 25 | 1250 | |
| Tacoma | PST120 | #918 | 2008 | Kenworth | T800B | Diesel | 25 | 1500 | |
| Tacoma | PST055 | H71064 | 2004 | Ford | F150 | Gasoline | 15 | 500 | |
| Tacoma | PST055 | H6872 | 1983 | GMC | TC20903 | Gasoline | 15 | 500 | |
| Tacoma | PST055 | H71114 | 2002 | Chevrolet | G2500 | Gasoline | 15 | 500 | |
| Tacoma | PST055 | H7514 | 1990 | Ford | 350 | Gasoline | 15 | 500 | |
| Tacoma | PST030 | PC53 | 1999 | FORD | Taurus | Gasoline | 10 | 1100 | |
| Tacoma | PST030 | PC55 | 2003 | MERCURY | Sable | Gasoline | 10 | 1238 | |
| Tacoma | PST030 | PG54 | 1996 | CHEVROLET | 3500HD | Gasoline | 10 | 860 | |
| Tacoma | PST030 | PB41 | 1999 | FORD-DIAMO | E-450 | Gasoline | 10 | 5366 | |
| Tacoma | PST030 | PB42 | 2005 | FORD-DIAMO | E-450 | Gasoline | 10 | 1404 | |
| Tacoma | PST030 | PB43 | 1999 | FORD-ELDOR | E-450 | Gasoline | 10 | 2294 | |
| Tacoma | PST030 | PSR56 | 1995 | FORD | F-350XL | Gasoline | 2 | 16 | |
| Tacoma | PST030 | PF67 | 1979 | INTERNATIONAL | | Gasoline | 2 | 2 | |
| Tacoma | PST030 | PF68 | 2000 | PETERBILT | | Diesel | 2 | 12 | |
| Tacoma | PST030 | PF69 | 2005 | INTERNATION | 4300 / T466 | Diesel | 2 | 160 | |
| Tacoma | PST030 | P64 | 1991 | ISUZUU | Pickup Truck | Gasoline | 10 | 398 | |
| Tacoma | PST030 | P66 | 1991 | ISUZU | Pickup Truck | Gasoline | 10 | 472 | |
| Tacoma | PST030 | P68 | 1993 | TOYOTA | Pickup Truck | Gasoline | 10 | 417 | |
| Tacoma | PST030 | P-70 | 1993 | TOYOTA | Pickup Truck | Gasoline | 10 | 1100 | |
| Tacoma | PST030 | P-73 | 2001 | DODGE | RAM 1500 | Gasoline | 10 | 1122 | |
| Tacoma | PST030 | P-74 | 2001 | DODGE | RAM 1500 | Gasoline | 10 | 1001 | |
| Tacoma | PST030 | P-75 | 2001 | DODGE | RAM 1500 | Gasoline | 10 | 2039 | |
| Tacoma | PST030 | P-76 | 2002 | FORD | F-150 | Gasoline | 10 | 1766 | |
| Tacoma | PST030 | P-77 | 2002 | FORD | F-150 | Gasoline | 10 | 2966 | |
| Tacoma | PST030 | P-78 | 2002 | FORD | F-150 | Gasoline | 10 | 1452 | |
| Tacoma | PST030 | P-79 | 2003 | FORD | F-150 | Gasoline | 10 | 2864 | |
| Tacoma | PST030 | P-80 | 2003 | DODGE | RAM 1500 | Gasoline | 10 | 1042 | |
| Tacoma | PST030 | P-81 | 2003 | DODGE | RAM 1500 | Gasoline | 10 | 3602 | |
| Tacoma | PST030 | P-82 | 2005 | FORD | F-150 | Gasoline | 10 | 3265 | |
| Tacoma | PST030 | P-83 | 2005 | FORD | F-150 | Gasoline | 10 | 1559 | |
| Tacoma | PST030 | P-84 | 2005 | FORD | F-150 | Gasoline | 10 | 2573 | |
| Tacoma | PST030 | P-85 | 2005 | FORD | F-150 | Gasoline | 10 | 2927 | |
| Tacoma | PST030 | P-86 | 2003 | FORD | F-150 | Gasoline | 10 | 4734 | |
| Tacoma | PST030 | P-87 | 2002 | FORD | F-150 | Gasoline | 10 | 670 | |
| Tacoma | PST030 | P-88 | 2004 | FORD | F-150 | Gasoline | 10 | 3437 | |
| Tacoma | PST030 | P-89 | 2000 | FORD | F-150 | Gasoline | 10 | 4434 | |
| Tacoma | PST030 | P-90 | 2008 | FORD | F-150 | Gasoline | 10 | 1877 | |
| Tacoma | PST130 | 1N | 2008 | FORD | F450 | Diesel | | 30000 | |
| Tacoma | PST130 | 2N | 2010 | FORD | E350 | Gasoline | | 10000 | |
| Tacoma | PST130 | 3N | 1979 | GRUMAN | G350 | Gasoline | | 5000 | |
| Tacoma | PST130 | 4N | 2004 | GMC | E350 | Gasoline | | 5000 | |
| Tacoma | PST130 | 5N | 2003 | FORD | F350 | Gasoline | | 1000 | |
| Tacoma | PST070 | 14094 | 1998 | Ford Eldorado Sl | Bus | Gasoline | 15 | 1113 | |
| Tacoma | PST070 | 15096 | 2000 | Ford Ranger | Ranger | Gasoline | 15 | 1118 | |

# Puget Sound Emissions Inventory
## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST070 | 15172 | 2000 | Ford Ranger | Ranger | Gasoline | 15 | 534 | |
| Tacoma | PST070 | 15175 | 2000 | Ford Ranger | Ranger | Gasoline | 15 | 455 | |
| Tacoma | PST070 | 15343 | 2004 | Ford Ranger | Ranger | Gasoline | 15 | 235 | |
| Tacoma | PST070 | 15426 | 2007 | GMC Sierra | Sierra | Gasoline | 15 | 1016 | |
| Tacoma | PST070 | 15479 | 2007 | GMC Sierra | Sierra | Gasoline | 15 | 935 | |
| Tacoma | PST070 | 15525 | 2003 | Ford -150 | F-150 | Gasoline | 15 | 302 | |
| Tacoma | PST070 | 15548 | 1989 | Dodge | Dakota | Gasoline | 15 | 75 | |
| Tacoma | PST070 | 15550 | 1990 | Dodge | Dakota | Gasoline | 15 | 75 | |
| Tacoma | PST070 | 15553 | 1989 | Dodge | Dakota | Gasoline | 15 | 452 | |
| Tacoma | PST070 | 15561 | 2003 | Forf F-150 | F-150 | Gasoline | 15 | 510 | |
| Tacoma | PST070 | 17024 | 1998 | GMC | Savana | Gasoline | 15 | 1108 | |
| Tacoma | PST070 | 18011 | 1991 | Ford F-350 | F-350 | Gasoline | 15 | 107 | |
| Tacoma | PST020 | J01 | 2004 | Ford | F350 | Gasoline | 15 | 836 | |
| Tacoma | PST020 | J02 | 2004 | Toyota | Tacoma | Gasoline | 10 | 243 | |
| Tacoma | PST020 | J11 | 2005 | Ford | F250 | Gasoline | 5 | 175 | |
| Tacoma | PST020 | J12 | 2005 | Ford | F250 | Gasoline | 5 | 2539 | |
| Tacoma | PST020 | J13 | 2005 | Ford | F250 | Gasoline | 5 | 2400 | |
| Tacoma | PST020 | J51 | 2005 | Ford | Ranger | Gasoline | 15 | 2769 | |
| Tacoma | PST020 | J52 | 2005 | Ford | Ranger | Gasoline | 15 | 0 | |
| Tacoma | PST020 | J53 | 2005 | Ford | Ranger | Gasoline | 15 | 1607 | |
| Tacoma | PST020 | J54 | 2005 | Ford | Ranger | Gasoline | 15 | 1915 | |
| Tacoma | PST020 | J55 | 2005 | Ford | Ranger | Gasoline | 15 | 1122 | |
| Tacoma | PST020 | J56 | 2005 | Ford | Ranger | Gasoline | 15 | 868 | |
| Tacoma | PST020 | J57 | 2005 | Ford | Ranger | Gasoline | 15 | 1264 | |
| Tacoma | PST020 | J58 | 2005 | Ford | Ranger | Gasoline | 15 | 1249 | |
| Tacoma | PST020 | J59 | 2005 | Ford | Ranger | Gasoline | 15 | 4967 | |
| Tacoma | PST020 | J60 | 2005 | Ford | Ranger | Gasoline | 15 | 1355 | |
| Tacoma | PST020 | J61 | 2005 | Ford | Ranger | Gasoline | 15 | 2678 | |
| Tacoma | PST020 | J62 | 2005 | Ford | Ranger | Gasoline | 15 | 2241 | |
| Tacoma | PST020 | J63 | 2005 | Ford | Ranger | Gasoline | 15 | 3037 | |
| Tacoma | PST020 | J64 | 2005 | Ford | Ranger | Gasoline | 15 | 1121 | |
| Tacoma | PST020 | J65 | 2005 | Ford | Ranger | Gasoline | 15 | 929 | |
| Tacoma | PST020 | J66 | 2005 | Ford | Ranger | Gasoline | 15 | 1303 | |
| Tacoma | PST020 | J67 | 2005 | Ford | Ranger | Gasoline | 15 | 822 | |
| Tacoma | PST020 | J68 | 2005 | Ford | Ranger | Gasoline | 15 | 2529 | |
| Tacoma | PST020 | J69 | 2005 | Ford | Ranger | Gasoline | 15 | 1077 | |
| Tacoma | PST020 | J70 | 2003 | Ford | Ranger | Gasoline | 15 | 1463 | |
| Tacoma | PST020 | J71 | 2002 | Ford | Ranger | Gasoline | 15 | 125 | |
| Tacoma | PST020 | J72 | 2002 | Chevrolet | S10 | Gasoline | 15 | 613 | |
| Tacoma | PST020 | J73 | 2003 | Ford | Ranger | Gasoline | 15 | 2784 | |
| Tacoma | PST020 | J74 | 2000 | Chevrolet | S10 | Gasoline | 15 | 447 | |
| Tacoma | PST020 | U01 | 2004 | Acroft | Ford E350 Cutaway | Gasoline | 15 | 6865 | |
| Tacoma | PST020 | U02 | 2004 | Acroft | Ford450 (perimeter s | Gasoline | 15 | 3536 | |
| Tacoma | PST020 | O01 | 2005 | Pacific Tank | 5000 gal Fuel Truck | Diesel | 5 | 538 | |
| Tacoma | PST020 | O02 | 2005 | Pacific Tank | 2500 gal Fuel Truck | Diesel | 5 | 453 | |
| Tacoma | PST100 | 1P | 2003 | Ford | 1/2 Ton | Gasoline | 15 | 6000 | |
| Tacoma | PST100 | 2P | 2000 | Chevrolet | 1/2 Ton | Gasoline | 15 | 4800 | |
| Tacoma | PST100 | 3P | 2005 | Toyota | 1/2 Ton | Gasoline | 15 | 840 | |
| Tacoma | PST100 | 4P | 2004 | Toyota | 1/2 Ton | Gasoline | 15 | 5400 | |
| Tacoma | PST100 | 5P | 2005 | Toyota | 1/2 Ton | Gasoline | 15 | 2400 | |
| Tacoma | PST010 | 3237 | 1979 | Chevrolet | C60 | Gasoline | 15 | 321 | |
| Tacoma | PST010 | 3369 | 1995 | Ford | F250XL | Gasoline | 15 | 1768 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST010 | 3371 | 1995 | Ford | F350XL FLATBED | Gasoline | 15 | 2027 | |
| Tacoma | PST010 | 3375 | 1996 | Ford | F250HD | Gasoline | 15 | 1872 | |
| Tacoma | PST010 | 3380 | 1996 | Ford | F250 TRANS(OVER | Gasoline | 15 | 2534 | |
| Tacoma | PST010 | 3382 | 1997 | Ford | F250 | Gasoline | 15 | 7431 | |
| Tacoma | PST010 | 3383 | 1997 | Ford | F250 | Gasoline | 15 | 4760 | |
| Tacoma | PST010 | 3387 | 1997 | Chevrolet | CM11006 ASTRO | Gasoline | 15 | 2019 | |
| Tacoma | PST010 | 3405 | 1999 | Dodge | RAM BR2L62 5.9L | Gasoline | 15 | 1299 | |
| Tacoma | PST010 | 3411 | 2000 | Ford | F56 SERVICEBDY | Gasoline | 15 | 1339 | |
| Tacoma | PST010 | 3430 | 1994 | Chevrolet | 1500C Cheyenne 199 | Gasoline | 15 | 2168 | |
| Tacoma | PST010 | 3431 | 1994 | Chevrolet | 1500C CHEYENNE | Gasoline | 15 | 1027 | |
| Tacoma | PST010 | 3432 | 1995 | Chevrolet | C3500 350 CID | Gasoline | 15 | 477 | |
| Tacoma | PST010 | 10169 | 1998 | Chevrolet | USED, meter 68417 | Gasoline | 15 | 1830 | |
| Tacoma | PST010 | 10333 | 2005 | Ford | ESCAPE 4x2 U95 | Gasoline | 15 | 1259 | |
| Tacoma | PST010 | 10436 | 1998 | Dodge | Ram 1500 4WD | Gasoline | 15 | 1291 | |
| Tacoma | PST010 | 10627 | 1999 | Ford | Ranger | Gasoline | 15 | 618 | |
| Tacoma | PST010 | 10643 | 2000 | Ford | EXPLORER | Gasoline | 15 | 2501 | |
| Tacoma | PST010 | 10695 | 2007 | Ford | F250XL | Gasoline | 15 | 4724 | |
| Tacoma | PST010 | 10936 | 2008 | Miles | ZX40ST | Gasoline | 15 | 10 | |
| Tacoma | PST010 | 10926 | 2008 | Ford | F350 | Gasoline | 15 | 2458 | |
| Tacoma | PST010 | 11249 | 2010 | Ford | XLT CARGO VAN | Gasoline | 15 | 3163 | |
| Tacoma | PST010 | 11250 | 2010 | Ford | XLT CARGO VAN | Gasoline | 15 | 1631 | |
| Tacoma | PST010 | 3377 | 1996 | Ford | F450 SUPERDUTY( | Gasoline | 15 | 783 | |
| Tacoma | PST010 | 3388 | 1997 | Ford | F350 | Gasoline | 15 | 7077 | |
| Tacoma | PST010 | 3395 | 1998 | Dodge | RAM PU BR2L62 | Gasoline | 15 | 3539 | |
| Tacoma | PST010 | 3398 | 1998 | Dodge | RAM PU | Gasoline | 15 | 11373 | |
| Tacoma | PST010 | 3399 | 1998 | DODGE | RAM PU | Gasoline | 15 | 2566 | |
| Tacoma | PST010 | 3402 | 1998 | Chevrolet | CP30842 | Gasoline | 15 | 6992 | |
| Tacoma | PST010 | 3404 | 1999 | Chevrolet | CG31503 | Gasoline | 15 | 3458 | |
| Tacoma | PST010 | 3409 | 1999 | Chevrolet | CC31403 C3500H | Gasoline | 15 | 9671 | |
| Tacoma | PST010 | 3410 | 2000 | Chevrolet | CC31403 | Gasoline | 15 | 9472 | |
| Tacoma | PST010 | 3412 | 2000 | Chevrolet | ASTROVAN | Gasoline | 15 | 4034 | |
| Tacoma | PST010 | 3414 | 2000 | Chevrolet | G3500 EXPRESS V | Gasoline | 15 | 2669 | |
| Tacoma | PST010 | 3421 | 2001 | Dodge | RAM 2500 BR2L62 | Gasoline | 15 | 4284 | |
| Tacoma | PST010 | 10168 | 1996 | Chevrolet | G3500 P SERIES | Gasoline | 15 | 4575 | |
| Tacoma | PST010 | 10179 | 1992 | Chevrolet | USED, meter 100,86 | Gasoline | 15 | 5835 | |
| Tacoma | PST010 | 10245 | 1996 | Chevrolet | P30 Multistop WAL | Gasoline | 15 | 3594 | |
| Tacoma | PST010 | 10437 | 2000 | Jeep | Cherokee | Gasoline | 15 | 2671 | |
| Tacoma | PST010 | 10497 | 2001 | Ford | F-150/7700 HD | Propane | 15 | 2267 | |
| Tacoma | PST010 | 10529 | 1992 | GMC | 3500 2WD | Gasoline | 15 | 151 | |
| Tacoma | PST010 | 10689 | 2004 | Ford | E250 C/V | Gasoline | 15 | 4987 | |
| Tacoma | PST010 | 10749 | 2008 | Ford | F350 | Gasoline | 15 | 6864 | |
| Tacoma | PST010 | 10823 | 2008 | Ford | F350 | Gasoline | 15 | 7387 | |
| Tacoma | PST010 | 10925 | 2008 | Ford | EXPLORER XL | Gasoline | 15 | 2376 | |
| Tacoma | PST010 | 10934 | 2008 | Ford | F250 | Gasoline | 15 | 9120 | |
| Tacoma | PST010 | 10937 | 2008 | Ford | F350 | Gasoline | 15 | 9538 | |
| Tacoma | PST010 | 10938 | 2008 | Ford | F250XL | Gasoline | 15 | 5296 | |
| Tacoma | PST010 | 11248 | 2010 | Ford | XLT CARGO VAN | Gasoline | 15 | 6769 | |
| Tacoma | PST010 | 10935 | 2008 | Miles | ZX40S | Gasoline | 15 | 88 | |
| Tacoma | PST010 | 3396 | 1998 | DODGE | RAM PU 2500 | Gasoline | 15 | 1954 | |
| Tacoma | PST010 | 3424 | 2002 | GMC | SONOMA TS10653 | Gasoline | 15 | 2224 | |
| Tacoma | PST010 | 3400 | 1998 | DODGE | D20 | Gasoline | 15 | 2198 | |
| Tacoma | PST010 | 3352 | 1992 | Isuzu | S14 | Gasoline | 15 | 229 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST010 | 3357 | 1993 | Ford | RANGER139166 | Gasoline | 15 | 761 | |
| Tacoma | PST010 | 3362 | 1994 | Chevrolet | CC20903 | Gasoline | 15 | 427 | |
| Tacoma | PST010 | 3385 | 1997 | Chevrolet | DBL CAB C3500 | Gasoline | 15 | 1438 | |
| Tacoma | PST010 | 3423 | 1994 | Chevrolet | C2500 350 2WD | Gasoline | 15 | 4343 | |
| Tacoma | PST010 | 10103 | 1996 | DODGE | DODGE 1500 | Gasoline | 15 | 1595 | |
| Tacoma | PST010 | 3374 | 1996 | Ford | F250HD | Gasoline | 15 | 1043 | |
| Tacoma | PST010 | 10516 | 2002 | Mitsubishi | Sport XLS | Gasoline | 15 | 2189 | |
| Tacoma | PST010 | 10101 | 1998 | Ford | Ranger 98 XCab | Gasoline | 15 | 1401 | |
| Tacoma | PST010 | 3317 | 1988 | Isuzu | S14 2.6L | Gasoline | 15 | 297 | |
| Tacoma | PST010 | 3425 | 2002 | GMC | SONOMA TS10653 | Gasoline | 15 | 515 | |
| Tacoma | PST010 | 3356 | 1993 | Ford | RANGER 136514 | Gasoline | 15 | 335 | |
| Tacoma | PST010 | 3419 | 1994 | Chevrolet | K1PU 1500S | Gasoline | 15 | 1859 | |
| Tacoma | PST010 | 3422 | 1994 | Jeep | CHEROKEE | Gasoline | 15 | 3441 | |
| Tacoma | PST010 | 10657 | 1997 | Chevrolet | K2500 4WD | Gasoline | 15 | 2072 | |
| Tacoma | PST010 | 10658 | 2002 | Ford | RANGER EXT-CA | Gasoline | 15 | 7059 | |
| Tacoma | PST010 | 10773 | 2001 | Ford | Taurus | Gasoline | 15 | 4132 | |
| Tacoma | PST010 | 11259 | 2005 | Ford | F250 2WD | Gasoline | 15 | 6729 | |
| Tacoma | PST010 | 11318 | 2006 | Ford | F250 2WD | Gasoline | 15 | 2964 | |
| Tacoma | PST010 | 10555 | 2006 | Ford | ESCAPE | Gasoline | 15 | 3090 | |
| Tacoma | PST010 | 10716 | 2006 | Ford | ESCAPE | Gasoline | 15 | 3124 | |
| Tacoma | PST010 | 3397 | 1998 | GMC | C15 FULL EXT CA | Gasoline | 15 | 1983 | |
| Tacoma | PST010 | 3427 | 2002 | Ford | EXPLORER | Gasoline | 15 | 545 | |
| Tacoma | PST010 | 3434 | 2003 | Ford | Explorer SUV | Gasoline | 15 | 715 | |
| Tacoma | PST010 | 10093 | 2003 | Ford | Explorer SUV | Gasoline | 15 | 777 | |
| Tacoma | PST010 | 10260 | 2005 | Toyota | Prius | Gasoline | 15 | 4310 | |
| Tacoma | PST010 | 10394 | 2005 | Ford | ESCAPE 4x2 U95 | Gasoline | 15 | 604 | |
| Tacoma | PST010 | 10435 | 2005 | Ford | Escape Hybrid 2WD | Gasoline | 15 | 1614 | |
| Tacoma | PST010 | 10662 | 2007 | Ford | ESC4D | Gasoline | 15 | 3625 | |
| Tacoma | PST010 | 10807 | 2008 | Ford | F-150 PICKUP SUP- | Gasoline | 15 | 6284 | |
| Tacoma | PST010 | 10808 | 2008 | Ford | F-15 PICKUP SUP- | Gasoline | 15 | 4886 | |
| Tacoma | PST010 | 10862 | 2000 | Ford | EXPLORER XL | Gasoline | 15 | 228 | |
| Tacoma | PST010 | 3413 | 2000 | Chevrolet | CL11006 VAN,AST | Gasoline | 15 | 641 | |
| Tacoma | PST010 | 10645 | 2006 | Kia | SEDONA LX | Gasoline | 15 | 3115 | |
| Tacoma | PST010 | 10863 | 2002 | Ford | Escape SP | Gasoline | 15 | 2901 | |
| Tacoma | PST010 | 10331 | 2005 | Ford | 103 Escape Hybrid | Gasoline | 15 | 4282 | |
| Tacoma | PST010 | 10674 | 2000 | Chevrolet | C3500 | Gasoline | 15 | 1863 | |
| Tacoma | PST010 | 3379 | 1996 | Dodge | NEON HIGHLINE | Gasoline | 15 | 303 | |
| Tacoma | PST010 | 3381 | 1997 | Ford | CLUB WAGON 15 | Gasoline | 15 | 955 | |
| Tacoma | PST010 | 3426 | 2002 | Kia | SEDONA | Gasoline | 15 | 2730 | |
| Tacoma | PST010 | 11021 | 2009 | Ford | F150 4 X 4 CREW C | Gasoline | 15 | 20552 | |
| Tacoma | PST010 | 10094 | 2003 | Ford | Explorer SUV | Gasoline | 15 | 26816 | |
| Tacoma | PST010 | 3433 | 2003 | Ford | Explorer | Gasoline | 15 | 27711 | |
| Tacoma | PST010 | 10429 | 2005 | Ford | Crown Victoria Inter | Gasoline | 15 | 5808 | |
| Tacoma | PST010 | 10752 | 2007 | Ford | EXPLORER U73 | Gasoline | 15 | 12276 | |
| Tacoma | PST010 | 10753 | 2007 | Ford | EXPLORER U73 | Gasoline | 15 | 8678 | |
| Tacoma | PST010 | 10337 | 2005 | Ford | EXPLORER | Gasoline | 15 | 7620 | |
| Tacoma | PST010 | 3435 | 2003 | Chevrolet | K15 EXT CAB PIC | Gasoline | 15 | 4284 | |
| Tacoma | PST040 | 21 | 2004 | FORD | VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 22 | 1985 | FORD | LN8000 | Diesel | 5 | 600 | |
| Tacoma | PST040 | 23 | 1995 | FORD | TANKER | Diesel | 5 | 600 | |
| Tacoma | PST040 | 27 | 1985 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 28 | 1985 | GMC | P-30 VAN | Diesel | 5 | 600 | |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST040 | 30 | 1985 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 35 | 1987 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 48 | 1984 | FORD | VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 49 | 2002 | FORD | VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 54 | 1978 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 55 | 1978 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 56 | 1978 | GMC | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 68 | 1985 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 69 | 1985 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 70 | 1985 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 74 | 1984 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 75 | 1984 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | 77 | 1984 | CHEV | P-30 VAN | Diesel | 5 | 600 | |
| Tacoma | PST040 | SSA2 | 1994 | DODGE | RAM | Gasoline | 5 | 600 | |
| Tacoma | PST040 | SSA3 | 1991 | CHEV | SPORT VAN | Gasoline | 5 | 600 | |
| Tacoma | PST040 | SSA6 | 1977 | GMC | VAN | Gasoline | 5 | 600 | |
| Tacoma | PST060 | 832 | 1999 | Dodge | Terminal Passenger V | Gasoline | 15 | 540 | 36 |
| Tacoma | PST060 | 851 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 1875 | 125 |
| Tacoma | PST060 | 816 | 1999 | Dodge | Pickup Truck 1/2 To | Gasoline | 15 | 2340 | 156 |
| Tacoma | PST060 | 860 | 2008 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 2490 | 166 |
| Tacoma | PST060 | 846 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 4290 | 286 |
| Tacoma | PST060 | 858 | 2008 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 4410 | 294 |
| Tacoma | PST060 | 830 | 1999 | Chevrolet | Step Van 16 Foot | Diesel | 15 | 5640 | 376 |
| Tacoma | PST060 | 828 | 1999 | Chevrolet | Step Van 14 Foot | Diesel | 15 | 7905 | 527 |
| Tacoma | PST060 | 825 | 1999 | Mack | Fuel Truck | Diesel | 15 | 9180 | 612 |
| Tacoma | PST060 | 848 | 2005 | Chevrolet | Pickup Truck 3/4 To | Gasoline | 15 | 10080 | 672 |
| Tacoma | PST060 | 824 | 1999 | Dodge | Pickup Truck 1 Ton | Diesel | 15 | 10200 | 680 |
| Tacoma | PST060 | 831 | 1999 | Chevrolet | Step Van 16 Foot | Diesel | 15 | 10980 | 732 |
| Tacoma | PST060 | 866 | 2001 | Freightliner | Step Van 16 Foot | Diesel | 15 | 11220 | 748 |
| Tacoma | PST060 | 845 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 12645 | 843 |
| Tacoma | PST060 | 834 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 12930 | 862 |
| Tacoma | PST060 | 812 | 1999 | Dodge | Pickup Truck 1/2 To | Gasoline | 15 | 14070 | 938 |
| Tacoma | PST060 | 801 | 1999 | Dodge | Pickup Truck 1/2 To | Gasoline | 15 | 14265 | 951 |
| Tacoma | PST060 | 865 | 2001 | Freightliner | Step Van 16 Foot | Diesel | 15 | 14385 | 959 |
| Tacoma | PST060 | 826 | 1999 | Dodge | Pickup Truck - Dako | Gasoline | 15 | 14760 | 984 |
| Tacoma | PST060 | 840 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 15120 | 1008 |
| Tacoma | PST060 | 857 | 2006 | Chevrolet | Pickup Truck 3/4 To | Gasoline | 15 | 16125 | 1075 |
| Tacoma | PST060 | 847 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 16425 | 1095 |
| Tacoma | PST060 | 850 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 17010 | 1134 |
| Tacoma | PST060 | 869 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 18810 | 1254 |
| Tacoma | PST060 | 856 | 2006 | Chevrolet | Pickup Truck 3/4 To | Gasoline | 15 | 19365 | 1291 |
| Tacoma | PST060 | 844 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 19605 | 1307 |
| Tacoma | PST060 | 861 | 2008 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 20100 | 1340 |
| Tacoma | PST060 | 839 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 20670 | 1378 |
| Tacoma | PST060 | 868 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 20985 | 1399 |
| Tacoma | PST060 | 855 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 21375 | 1425 |
| Tacoma | PST060 | 867 | 2001 | Freightliner | Step Van 16 Foot | Diesel | 15 | 22425 | 1495 |
| Tacoma | PST060 | 849 | 2005 | Chevrolet | Pickup Truck 3/4 To | Gasoline | 15 | 22860 | 1524 |
| Tacoma | PST060 | 843 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 23145 | 1543 |
| Tacoma | PST060 | 842 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 23220 | 1548 |
| Tacoma | PST060 | 841 | 2005 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 24645 | 1643 |
| Tacoma | PST060 | 859 | 2008 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 25215 | 1681 |

# Puget Sound Emissions Inventory

## Terminal Fleet Vehicle Data

| Port | Terminal ID | ID No. | YEAR | MAKE | MODEL | ENGINE | Avg Speed (mph) | Mileage 2011 | Hours 2011 |
|---|---|---|---|---|---|---|---|---|---|
| Tacoma | PST060 | 829 | 1999 | Chevrolet | Step Van 12 Foot | Gasoline | 15 | 26460 | 1764 |
| Tacoma | PST060 | 836 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 26955 | 1797 |
| Tacoma | PST060 | 853 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 27540 | 1836 |
| Tacoma | PST060 | 835 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 29685 | 1979 |
| Tacoma | PST060 | 833 | 1999 | Chevrolet | Step Van 12 Foot | Gasoline | 15 | 33570 | 2238 |
| Tacoma | PST060 | 864 | 2008 | Workhorse | Step Van 12 Foot | Gasoline | 15 | 37290 | 2486 |
| Tacoma | PST060 | 852 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 38040 | 2536 |
| Tacoma | PST060 | 854 | 2006 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 38610 | 2574 |
| Tacoma | PST060 | 838 | 2004 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 39285 | 2619 |
| Tacoma | PST060 | 827 | 1999 | Chevrolet | Step Van 14 Foot | Diesel | 15 | 40515 | 2701 |
| Tacoma | PST060 | 862 | 2008 | Chevrolet | Pickup Truck 1/2 To | Gasoline | 15 | 40530 | 2702 |
| Tacoma | PST060 | 863 | 2008 | Workhorse | Step Van 12 Foot | Gasoline | 15 | 40665 | 2711 |
| Seattle | PSS020 | | | Car | Passenger cars | Gasoline | 15 | 11813 | |
| Seattle | PSS020 | | | Minivan | | Gasoline | 15 | 60 | |