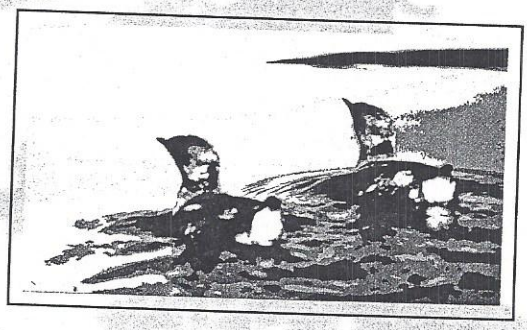
Species of Federal Concern

Thorndyke Operations Complex

Marbled Murrelet Assessment

Brachyramphus marmoratus



Prepared for Fred Hill Materials

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Species of Federal Concern:

Introduction

The objective of the following biological assessment is to determine the potential impacts that the proposed pier/single-conveyor system (referred here to as the TOC) will have on Federally Listed Species (bald eagles and marbled murrelets). This includes determining the project's possible impacts on the species' site use, primary food stocks, prey species, and foraging habitat. In addition, opportunistic observations were also made of Federal Species of Concern (olive-sided flycatcher, northern goshawk, peregrine falcon) and State Monitor Species (great blue heron, osprey).

Marbled Murrelets

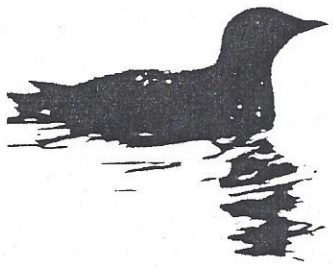
Methods

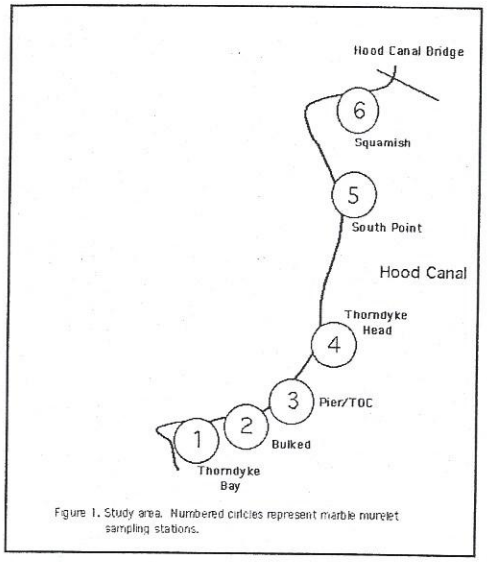
Surveys of marbled murrelets on marine waters were conducted by taking shore-based point counts. Six sampling stations will were established between Thorndyke Bay and Squamish Bay (**Fig 1**). In addition to addressing the questions concerning potential project impacts, the dispersion of sampling sites was intended to provide a general picture of murrelet distribution in the greater TOC area. The was done by dispersing the sampling sites along 3 miles of shoreline to address the following questions.

1) Does the proposed TOC/pier site represent a local hot spot of murrelet activity relative to adjacent marine habitats?

2) If murrelets are utilizing this area, is there suitable alternate foraging habitat if the pier's construction/operations result in bird displacement?

3) What is the overall biological productivity of the TOC site (as measured in marine bird abundance) relative to the entire study area?





Counts of murrelets were obtained with a 25x spotting scope during a 15-minute observation period (adapted from Raphael et al. 1999). Information recorded during each observation period included group size, age class (adult, juvenile) and behavior (resting, diving, flying, fish-holding behavior, vocalizations). On those instances where birds were located at the TOC/pier site, additional observations were to commence, thus permitting a higher resolution of murrelet behavior and habitat use. All six sites were sampled at intervals of approximately of 18 days.

Figure 1. Study area; circled numbers represent marbled murrelet/seabird sampling stations.

Results:

Seventeen complete survey routes were conducted (6 sites per route), resulting in 102 point counts being tabulated between late February and mid November. Murrelets were sighted on 9 point counts totaling 34 birds **(Table 1, Fig. 2).**

Date	Location	Time	Count	Behavior
10-May	Squamish	17:20	5	diving
1-Jun	South Point	8:30	2,1	Flying south, mid channel
2-Jun	Pier/TOC	9:15	2	Flying to NE, passing just off NavAid
25-Jun	Thorn Bay	15:22	2	roosting on surface, diving
23-Jul	Squamish	19:45	3	diving
27-Jul	Thorn Bay	17:20	1,2	diving
4-Aug	South Point	18:02	5	roosting on surface, diving
4-Aug	Squamish	18:35	7	roosting on surface, diving
22-Sep	Thorn Bay	10:20	5	roosting on surface, diving

Table 1. Summary of murrelet observations

Murrelet group size ranged from 1 to 7 individuals with a mean group size of 3.7 birds (SD=1.7). Although no attempt was made to measure precise distance from shore, all roosting/foraging individuals were found to be in relatively near shore waters (approximately 300 m from mean high water). All detections were noted between 10 May and the 22 September, which corroborates USFWS findings that MAMU presence in northern Hood Canal is largely concurrent with the breeding season (Tom Bloxton, personal communication.). Of the 48 marine-related species noted in the study area, murrelets ranked 25th in terms of their total numbers. All observations consisted of adult birds that were non-vocalizing. Fish-holding behavior was not observed. No detections of murrelets were made at any of the upland land bird plots.

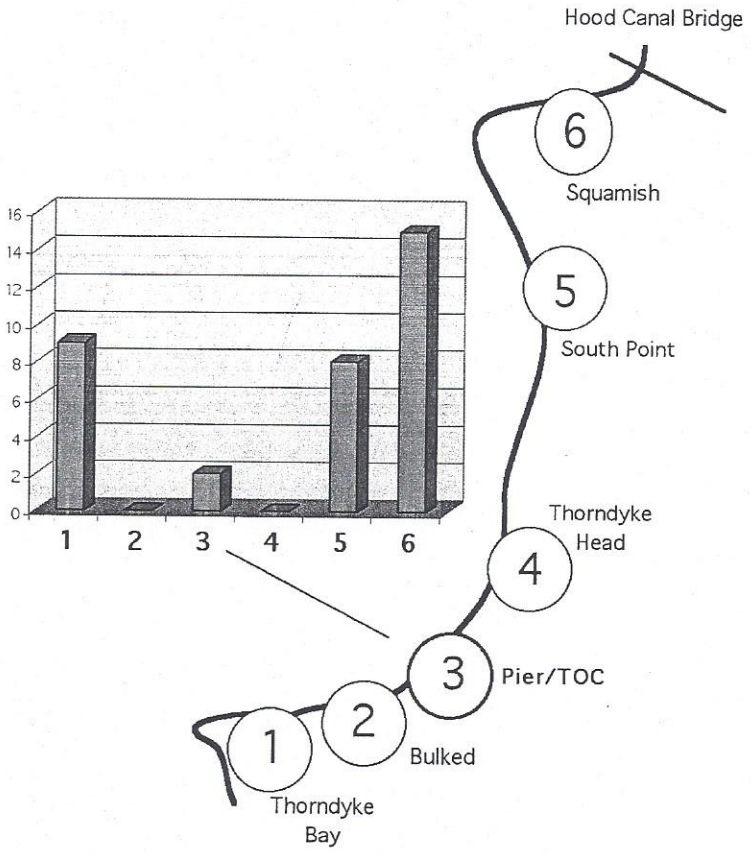


Figure 2. Distribution of marbled murrelet sightings across the study area.

Pier/TOC Sampling Station (station 3)

A total of two birds **(Fig. 2)** were noted at the TOC/Pier sampling station on 2 June. This pair was noted flying past in an easterly direction approximately 50 m from the navigation aid.. No additional sightings of birds foraging or roosting were made at this site.

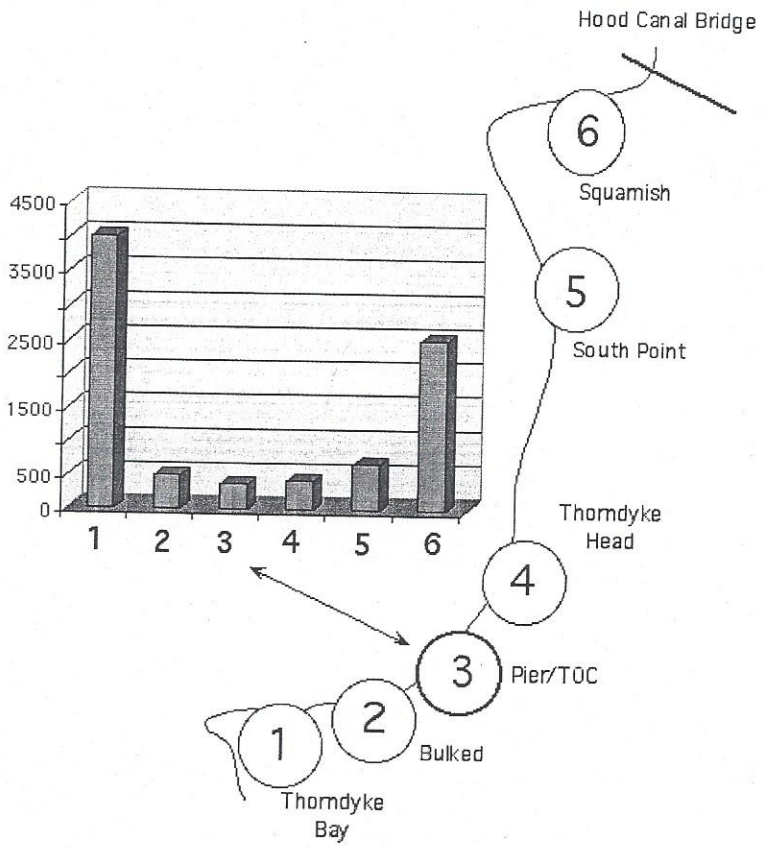


Figure 3. Total counts of marine birds at the six sampling stations.

Marine BirdsAbundance

A total of 8,435 marine birds were counted between the six sample stations **(Fig. 3).** Thorndyke Bay and Squamish Bay were found to consistently support the highest counts of marine birds while the TOC/Pier site, and the two adjacent stations (2 & 4), consistently harbored the lowest counts. The low counts at three stations was found across all seasons and foraging guilds (i.e., dabblers, piscine divers, plunge divers, benthic invertebrate feeders, shorebirds and gulls). In addition, the navigation aid adjacent to the TOC/Pier was rarely used as a gull or cormorant roost **(Fig. 4).** In contrast, the pilings and navigation structures located at South Point and Squamish Bay were found to be consistently used by double-crested cormorants, glacous-winged gulls, pigeon guillemots, American crows, purple martins and rock doves **(Fig. 5)**.

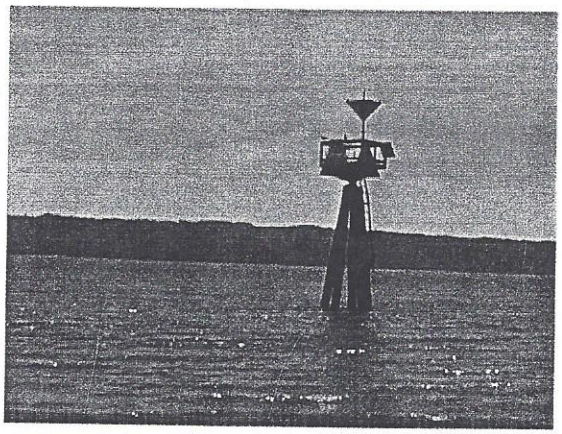


Figure 4. Navigation aid at the TOC/Pier site. This structure was rarely used as a roosting site.

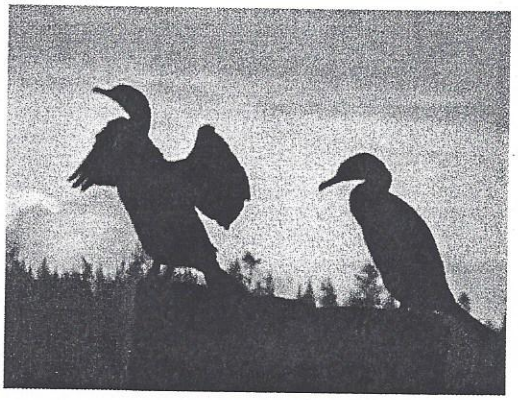


Figure 5. Double crested cormorants roosting on pilings at South Point.

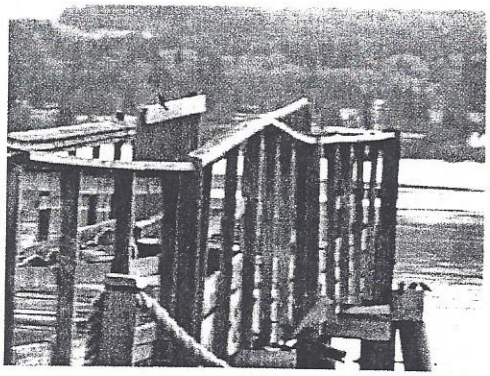


Figure. 6 Purple martins roosting on South Point dock.

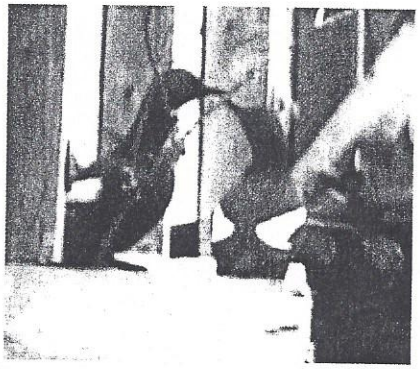


Figure 7. Pigeon guillemots roosting on South Point dock.

Discussion

Taken as a whole, these findings indicate that murrelets are present in the study area, but in small numbers. Similar to all other species of marine birds, murrelets did not show an affinity for the waters in the vicinity of the TOC/Pier site. It is not clear why counts of essentially all marine birds were consistently low at the TOC/Pier site. It is possible that the extensive sand flats found at this site provide few resources for marine birds (**Fig. 8**). Relative to adjacent shorelines, cobble/boulder fields are much less extensive and occur higher in theintertidal. Boulder fields increase structural complexity of intertidal areas and provide a substrate for macro algae, bivalves, and other invertebrates. Eelgrass beds also appeared to be relatively sparse in the vicinity of Pier sampling station. The source of these sediments appeared to be the heavily sloughing cliffs (**Fig. 9**) between sampling station 2 and Thorndyke Bay. A large volume of course woody debris has sloughed down the bluff face, resulting in a deposition of numerous logs in the intertidal zone (**Fig 10**). These logs increase habitat complexity, as they were utilized by kingfishers as hunting perches and a foraging substrate for Barrow's goldeneyes (**Fig. 11**). However, the bluffs at the TOC/Pier site are relatively stable, to the deposition of logs in the intertidal is minimal.

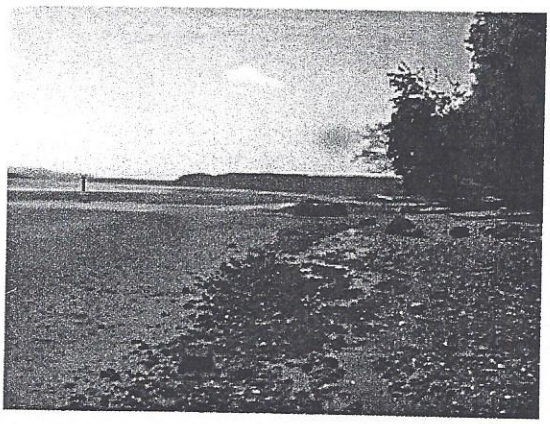


Figure 8. Beach area at TOC/Pier sampling station.

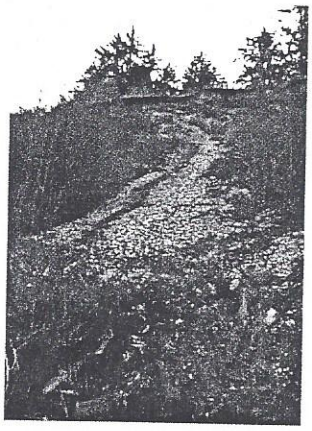


Figure 9. Sloughing glacial bluff between station 2 and Thorndyke Bay

Figure 10. Woody debris on beach originating from slouging bluff

Figure 11. Barrows goldeneye foraging on bivalves on woody debris.