

2022 KETCHIKAN PORT FACILITY RECAPITALIZATION PROJECT

Marine Mammal Monitoring & Mitigation Program Final Report National Marine Fisheries Service

Prepared for

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ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Program
AHTNA	AHTNA Infrastructure & Technologies, LLC
BiOp	Biological Opinion
DTH	Down-The-Hole drilling
Fairweather Science	Fairweather Science, LLC
hr(s)	hour(s)
IHA	Incidental Harassment Authorization
km	kilometers
m	meter
min(s)	minute(s)
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMAO	NMFS Office of Marine and Aviation Operations
PM	Project Manager
PSO(s)	Protected Species Observer(s)
SOP	Standard Operating Procedures
USACE	United States Army Corps of Engineers
WMC	Western Marine Construction

EXECUTIVE SUMMARY

AHTNA Infrastructure & Technologies, LLC (AHTNA) contracted Fairweather Science, LLC (Fairweather Science) to implement the Marine Mammal Monitoring and Mitigation Program (4MP) during the 2022 Ketchikan Port Facility Recapitalization Project (hereafter, Ketchikan Recapitalization Project) for the home port of the National Oceanic and Atmospheric Administration's (NOAA) *RV Fairweather*. This facility is located at 1010 Stedman Street in the City of Ketchikan, Alaska, and was undertaken due to failing and inadequate docking facilities for the aforementioned vessel. The demolition, removal, and replacement of the pier and landside facilities involved 77,000-square-foot upland area and a 102,000 square foot in-water area. The entire area is owned by NOAA. The relevant in-water work that took place during this project included extraction of 134 remnant 14-in diameter timber piles and 70 remnant 14-24-in steel piles, and Down-The-Hole drilling (DTH) of 16 24-in steel piles to support the new structures (a floating pier, truss-framed transfer bridge, bridge support float adjacent to the pier, and a small boat dock connected to the pier via a gangway).

Both the Incidental Harassment Authorization (IHA) and the Biological Opinion (BiOp) were issued on February 2, 2022 by NOAA's National Marine Fisheries Service (hereafter NMFS). The action agencies involved in the production and issuance of the BiOp were NMFS Office of Marine and Aviation Operations (OMAO) and Permits and Conservation Division (PR1), and the U.S. Army Corps of Engineers (USACE).

In accord with the IHA and BiOp, Fairweather Science provided a minimum of three Protected Species Observers (PSOs) throughout the pile extraction and drilling phases of this construction project. Due to the nature of the Tongass Narrows (the long, narrow marine strait along Ketchikan's waterfront), the Level A and Level B mitigation zones could only be monitored adequately by PSOs stationed at strategic locations along the western side of Revillagigedo Island. A Lead PSO was stationed at the construction site, and the other PSOs monitored from observation points near the edges of the Level B harassment zone. The portions which necessitated marine mammal observations, PSOs, for the Ketchikan Recapitalization Project took place between March 2, 2022 and July 1, 2022.

Pile extraction and drilling activities occurred from March 2, 2022 to July 1, 2022; 1 day of pile extraction were recorded, and 9 days of DTH drilling occurred. These activities did not occur back-to-back as other landside activities necessitated breaks between the in-water portions of the construction project. Three PSOs observed continuously for at least 30 minutes (min) prior to each day of extraction and/or DTH drilling event, and at least 30 min of observation occurred after the last activity for the day. Two PSOs were stationed on satellite sites near the edges of the Level B zones, and the Lead PSO observed close around the pile extraction and drilling locations in order to monitor the Level A shutdown zones.

The total on-effort PSO monitoring time was 246 hours (hrs) and 27 min; PSOs recorded 46 hrs and 6 min of pre in-water activity time and 13 hrs and 30 min of post in-water activity observation time. A total of 26 sightings (i.e., groups) of approximately 42 individual animals were observed by PSOs from March 2, 2022 to July 1, 2022 (Table 1). Steller sea lions were the most frequently observed species, followed by harbor seals and harbor porpoises.

Mitigation measures identified in the IHA were incorporated into PSO field protocol for implementation during the Project. Prior to the start of pile extraction or drilling operations, PSOs observed a series of species-specific mitigation zones (Section 2.2) for 30 min in order to request delays to in-water activity if a marine mammal was present in a shutdown zone. During the Ketchikan Recapitalization Project, 7 marine mammal sightings were observed prior to the extraction or DTH drilling activities, none of which resulted in a shutdown or work delay (Section 4.4).

As required by NMFS, monthly reports (March, June, July) were submitted during the Project. The reports summarized completed and ongoing operations, monthly and cumulative numbers of marine mammal sightings, and number and type of mitigation measures implemented. This report, submitted to NMFS within 90 days of the Project completion date (July 1, 2022), presents a summary of information requested in the IHA, as well as the BiOp, and/or the USACE permit for the Ketchikan Recapitalization Project.

Sound source verification was conducted by Robert Miner Dynamic Testing, Inc. and the results are included in Appendix E.

Table 1. Summary of Marine Mammal Sightings, Shutdowns, Level A Exposures, and Level B Exposures During the Ketchikan Recapitalization Project.

Marine Mammal Species	No. of Sightings ¹	Estimated No. of Individuals ²	No. of Shutdowns/ Delays	No. of Project Level A Exposures	No. of Allowable Project Level A Exposures	No. of Project Level B Exposures	No. of Allowable Project Level B Exposures
Humpback whale	1	1	0	0	0	0	Hawaii DPS – 40 Mexico DPS – 1
Gray whale	0	0	0	0	0	0	4
Minke whale	0	0	0	0	0	0	1
Killer whale	3	15	0	0	0	10	20
Harbor porpoise	4	4	0	0	10	1	20
Dall's porpoise	1	5	0	0	20	0	40
Pacific white-sided dolphin	0	0	0	0	0	0	200
Steller sea lion	10	10	0	0	0	6	470
Harbor seal	6	6	0	0	141	2	423
Other	1	1	0	0	NA	0	NA
Unidentified marine mammal	0	0	0	0	NA	0	NA
Unidentified pinniped	0	0	0	0	NA	0	NA
Total	26	42	0	0	NA	19	NA

¹One sighting equals one group.

²Totals do not include individuals from re-sightings.

1.0 INTRODUCTION

NMFS AKR issued an IHA to AHTNA Engineering and NOAA OMAO on February 8, 2022, under the authority of Section 101(a)(5)(D) of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 *et seq.*) for work proposed to occur during 2022 in the City of Ketchikan, Tongass Narrows, Alaska. This authorization allowed these parties to harass small numbers of marine mammals, by Level A and B acoustic harassment, incidental to the in-water work for the Ketchikan Recapitalization Project that commenced on March 2, 2022 and concluded on July 1, 2022.

The IHA authorized a small number of takes for the following species: gray whale (*Eschrichtius robustus*), minke whale (*Balaenoptera acutorostrata*), humpback whale (*Megaptera novaeangliae*), killer whale (*Orcinus orca*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoida dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Steller sea lion (*Eumetopias jubatus*), and harbor seal (*Phoca vitulina richardsi*). Marine mammal observation occurred during activities specified in the IHA issued on February 8, 2022, and the NMFS BiOp issued on February 2, 2022.

The purpose of the project was to remove an obsolete dock facility and construct a new facility- including a 240 feet (ft) × 50 ft main floating dock connected to land by a transfer bridge. A small vessel floating dock was connected to the main floating dock via a pedestrian walkway and a boat launch ramp was constructed adjacent to the other structures.

The Ketchikan Recapitalization Project was located in the Tongass Narrows in Ketchikan, southeast Alaska (Figure 1). The pile extraction and drilling activity occurred at the NOAA-owned dock, on Stedman Street within the City of Ketchikan. In-water construction activities commenced on March 2, 2022, and the final pile was drilled on July 1, 2022; a total of 10 piles were extracted (requiring monitoring) and 16 piles were installed/drilled.

The specific objectives of the monitoring and mitigation program, as outlined in the 4MP provide:

- the basis for real-time mitigation, as required by the various permits;
- the information needed to estimate the number of “takes” of marine mammals by harassment, which must be reported to NMFS;
- data on the occurrence, distribution, and activities of marine mammals in the areas where the permitted activity was conducted; and,
- information to compare the distances, distributions, behaviors, and movements of marine mammals relative to the permitted activities.

This report presents the final marine mammal data and findings from the Ketchikan Recapitalization Project, and includes information on operations, marine mammal monitoring and sightings, and mitigation measures implemented. Complete data fields are provided in Appendix A, and Appendix B contains effort and marine mammal sighting forms. An overview of marine mammal sighting data is provided in Appendix C. Our complete master effort and sightings dataset is available in Excel form, upon request. Appendix D contains an example marine mammal stranding report.



Figure 1. Ketchikan Recapitalization Project area (NMFS Consultation Number: AKRO-2021-02754).

1.1 DESCRIPTION OF ACTIVITIES

Western Marine Construction (WMC), AHTNA's construction contractor, performed vibratory pile extraction to remove an obsolete dock facility and DTH drilling methods to construct a new facility including a 240 feet (ft) × 50 ft main floating dock connected to land by a transfer bridge. A small vessel floating dock was constructed to connect to the main floating dock via a pedestrian walkway and a boat launch ramp adjacent to the other structures.

The Project site was located at 55.3345 North Latitude, -131.6297 West Longitude.

A general outline of the Project's timeline is provided in Table 2. Prior to the Project start, a kickoff meeting was held on March 2, 2022 in Ketchikan, Alaska, that was attended by representatives from AHTNA, WMC, and Fairweather Science. Fairweather Science met with the Dawson Construction protected species observers on March 1 to distribute field gear, address any remaining questions regarding Project permits and the 4MP, and review marine mammal identification and sighting cues.

The Ketchikan Recapitalization Project commenced on March 2, 2022 with vibratory pile removal operations of nine 12" round steel piles and one 16" round steel pile, during which three PSOs monitored the Project area. PSOs demobilized from the Project as the remaining timber piles could be extracted without the use of the vibratory hammer, and no in-water work requiring PSOs was conducted. PSOs remobilized to the Project on March 9, 2022 and were held on standby until AHTNA determined that PSOs were not needed for the remainder of the demolition. PSOs demobilized on March 26, 2022. Three PSOs remobilized to the Project on June 14, 2022 for the installation phase of the Project. In-water DTH drilling commenced on June 17, 2022 and ended June 19, 2022 for a prescheduled resupply barge at the Project site. During this time, land-side work took place, which did not require PSOs. In-water DTH drilling recommenced on June 27, 2022 and continued through July 1, 2022 when the installation phase of the project was completed. PSOs demobilized for the remainder of the project on July 2, 2022. A total of sixteen 24" steel round piles were driven using DTH methods.

The Lead PSO maintained contact with AHTNA and WMC personnel for marine mammal data management purposes, and distributed daily marine mammal data updates. The Fairweather Science Project Manager (PM) coordinated with the AHTNA and WMC project leads to provide marine mammal sightings updates.

Table 2. General Timeline of Events During the Ketchikan Recapitalization Project.

Date	Activity
March 1, 2022	PSO Pre Field Meeting
March 2, 2022	Kickoff meeting in Ketchikan, AK.
March 2, 2022	Project commenced. Vibratory removal of 10 round steel piles completed.
March 3, 2022	PSOs no longer needed. PSOs demobilized.
March 9, 2022	PSOs mobilized, held on standby.
March 26, 2022	AHTNA determined that PSOs were no longer needed for the rest of the demolition phase of the Project. PSOs demobilized.
June 14, 2022	PSOs mobilized for installation phase of the Project.

Date	Activity
June 17, 2022	DTH drilling commenced.
June 19, 2022	DTH drilling paused for prescheduled land-side work and resupply barge. PSOs on standby.
June 27, 2022	DTH drilling recommenced.
July 1, 2022	DTH drilling completed. Installation of 16 24” round steel piles completed.
July 2, 2022	PSOs demobilized for the remainder of the Project.

2.0 MARINE MAMMAL MONITORING AND MITIGATION PROGRAM

The IHA authorized small numbers of takes (Table 1), by Level A and Level B harassment, for 9 NMFS-managed marine mammal species. Other species of marine mammals were recorded, if observed.

The Ketchikan Recapitalization Project utilized three land-based PSOs for marine mammal monitoring and mitigation during pile extraction and drilling activities. The PSO team had two primary objectives:

Monitoring: Record numbers, behaviors, and proximity to vibratory and DTH drilling zone for marine mammal sightings during monitoring. Document animal reactions (when applicable), and environmental variables that may affect the ability to sight marine mammals.

Mitigation: Initiate necessary communication and mitigation protocols, including work shut down or request additional zone clearing time, for marine mammals within, or about to enter, the applicable zones.

2.1 VISUAL OBSERVATIONS

During the pile extraction and drilling operations, three PSOs monitored for marine mammals during daylight hours in accordance with all permits and the construction schedule. Two PSOs were stationed at satellite sites near the edges of the Level B harassment zones, and one Lead PSO was stationed at the construction site throughout the duration of in-water construction activities (Figure 2). All necessary security clearance measures were completed prior to the Lead PSO entering the work site.

The satellite PSOs were stationed at variable locations due to there being two different Level B zones to capture the full visible range required to adequately monitor both the shutdown and harassment zones. The northern satellite station, “Wolf Point” remained constant throughout the project as PSOs felt this was the best location to observe the northern section of the Level B zone. Reference points for known landmarks and distances at Wolf Point are shown in Figure 3.

During the one day of monitoring in March 2022, PSOs chose the “Mountain Point” as the southern satellite station, as they felt this location gave them a good vantage point of the southern section of the Level B zone. Reference points for known landmarks and distances at Mountain Point are shown in Figure 4.

When PSOs returned to the project in June, they established the “Mid South” location as the new southern satellite station as vegetation growth at the Mountain Point location hindered their observing ability to adequately monitor the entirety of the 11,660-meter (m) Level B zone. Reference points for known landmarks and distances at Mid South are shown in Figure 5.

All three PSOs were equipped with 7x50 Fujinon reticle binoculars, a Bushnell rangefinder, a Canon Powershot camera, Garmin GPS, and a clipboard with rite-in-the-rain datasheets. PSOs remained in contact with each other and the barge personnel at all times via marine radios or cellphones.

PSOs observed the Project area with the naked eye and binoculars. Observers scanned the area in a systematic manner, searching from left to right and included both far and near fields of view.

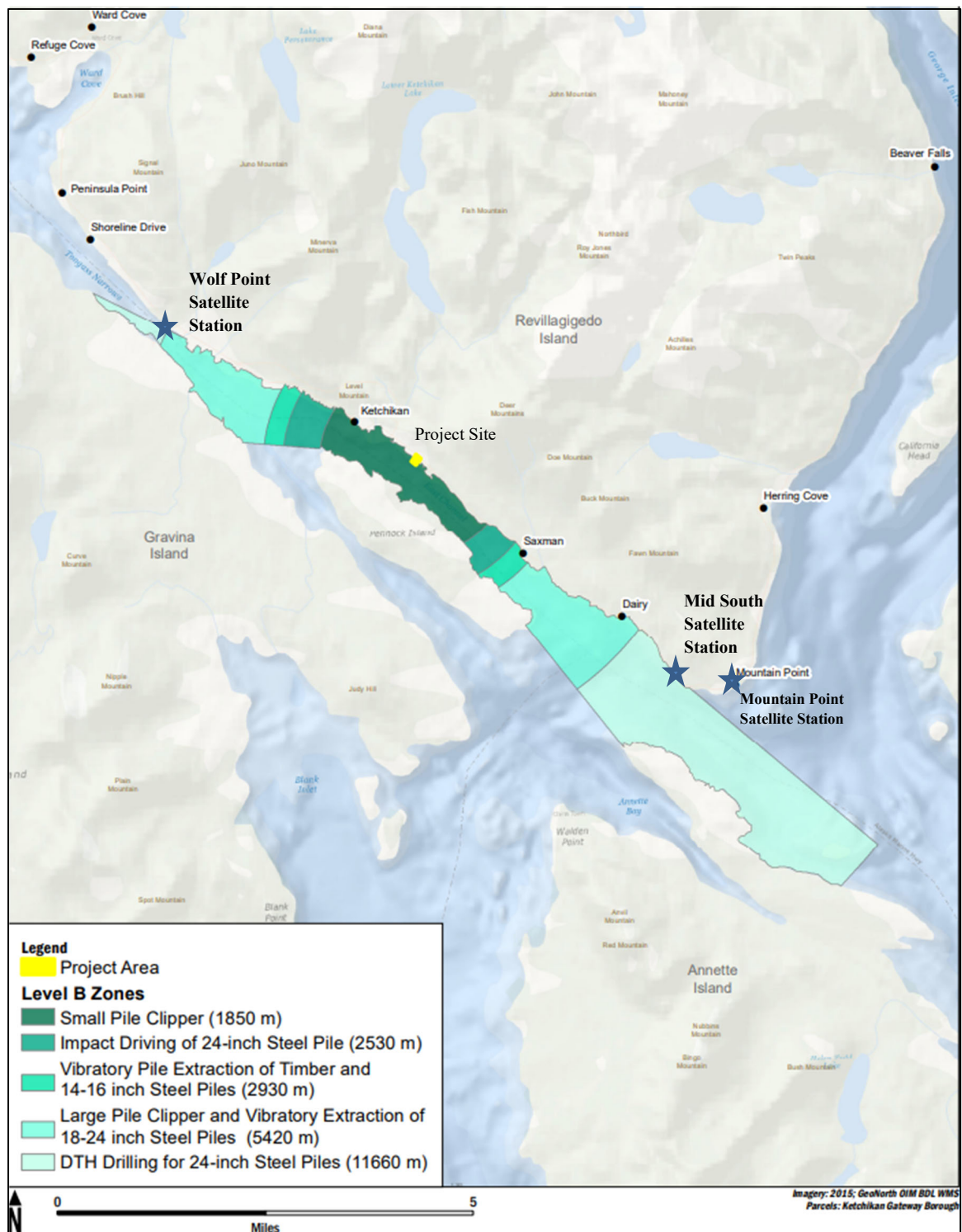


Figure 2. Level B PSO stations for the 2022 Ketchikan Recapitalization Project.

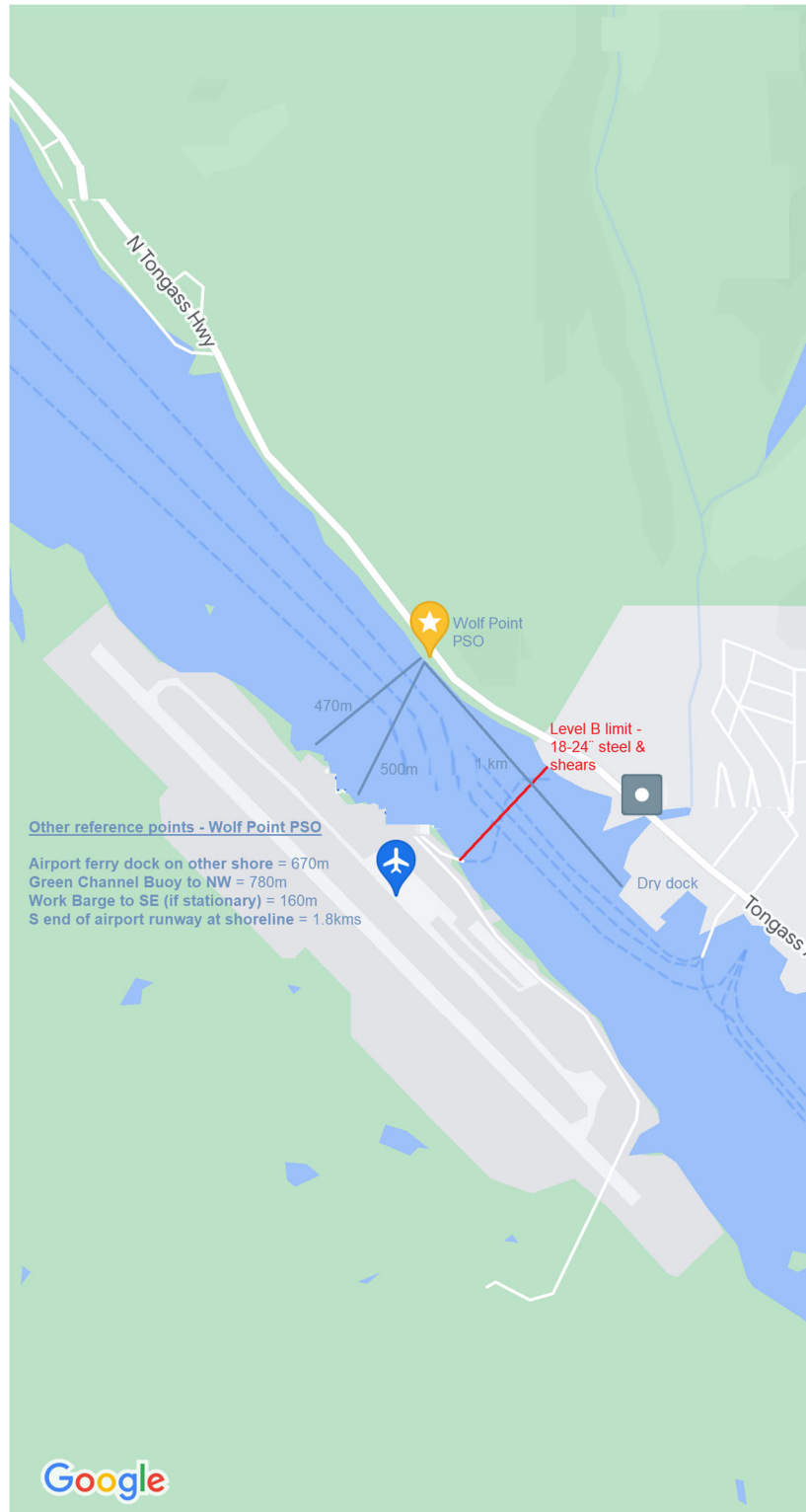


Figure 3. Reference Points at Wolf Point, PSO Satellite Station North of Project Site

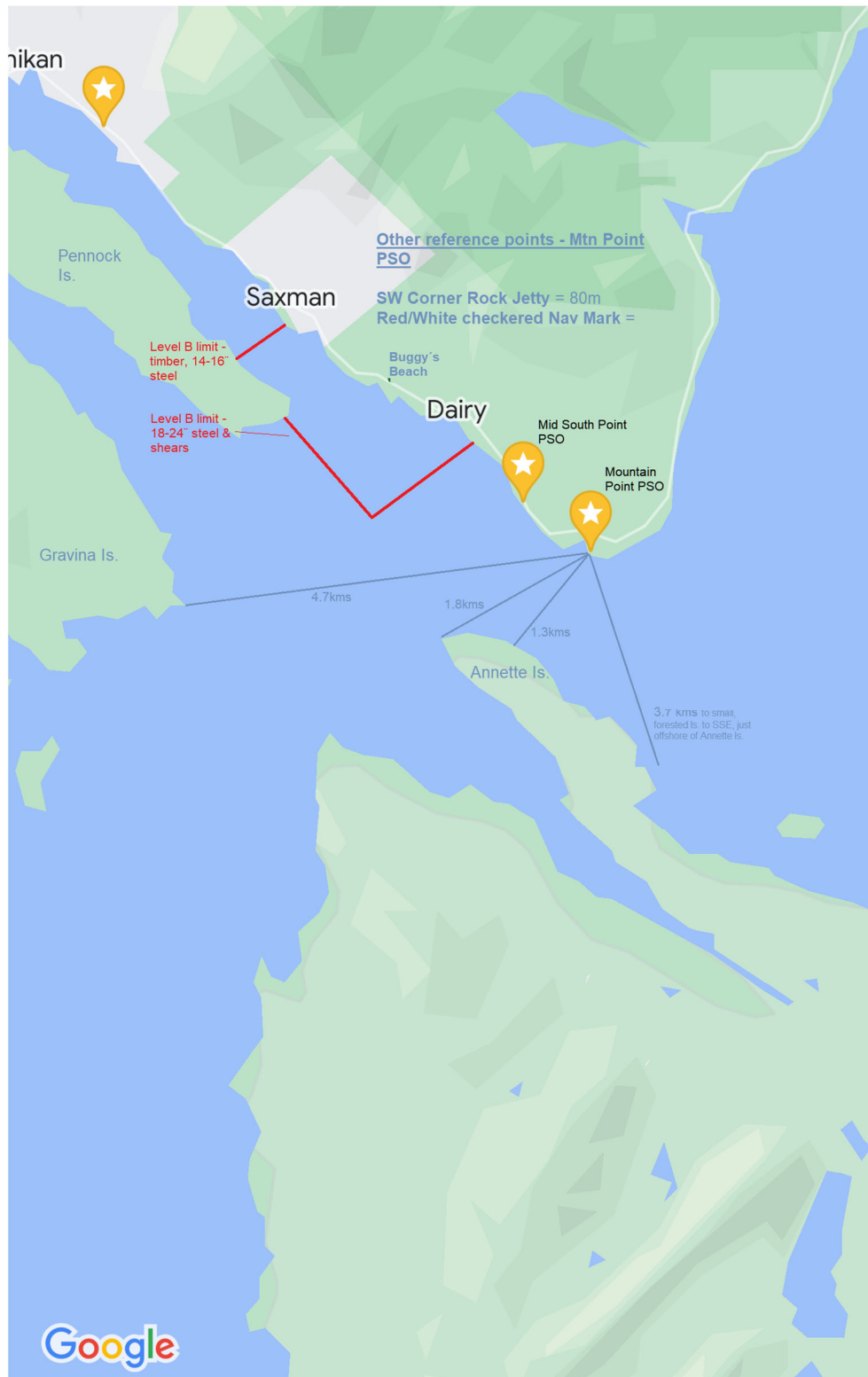


Figure 4. Reference Points at Mountain Point, March PSO Satellite Station South of Project Site

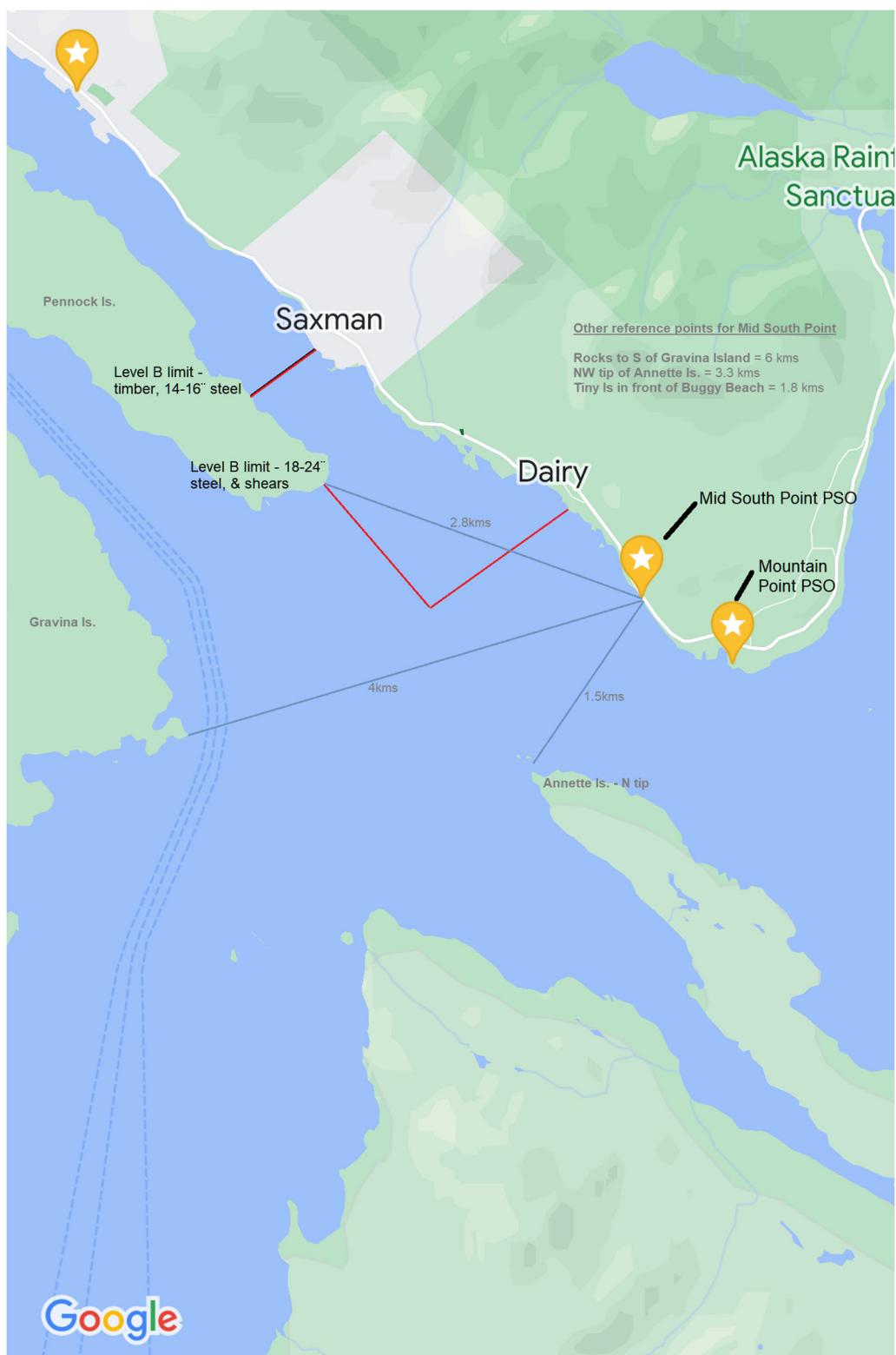


Figure 5. Reference Points at Mid South, June-July PSO Satellite Station South of Project Site

2.1.1 Data collection

PSOs collected effort and sightings data to provide a comprehensive account of marine mammal observations in the context of Project activities. Data sheets (Appendix B) printed on Rite-in-the-Rain[®] paper were used to document all records. This method of data recording was selected due to the expected low frequency of sightings and the lack of shelter or surfaces at the outdoor observing locations.

Each PSO recorded effort data at the beginning of pre-watch, at the end of post-watch, and upon any change in Project activity or environmental conditions. Marine mammal sightings were recorded immediately upon observation. Confirmed re-sightings of the same individual(s) were recorded using the ID number assigned to the original sighting and with descriptive notes detailing the re-sight. All effort and sighting data fields, units, and descriptions are provided in Appendix A.

After the end of each watch period, the Lead PSO transcribed all effort and sightings data into a master Excel database housed on Google Docs. All entries were Quality Assurance/Quality Controlled (QA/QC'ed) by the Lead PSO and the Fairweather Science PM. The Lead PSO distributed a daily marine mammal sightings summary to AHTNA and WMC personnel via email, and distributed the up-to-date master database on a weekly basis.

PSOs recorded the initial and secondary behaviors (as applicable) of each marine mammal sighting. The initial behavior was defined as the first behavior that observers noticed upon detecting the marine mammal. Secondary behaviors were additional behaviors observed over the duration of the sighting. Marine mammals were observed until they were no longer in view. PSOs also recorded any potential reactions that marine mammals may have had in response to Project operations. If the animal did not appear to acknowledge the ongoing activity, the reaction was coded as no reaction (none). For sightings comprised of more than one animal, the most common behavior of the group was recorded. Effort-specific data, including vessel activity was also recorded at the time of the sighting.

On March 2 and June 16, prior to in-water operations, the Lead PSO provided AHTNA and WMC personnel an overview of marine mammal monitoring methods (e.g., basic ID and sighting cues) for data collection if a marine mammal was observed within the 10 m shut down zone, not visible to the Lead PSO. WMC personnel were instructed to generate a record for all marine mammal sightings within the shutdown zone of in-water operations where the lead could not see around the barge. Sighting forms were distributed and remained on board the barge during in-water operations. Each completed sighting form was to be emailed to the Lead PSO at the end of each day by the superintendent for marine mammal data management – AHTNA and WMC did not record any marine mammal sightings. The Lead PSO distributed the updated version of the marine mammal database on a daily basis via email.

The PSOs reviewed protocols with the Fairweather Science management team for reporting dead or injured marine mammals as outlined in the IHA (stipulation 6[d]). An example Level A Stranding Report form is provided in Appendix D.

2.2 MITIGATION MEASURES

As outlined in the IHA and BiOp, PSOs established monitoring zones and shutdown zones around the extraction and drilling area (Table 3). The zones represented species-specific estimated 160-decibel (dB) disturbance harassment thresholds for marine mammals, as defined by NMFS. PSOs cleared the zones for 30 min prior to each vibratory and drilling event. If any marine mammals were observed within the shutdown zones, the activity did not occur until the marine mammal was visually confirmed to have exited

the shutdown zone or was not observed for an additional 30 min. The construction crew began each new pile with multiple “test drops” which assessed the performance of the DTH hammer on the bedrock where the pile would be placed. Based off the findings from the test drops, DTH drilling would commence or the construction crew would make adjustments to the hammer before initiating another round of test drops. Once the crew was satisfied with the performance of the hammer, DTH drilling would begin. PSOs observed the Project area for 30 minutes after the last in-water activity for the day; pile extraction and drilling did not occur later than 30 minutes after sunset (civil twilight). All marine mammals observed within the Project area were documented. Additionally, a shutdown zone of 10 m around vibratory and drilling activities was observed by construction and support crew as well as the Lead PSO at the Project site.

Table 3. Ketchikan Recapitalization Project Marine Mammal Monitoring Zones.

Activity	Shutdown Zone (Level A)						Harassment Zone (Level B)
	LF Cetaceans (Humpback, Minke, North Pacific Right, Gray whale)	MF Cetaceans (Killer whale, Pacific White-sided dolphin)	HF Cetaceans (Harbor, Dall's Porpoise)	Phocids (Harbor seal)	Otariids (Steller sea lion)	Sea Otter	All Marine Mammals
DTH	130m	10m	160m	70m	10m	300m	11,660m
Impact	160m	10m	180m	90m	10m	500m	2,530m
Vibratory	10m	10m	10m	10m	10m	300m	2,930m
Sm Pile Clipper	10m	10m	10m	10m	10m	300m	1,850m
Lg Pile Clipper	10m	10m	20m	10m	10m	300m	5,420m

3.0 MARINE MAMMAL MITIGATION AND MONITORING ANALYSIS

This section describes analysis methods for data collected during IHA-specified pile-drilling activities subsequent to the Ketchikan Recapitalization Project. Terminology and definitions used in this section are defined in Table 4.

Table 4. Definitions of Data Collection and Analysis Terminology.

Pre-clearance effort	Periods during which PSOs were on watch prior to vibratory or other drilling activity.
Post in-water effort	Periods when PSOs were on watch subsequent to last in-water activity for the day.
Sighting	An observation of one of more marine mammals. One sighting equals one group.
Station	Physical location where PSOs were stationed during observations, e.g., Project site, Wolf Point, Mid South/Mountain Point
Group (i.e., sighting)	One or more individuals in close proximity and behaving in a similar manner (e.g., coordinated surfacing, orientation, etc.)
Actual effort	Actual run time (hr:min) during which PSOs were on-watch, accounts for duplication.
Total effort	Total on-watch effort (hr:min); sum of independent watch periods of three PSOs.
Sighting rate	The number of marine mammal groups (or individuals) recorded per hour of observation effort. Sighting rates are calculated during pre- and post-watch effort.

3.1 MONITORING EFFORT AND ENVIRONMENTAL CONDITIONS

Monitoring effort was based on PSO observation effort records and calculated for pre- and post in-water activity watch periods. Effort by environmental conditions includes the Beaufort Sea State and visibility. Beaufort Sea State is presented by ranking on a 0-12 scale, and effort by visibility is presented with conditions encompassing distances of <0.5 kilometers (km), 0.5-0.9 km, 0.9-3.0 km, 3-10.0 km, and >10.0 km. Precipitation is displayed as relative frequency. All environmental analyses using effort data were calculated using total PSO effort.

3.2 METHODS FOR CALCULATING EFFORT HOURS

Observation effort hours were calculated on a daily basis and added to a cumulative total. Daily pre- and post in-water activity observation time was recorded and summed with on-watch times for actual daily effort. The sum was multiplied by three to capture the total PSO effort.

3.3 METHODS FOR CALCULATING SIGHTINGS AND SIGHTING RATES

Marine mammal observations are presented per species as number of sightings (i.e., one sighting equals one group), and estimated number of individuals. Rates were calculated for pre in-water activity, during in-

water activity, and post in-water activity, in addition to cumulative time periods. Actual observation effort was used to calculate all sighting rates.

3.4 MARINE MAMMAL BEHAVIOR

Marine mammal movement relative to Project activities, initial and secondary behavior states, and observable reactions were recorded for each marine mammal sighting. These data fields and associated values were consistent with those presented in other marine mammal monitoring and mitigation reports (e.g., Aerts et al. 2008; Blees et al. 2010; Lomac-MacNair et al. 2014; Fairweather Science 2020).

3.5 NUMBER OF EXPOSURES

Under the MMPA, NMFS defined levels of harassment for marine mammals. Level A harassment is defined as “...any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild.” Level B harassment is defined as “...any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.”

For Level A, the NOAA Technical Memorandum NMFS-OPR provides guidelines for assessing the onset of permanent threshold shifts (PTS) from anthropogenic sound. Under this guideline, marine mammals were separated into five functional hearing groups; source types are separated into impulsive and non-impulsive and require analyses of the distance to the peak received sound pressure level (SPL, L_{pk}) and 24-hr cumulative sound exposure level (SEL_{24h}). Monitoring and shutdown zones (Table 3) were established based on these hearing thresholds and Project sound sources.

3.5.1 Implemented Mitigation Measures

The Fairweather PM developed a Standard Operating Procedures (SOP) document prior to the commencement of the Ketchikan Recapitalization Project. The purpose of the SOP was to provide a brief summary of IHA requirements, marine mammal monitoring zones, and mitigation protocols. The PSO team also created a one-page guide that outlined PSO communication processes and shutdown zones. The documents were distributed to the construction crew and relevant vessel personnel so that all parties maintained a clear understanding of marine mammal-related monitoring and mitigation procedures throughout the duration of the Project.

4.0 RESULTS

The results below provide a summary of data collected while PSOs were on watch, during pile extraction and drilling operations that occurred on March 2, 2022, between June 16 to June 19, 2022, and from June 27 through July 1, 2022. PSOs were not required for land-side or barge work that occurred from March 3 - June 15, and marine mammals were not observed during this time; therefore, all results pertain only to PSO effort, marine mammal sightings, and environmental conditions recorded during pile extraction or drilling.

4.1 EFFORT AND ENVIRONMENTAL CONDITIONS

4.1.1 Total Monitoring Effort

The total PSO monitoring effort associated with the Ketchikan Recapitalization Project was 246 hours and 27 minutes, which included 43 hours and 6 minutes of total pre in-water activity effort and 13 hours and 30 minutes of total post in-water activity effort (Table 5). 10 piles requiring PSO monitoring were extracted and 16 steel piles were driven during the Project.

PSO watch periods during the project generally commenced at civil dawn and ended either 30 minutes after the last in-water activity for the day or at civil twilight. PSO watch periods between March 2, 2022 and July 1, 2022 began between 5:45 AM and 12:30 PM, and ended between 11:10 AM and 8:34 PM.

Pile extraction and drilling activities commenced in a variable, yet productive, manner with no delays due to marine mammal presence in the shutdown zones. Most of the wooden piles were extracted without the vibratory hammer.

Table 5. Total PSO Observation Hours Relative to In-Water Activity.

PSO Watch Relative to In-Water Activity	Actual Effort (HH:MM)	Total Effort (HH:MM)
Pre-watch	14:22	46:06
On watch	63:17	189:51
Post-watch	4:30	13:30
TOTAL	82:09	246:27

4.1.2 Monitoring Effort by Environmental Conditions

The environmental conditions in the Project area were conducive to consistent and successful monitoring efforts. Beaufort Sea States ranged from 0-4, and were documented as 3 or less for 99% of the total monitoring effort (Figure 6). Sightability ranged from “Bad” to “Excellent”, and conditions of “Good” or “Excellent” was recorded for 89% of the total monitoring effort. Visibility ranged from <0.5 km - >10 km, and a visibility of 3 km or more was recorded approximately 89% of the time (Figure 7). Precipitation occurred during 10% of effort hours (Figure 8) and included light rain (8% effort) and steady rain (2% effort). Overcast was the most recorded environmental condition during the Project (42%; n=99) followed by sunny skies (24%, n=55).

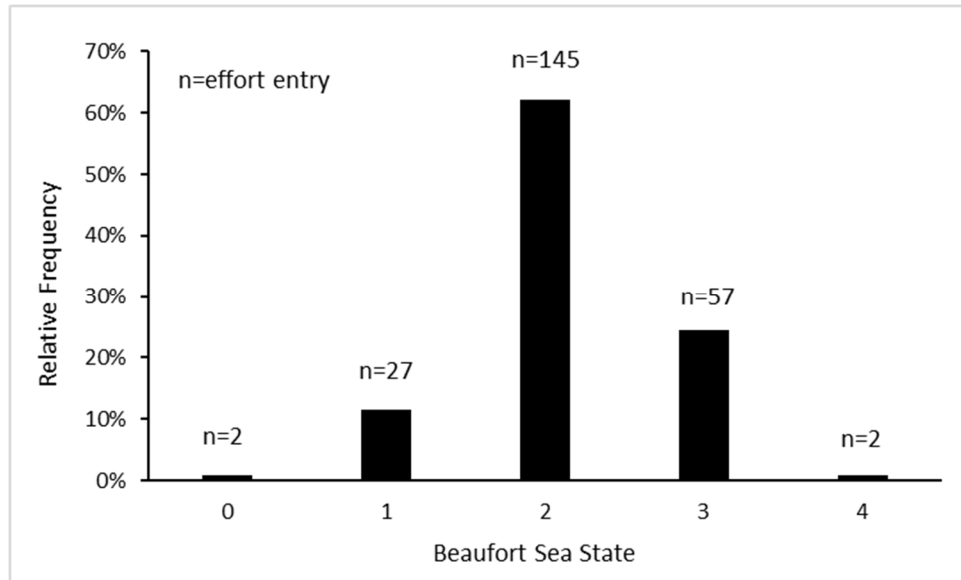


Figure 6. Relative Frequencies of Beaufort Sea State Conditions During the Project.

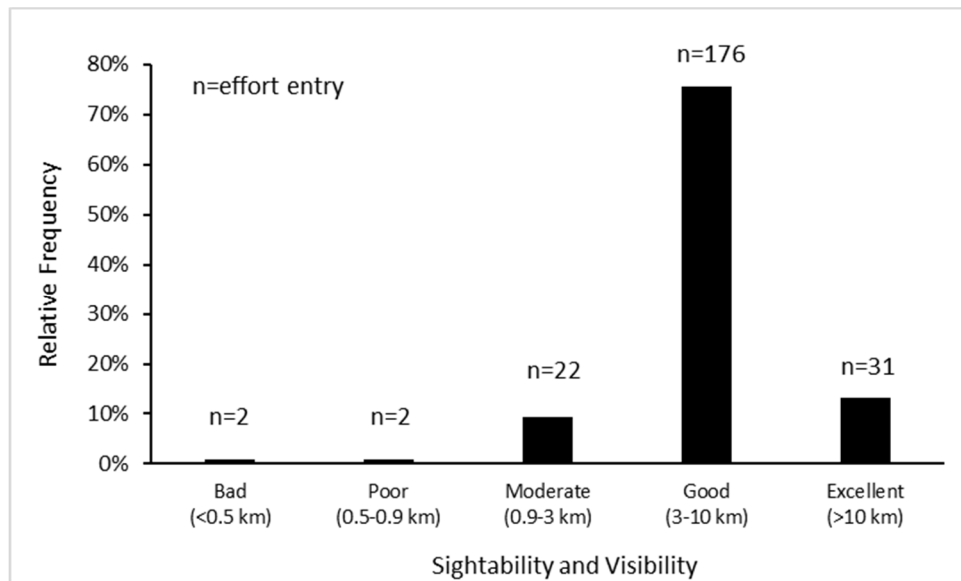


Figure 7. Relative Frequencies of Sightability and Visibility Conditions Recorded During the Project.

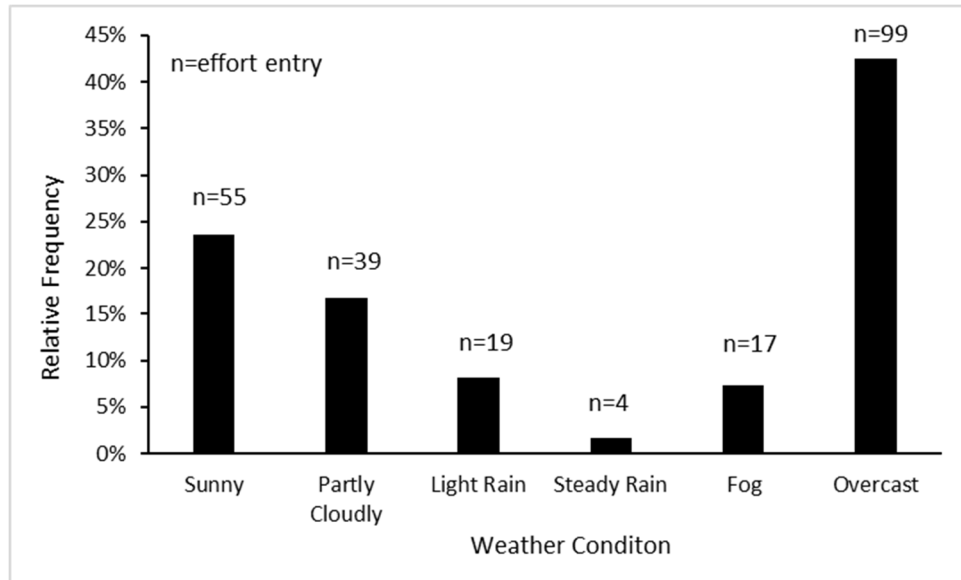


Figure 8. Relative Frequencies of Weather Conditions During the Project.

4.2 MARINE MAMMAL VISUAL OBSERVATIONS

4.2.1 Marine Mammal Sightings

During the Ketchikan Recapitalization Project, PSOs recorded a total of 26 independent marine mammal sightings comprised of 42 individuals (Table 6). There was one sighting of a northern sea otter, which is labeled as “Other”.

Table 6. Marine Mammal Sightings, Estimated Number of Individuals Observed, and Initial Behaviors Recorded During the Project.

Marine Mammal Species	No. of Sightings ¹	Estimated No. of Individuals ²	Initial Behaviors
Humpback whale	1	1	Blow
Gray whale	0	0	-
Minke whale	0	0	-
Killer whale	3	15	Swim
Harbor porpoise	4	4	Swim
Dall’s porpoise	1	5	Swim/Splash
Pacific white-sided dolphin	0	0	-
Steller sea lion	10	10	Swim
Harbor seal	6	6	Look
Other	1	1	Swim
Unidentified marine mammal	0	0	-
Unidentified pinniped	0	0	-
Total	26	42	-

¹One sighting equals one group.

²Totals do not include re-sightings.

Table 8 presents the total marine mammal sightings sighted per station.

Table 7. Total Marine Mammal Sightings and Estimated Individual Counts per PSO Station.

	North (Wolf Point)		South (Mountain Point or Mid South)		Job Site (Central)		Total	
Species	No. of Sightings ¹	Estimated No. of Individuals ²	No. of Sightings ¹	Estimated No. of Individuals ²	No. of Sightings ¹	Estimated No. of Individuals ²	No. of Sightings ¹	No. of Individuals ¹
Humpback whale	0	0	1	1	0	0	1	1
Gray whale	0	0	0	0	0	0	0	0
Minke whale	0	0	0	0	0	0	0	0
Killer whale	0	0	3	15	0	0	3	15
Harbor porpoise	0	0	1	1	3	3	4	4
Dall's porpoise	0	0	1	5	0	0	1	5
Pacific white-sided dolphin	0	0	0	0	0	0	0	0
Steller sea lion	4	4	5	5	1	1	10	10
Harbor seal	1	1	2	2	3	3	6	6
Other	1	1	0	0	0	0	1	1
Unidentified marine mammal	0	0	0	0	0	0	0	0
Unidentified pinniped	0	0	0	0	0	0	0	0
Total	6	6	13	29	7	7	26	42

¹One sighting equals one group.

²Totals do not include individuals from re-sightings.

4.2.1.1 Cetaceans

Humpback Whale

One sighting of one individual humpback whale was observed during the Project. The whale was observed during pre-watch effort, 1150m from the PSO and 6400m SE of the project site. The PSO indicated that the whale's blow was the visual sighting cue, and that the animal was traveling at a moderate pace upon initial detection. The humpback was observed leaving the Level B zone 36 minutes before DTH drilling began.

Killer Whale

There was a total of three killer whale sightings during the Project, totaling 15 individuals. One group of 5 whales was observed 2400m from the PSO and 7000m SE of the project site. The PSO indicated that the whale's body was the visual sighting cue, and that the animal was traveling East with intermittent fluke slapping and dives upon initial detection.

A group of 6 killer whales was observed 475m from the PSO and 6750m SE of the project site. The PSO indicated that the whale's dorsal fin was the visual sighting cue, and the pod consisted of 1 male, 4 females, and 1 calf. The group's primary behavior was traveling (North) and milling. The group was observed for 3 hours and 18 minutes during DTH drilling and did not appear to have any response to the construction activity.

A group of 4 killer whales was observed 1600m from the PSO and 6400m SW of the project site. The PSO indicated that the whale's dorsal fin was the visual sighting cue, and the pod consisted of 4 females. The group's primary behavior was traveling (Southeast) and swimming. The group was observed for 14 minutes during DTH drilling until the whales went out of sight of the PSO away from the project site.

Dall's Porpoise

One sighting of five individual Dall's porpoise was observed during the Project. The porpoises were observed 2800m from the PSO and 7000m from the project site. The PSO indicated that surface activity (splashing) was the visual sighting cue and the pod was swimming SE, away from the project site, when the PSO lost visual of the group.

Harbor Porpoise

There were four sightings of four individual harbor porpoise during the Project. One individual was observed 400m from the PSO and 400m from the project site, which is the closest sighting to the site. All other sightings of individual harbor porpoise were >1200m from the project site. The PSOs indicated that the porpoise's dorsal fin or body was the visual sighting cue, and in three sightings, the porpoise was only seen one time. One individual was observed during DTH drilling, 6600m from the project site, and was only seen surfacing one time.

4.2.1.2 Pinnipeds

Pinnipeds were about equally detected using binoculars and the naked eye. Collectively, pinniped species were sighted between 50 m and 1850 m from the PSO stations, with an average sighting distance of ~307 m, and were sighted between 150 m and 6450 m from the Project site, with an average distance of ~4735 m. All sightings of pinnipeds were of solitary animals. Sighting cues included head and body.

4.2.1.2.1 Behavior

Pinniped initial behaviors recorded during the Ketchikan Recapitalization Project included; look and swim, (Table 8), with swim as the most commonly recorded initial behavior. Secondary behaviors observed included; dive, sink, swim, and travel.

Table 8. Pinniped Sighting Initial Behaviors.

Pinniped Initial Behavior	Percent of Sightings (%)	Number of Sightings
Look	38%	6
Swim	62%	10
Total	100%	16

Steller Sea Lion

Steller sea lions were detected by the presence of a head (70%; n=7) or body (30%; n=3), and swim was the most commonly recorded initial behavior (70%). Behaviors were performed at slow to moderate paces. All sightings were of solitary animals. There were no Steller sea lion sightings observed during pre or post watch, and 40% of sightings (n=4) were recorded while no in-water work was occurring. 60% of sightings (n=6) were recorded in the harassment zone during DTH drilling, but no reactions to the activity were observed. The closest a Steller sea lion came to the Project site was 1800 m, while all other sightings were >5500 m from the site. No mitigation measures were required or implemented.

Harbor Seal

Harbor seals were detected by the presence of a head (67%; n=4) or body (33%; n=2), and look and swim were equally recorded as initial behavior. When look was the initial behavior, 100% of sightings recorded sink as the secondary behavior (n=3). All sightings were of solitary animals. There were two sightings of individual harbor seals during pre-watch and one sighting of an individual harbor seal during post-watch. There were two sightings of individual harbor seals in the harassment zone during DTH drilling, but no reactions to the activity were observed. No mitigation measures were required or implemented.

4.2.2 Marine Mammal Sighting Rates

Table 9 presents overall marine mammal sighting and individual animal observation rates, and Table 10 shows sightings per hour and individuals observed per hour for pre- and post-watch effort.

Steller sea lion sightings were observed at the highest overall rates, followed by harbor seals and harbor porpoises (Table 9). Killer whales had the highest overall rates of individual animals, followed by Steller sea lions and harbor seals (Table 9).

Harbor porpoises and harbor seals were observed at higher rates during pre-watch effort than post-watch (Table 10). This, however, may have been influenced by a number of confounding variables such as; occurrence of in-water activities at varying times of day, weather conditions, and low sample size.

There was one sighting of a northern sea otter (“Other”) during pre-watch effort.

Table 9. Marine Mammal Sighting Rates.

Species	No. of Sightings¹	Estimated No. Individuals²	Sightings/hour	Individuals/Hour
Humpback whale	1	1	0.01	0.01
Gray whale	0	0	0.00	0.00
Minke whale	0	0	0.00	0.00
Killer whale	3	15	0.04	0.18
Harbor porpoise	4	4	0.05	0.05
Dall's porpoise	1	5	0.01	0.06
Pacific white-sided dolphin	0	0	0.00	0.00
Steller sea lion	10	10	0.12	0.12
Harbor seal	6	6	0.07	0.07
Other	1	1	0.01	0.01
Unidentified marine mammal	0	0	0.00	0.00
Unidentified pinniped	0	0	0.00	0.00
Total	26	42	NA	NA

¹One sighting equals one group.

²Totals do not include individuals from re-sightings.

Table 10. Marine Mammal Sighting Rates During Pre and Post In-Water Activity.

	Pre In-Water Activity				Post In-Water Activity			
Species ¹	No. of Sightings ²	Estimated No. Individuals ³	No. of Sightings/hour	No. of Individuals/hour	No. of Sightings ²	Estimated No. Individuals ³	No. of Sightings/hour	No. of Individuals/hour
Humpback whale	1	1	0.07	0.07	0	0	0.00	0.00
Harbor seal	2	2	0.14	0.14	1	1	0.22	0.22
Harbor porpoise	3	3	0.21	0.21	0	0	0.00	0.00
Other	1	1	0.07	0.07	0	0	0.00	0.00
Total	7	7	-	-	1	1	-	-

¹Includes observed species only. See Table 9 for a complete list of species and overall rates.

²One sighting equals one group.

³Totals do not include individuals from re-sightings.

While no marine mammals were observed within the shutdown zone prior to the initiation of in-water activities, 8 sightings of 8 individual animals were observed within their species-specific Level B zones prior to and following some in-water activity. Table 11 shows the total daily sighting rates for individual marine mammals observed in Level B zones, by month. Exercise caution when comparing rates between months due to low sample size, and difference in number of days of in-water activity between months (1 day in March, 8 days in June, 1 day in July).

Table 11. Daily Individual Sighting Rates for Marine Mammals Observed in Level B Zones, by Month.

Species	March Individuals ¹ in the Level B zone ²	March Level B Zone Individuals/Day	June Individuals ¹ in the Level B zone ²	June Level B Zone Individuals/Day	July Individuals ¹ in the Level B zone ²	July Level B Zone Individuals/Day
Humpback whale	0	0.00	1	0.13	0	0.00
Killer whale	5	5.00	10	1.25	0	0.00
Harbor porpoise	0	0.0	2	0.25	2	2.00
Dall's porpoise	5	5.00	0	0.00	0	0.00
Steller sea lion	1	1.00	8	1	1	1.00
Harbor seal	2	2.00	4	0.5	0	0.00
Other	0	0.00	1	0.13	0	0.00
Total	13	-	26	-	3	-

¹Includes observed species only. See Table 10 for a complete list of species and overall rates.

²Species-specific Level B Zone, see Table 4.

4.3 MARINE MAMMAL EXPOSURES

There were a total of 19 marine mammal Level B exposures during in-water pile extration and DTH drilling operations associated with the Ketchikan Recapitalization Project (Table 1). There were no marine mammal Level A exposures during the Project (Table 1).

4.4 SUMMARY OF MITIGATION MEASURES

No shutdowns were implemented during the Ketchikan Recapitalization Project, and sightings did not result in any delays to operations (Table 12). All marine mammals observed prior to DTH drilling activites were visually confirmed beyond species-specific shutdown zones prior to the initiation of DTH drilling, or 30 minutes had passed without subsequent detection of the marine mammal within the species-specific shutdown zone. Appendix C contains a record of all sighting species, their proximities to the Project site, and the time of sighting.

Table 12. Number of Mitigation Measures Implemented Per Species for all Marine Mammal Sightings.

Species	Mitigation Measure ¹			
	Shut down	Delay ²	None	Total
Humpback whale	0	0	0	0
Grey whale	0	0	0	0
Minke whale	0	0	0	0
Killer whale	0	0	10	10
Harbor porpoise	0	0	1	1
Dall's porpoise	0	0	0	0
Steller sea lion	0	0	6	6
Harbor seal	0	0	2	2
Pacific white-sided dolphin	0	0	0	0
Other	0	0	0	0
Unidentified marine mammal	0	0	0	0
Unidentified pinniped	0	0	0	0
Total	0	0	19	19

¹Count refers to sightings, not individuals.

²Sightings that result in a delay of operations.

5.0 REFERENCES

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- Bles, M.K., K.G. Hartin, D.S. Ireland, and D. Hannay. 2010. Marine mammal monitoring and mitigation during open water seismic exploration by Statoil USA E&P Inc. in the Chukchi Sea, August-October 2010: 90-day Report. LGL Report P1119. Prepared by LGL Alaska Research Associates Inc., LGL Ltd., and JASCO Research Ltd. for by Statoil USA E&P Inc., National Marine Fisheries Service, and U.S. Fish and Wildlife Service. 102 pp., plus appendices.
- Fairweather Science, LLC. 2020. City of Ketchikan Rock Pinnacle Removal Project Marine Mammal Monitoring and Mitigation Report. Prepared for National Marine Fisheries Service, Alaska Region, Protected Resources Division, 222 W. 7th Avenue, #43 Anchorage, AK 99513; National Marine Fisheries Service, Permits and Conservation Division, Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD, 20910. Prepared by Fairweather Science, LLC, 301 Calista Court, Anchorage, AK 99518. April 2020.
- Lomac-MacNair, K., M.A. Smultea and G. Campbell. 2014. Draft NMFS 90-Day Report for Marine Mammal Monitoring and Mitigation during Apache's Cook Inlet 2014 Seismic Survey, 2 April – 27 June 2014. Prepared for Apache Alaska Corporation, 510 L Street #310, Anchorage AK 99501. Prepared by Smultea Environmental Sciences (SES), P.O. Box 256, Preston, WA 98050.

APPENDIX A. EFFORT AND SIGHTINGS DATA FIELD FORM DEFINITIONS

Project Name:	Project Name
Location:	Name of observation station - S1, S2, S3 (North, Central, South)
Date:	MM/DD/YYYY
Observer/PSO:	Name of Observer
Time Effort Initiated/Completed:	Time started pre-watch and time post-watch ended (military time). If there is more than one monitoring period, or observer at a location in a day, start a new form for each period, or each observer.
Lat:	Location of observation station. Decimal degrees.
Lon:	Location of observation station. Decimal degrees.

Environmental Conditions	Record at the start of monitoring period, when changes to environmental conditions occur, and at the end of monitoring period		
Visibility	Code	Distance Visible	NOTE: % Visibility of the Monitoring Zone
	B	Bad (<0.5km)	
	P	Poor (0.5-0.9km)	
	M	Moderate (0.9-3km)	
	G	Good (3-10km)	
	E	Excellent (>10km)	
Visibility %	% of Monitoring Zone Visible		
Glare	Amount of water obstructed by glare (0-100%) and direction of glare (from south, north, or other direction)		
Weather Conditions	Code	Weather Condition	
	S	Sunny	
	PC	Partly Cloudy	
	L	Light Rain	
	R	Steady Rain	
	F	Fog	
	OC	Overcast	
	SN	Snow	
	HR	Heavy Rain	
Wave Height	Code	Wave Height	
	Light	0-3 ft	
	Moderate	4-6 ft	
	Heavy	>6 ft	
BSS	Scale 0-12. See Beaufort Sea State Sheet		
Wind	From north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)		
Swell	From north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)		

Sightings

Event Code	Indicates what events are happening at the time of the sighting, and what events may have occurred due to the sighting.	
	Code	Activity Type
	E ON	Effort On
	E OFF	Effort Off
	PRE	Pre-Construction Watch
	POST	Post-Construction Watch
	CON	Construction (see types)
	S	Sighting

	M	Mitigation (see types)
	OR	Observer Rotation
Sight # (1 or 1.1 if re-sight)	Chronological (1, 2, 3, etc.) If the same marine mammal is resighted at a distance greater than 25 m from the original sighting location, record as a resight (Ex. 1.1 - same marine mammal as sighting 1, but sighted for a second time in a different location.	
Time/Dur (Start/End time if cont.)	Start and stop time, and duration of sighting	
WP/Grid #/ DIR of travel	Grid number that marine mammal was sighted in and direction of travel	
Distance from pile	Distance in meters from in-water work	
Distance from pile	Distance in meters from observer	
Optics	Code	Optics Description
	Naked eye	Enter if the distance was estimated by eye.
	7x50	Enter if the distance was determined by using the reticles in the handheld 7x50 binoculars.
	Range	Enter if the distance was determined by using the range finder.
Sighting Cue	Initial visual cue that the PSO saw and resulted in a sighting	
	Code	Distance Visible
	BI	Group of birds on water surface or hovering over a particular area, possibly feeding
	BL	Blow, exhalation visible
	BO	Body, part of the body visible
	BR	Breach
	DF	Dorsal Fin
	FL	Fluke visible above water
	FO	Wake on water surface from animal swimming
	HE	Part of the head visible
	SA	Surface Activity
	OTHR	Other
Species	Code	Marine Mammal Species
	HSEA	Harbor Seal
	STSL	Steller sea lion
	HPBK	Humpback whale (H-S)
	HAPO	Harbor porpoise
	DAPO	Dall's porpoise
	MINK	Minke whale
	ORCA	Killer whale
	GRAY	Gray whale
	PWSD	Pacific White Sided Dolphin
	SEAO	Sea otter
Group Size	Record the min and max number of individuals sighted. Then determine and record the best number of individuals	
	Code	Estimate
	Min:	Record minimum number of individuals sighted
	Max:	Record maximum number of individuals sighted
	Best:	Record best number of individuals sighted
Behavior	Code	Behavior Descriptions
	Blow/Chuff	Visible exhalation from a cetacean species.
	Breach	Cetacean jumping out of the water.

	Dead	Carcass is found. Describe condition in Notes. Complete stranding report.
	Dive	Animal dives below the water surface and is not seen again for an extended period of time.
	Enter Water	Pinniped enters the water from a haul-out for no obvious reason.
	Fight	Agonistic interactions between two or more individuals
	Fluke	Cetacean raises tail before completing a forward dive.
	Flush (from haul out)	Enters water in response to disturbance
	Foraging	Confirmed by food seen in mouth. Animal is feeding or prey is observed in combination with characteristic feeding movement/behavior.
	Haulout	Pinniped(s) resting on land or ice.
	Logging	Animal resting at the water surface. Drifting and not otherwise moving.
	Look	Animal looked in any direction above the water surface.
	Mill/Milling	Animals are slowly moving about while remaining in the same general area.
	Other	Behavior not otherwise captured by the options listed in the drop-down. Describe in the Notes.
	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
	Porpoising	Rapid travel at the water surface. Low, arching leaps above the water surface.
	Rafting	Group of animals motionless at the surface. Typical for sea otters.
	Rest/Resting	Animal is motionless at the water surface or on land/ice.
	Rush	Rapid movement into the water from the land/ice.
	Sink	Pinniped sinks below the water surface in an upright/vertical position.
	Slap	Vigorously slapping the water surface with body, flippers, tail, etc.
	Spyhop	Cetacean raises head in a vertical position with eyes above the water surface.
	Startle	Rapidly changing behavior, dispersement, or travel that suggests a response to an external event.
	Surface active	Several behaviors observed at the surface, including splashing, breaching, lobtailing, etc.
	Swim/Swimming	Animal swimming at the water surface. May include several short shallow dives.
	Tail wave	Vertical body position with tail held out of the water. Tail may be moving slowly but slapping/splashing does not occur.
	Travel/Traveling	Steady swimming in one direction.
	Vocalizing	Animal emits barks, squeals, etc.
	Unknown	Unable to determine behavior. Enter this in second behavior, if none is observed.
Construction Type	Code	Activity Type
	V	Vibratory Pile Driving
	I	Impact Pile Driving
	DTH	Down-the-Hole
	SPC	Small Pile Clipper
	LPC	Large Pile Clipper
	OWC	Over-Water Construction
	NOWC	No Over-Water Construction
	NONE	No Construction
Mitigation Type	Code	Activity Type
	SS	Soft Start
	BC	Bubble Curtain
	DE	Delay onset of In-Water Work
	SD	Shut down In-Water Work
	None	None

Exposure (Y/N)	If a marine mammal enters its Level A or Level B distance and work is actively occurring (Y), If no work is actively occurring, indicate (N)	
Confidence	Confidence level in species identification - 100, 75, or 50%	
Composition	Composition of group if there are more than one species (ie, 2 ORCA, 1 HSEA)	
# by Cohort	Estimated # of Animals By Cohort (adults, juveniles, neonates, group composition)	
CPA (m)	Closest Point of Approach - the closest distance to the in-water work the animal reaches (m)	
Time in harass zone	Estimated time spent within the harassment zone	
Reaction	Behavior Change/Response to Activity/Comments/Human Activity/ Vessel Hull # or Name/Visibility Notes	
	Code	Reaction Type
	None	No reaction observed. The animal continues to behave in same way and at the same pace as when first encountered.
	Avoid	Animal maneuvers away from project activities.
	Approach	Animal approaches project area.
	Increase Speed	Animal was traveling at a certain speed and then increased speed, likely in response to project activities.
	Decrease Speed	Animal was traveling at a certain speed and then reduced speed, likely in response to project activities.
	Change Direction	Animal was traveling in one direction and then changed course, likely in response to project activities.
	Look	Pinniped appears to look at the project activity.
	Rush	Rapid movement into the water from the land/ice, likely in response to project activities.
	Splash	Animal moves vigorously and creates a splash, likely in response to project activities.
	Startle	Animal exhibits a sudden shock or alarmed behavior, likely in response to project activities.
	Dive	Animal dives below the water surface and is not seen again for an extended period of time, likely in response to project activities.
	Interact with gear	Animal is interacting with project equipment in the water.
	Unknown	Unknown if behavior is a reaction to project activities.

APPENDIX B. EFFORT AND MARINE MAMMAL SIGHTING FORMS

Marine Mammal Observation Record

Project Name: AHTNA NOAA Fairweather Homeport

Location: _____

Date: _____

Observer/PSO: _____

Effort Initiated: _____

Effort Complete: _____

Time

Lat: _____

Lon: _____

% of Monitoring Zone Visible	Time	Visibility	Glare	Weather Conditions	Wave Height	BSS	Wind	Swell
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W
	:	B - P - M - G - E	%	S - PC - L - R - F - OC - SN - HR	Lt/Mod/Hvy		N S E W	N S E W

Page _____ of _____

Event Code	Sight # (1 or 1.1 if re-sight)	Time/Dur (Start/End time if cont.)	WP/Grid #1 DIR of travel	Distance from work (m)	Distance from PSO (m)	Optics (m)	Sighting Cue	Species	Group Size	Behavior	Construction Type	Mitigation Type	Exposure (V/N)	Confidence	Composition	# by Cohort	CPA (m)	Time in harassment zone	Reaction: Behavior Change/Response to Activity/Comments/Human Activity/ Vessel Hull # or Name/Visibility Notes
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							
E ON PRE/POST CON S M OR E OFF		:	Grid N or S W or E				BI BL BO BR DF FL FO HE SA OTHR		Min: Max: Best:		SSV SSI V DTH I SPC LPC OWC NOWC/None	SS/BC DE SD None							

APPENDIX C. MARINE MAMMAL SIGHTINGS DATA

(Re-sightings highlighted in red)

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
3/2/2022	South (Mountain Point)	11:28	11:30	DAPO	3 6 5	2800	7000	Naked Eye	SA	Splash	None	Rooster tail & footprint
3/2/2022	South (Mountain Point)	11:38	11:40	DAPO	3 6 5	2800	7500	Naked Eye	BO	SW SE	None	observe dorsal fins of porpoise swimming SE before losing sight of them past Mtn Point
06/28/22	Project Site	6:41	6:46	HAPO	1 2 1	400	400	Binoculars 7x50	BO	SW S	None	Slow progression to S parallel to far shore throughout sighting
06/29/22	Project Site	6:05	6:08	HAPO	1 2 1	1400	1500	Binoculars 7x50	BO	MILL	None	Occurred during prewatch but far from Level A zone; continued to stay N apparently
07/01/22	Project Site	6:01	6:18	HAPO	1 2 1	1150	1200	Naked Eye	BO	MILL	None	Milling between cruise terminal and far shore; lost but likely moving around far side of island
07/01/22	Mid South	11:31	11:32	HAPO	1 1 1	700	6600	Naked Eye	DF	SWIM	None	Surfaced 700m offshore. Observed one time.

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
06/30/22	Mid South	7:22	7:50	HPBK	1 1 1	1150	6400	Naked Eye	BL	BLOW TRAVEL	None	Moving SE from North end of Annette Island past Mt. Point. Direct line of travel SE
3/2/2022	Project Site	14:46	14:48	HSEA	1 1 1	150	150	Naked Eye	BO	LO SI	None	Bottling @ Surface
3/2/2022	Project Site	15:03	15:05	HSEA	1 1 1	300	300	Bino/Rangefinder	BO	LO SI	None	Bottling @ Surface
3/2/2022	Project Site	15:20	15:21	HSEA	1 1 1	300	300	Bino/Rangefinder	BO	LO SI	None	Bottling @ Surface; Vibratory removal started 2 minutes later
3/2/2022	South (Mountain Point)	6:58	6:59	HSEA	1 1 1	600	6000	Bino/Rangefinder	BO	SW E	None	
3/2/2022	South (Mountain Point)	7:03	7:05	HSEA	1 1 1	600	6000	Bino/Rangefinder	BO	SW E	None	
6/17/22	Mid South	19:53	19:58	HSEA	1 1 1	75	6360	Naked Eye	HE	LO SI	None	Moved South along shore and around corner out of sight

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
6/18/22	Project Site	9:17	9:19	HSEA	1 1 1	700	700	Binoculars 7x50	HE	SW N	None	Slow swimming N toward cruise ship dock
06/28/22	Project Site	6:06	6:08	HSEA	1 1 1	150	200	Binoculars 7x50	HE	SW N	None	Steady slow swimming to N toward cruise ship terminal; occ. looking around
06/29/22	Wolf Point	12:15	8:13	HSEA	1 1 1	140	5900	Naked Eye	HE	LOOK SINK	None	Harbor Seal 140m West of site. Look then sink.
3/2/2022	South (Mountain Point)	13:30	14:15	ORCA	4 5 5	2400	7000	Bino/Rangefinder	BO	SW E SL DI	None	SW E intermittent fluke slapping and dives. B1pod, B7 matriline
06/28/22	Mid South	9:54	11:31	ORCA	6 6 6	475	6750	Naked Eye	DF	TRAV MILL	None	Whales came around Mt Point heading NW. Moved away from shore at heading 270. Milled 2400m off shore slowly moving SE towards Annette Island.
06/28/22	Mid South	12:40	13:12	ORCA	6 6 6	2050	6350	Naked Eye	DF	MILL	None	Returned from break and whales were further N in same vicinity, North of Annette Island before moving West and out of sight.

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
06/28/22	Mid South	15:50	16:04	ORCA	4 4 4	1600	6400	Naked Eye	DF	TRAV SWIM	None	Whales came around the North end of Annette Island and headed SE along shoreline for 800m before heading East towards Mtn Pt and out of sight.
6/27/22	Wolf Point	6:55	7:02	SEAO	1 1 1	125	5840	Naked Eye	BO	SW DI	None	Swimming on back and diving. Slowly headed North. Lost in the fog.
3/2/2022	North (Wolf Point)	12:12	12:15	STSL	1 1 1	100	5500	Naked Eye	BO	SW SE	None	Not in any zone. About to go into 5420 zone. 100% confidence, naked eye. Swimming south, Female or Juvenile male
6/16/22	Mid South	8:38	8:38	STSL	1 1 1	58	6400	Naked Eye	HE	SW SE	None	surfaced once off shoreline. slowly swimming SE
6/16/22	Mid South	10:11	10:11	STSL	1 1 1	400	6400	Naked Eye	HE	SW SE	None	surfaced once. slowly swimming SE
6/19/22	Mid South	10:37	10:37	STSL	1 1 1	100	6450	Naked Eye	HE	LO SW	None	Looked then swam/dove SE around the corner and out of sight

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
6/19/22	Mid South	14:00	14:02	STSL	1 1 1	100	6400	Naked Eye	BO	LO SW	None	Looked then swam/dove SE around the corner and out of sight
6/19/22	Mid South	16:53	17:07	STSL	1 1 1	50	6400	Naked Eye	BO	LO SW	None	Travelling North alongside the shore towards the construction site
06/30/22	Wolf Point	8:13	8:30	STSL	1 1 1	200	5500	Naked Eye	HE	SWIM DIVE	None	1 STSL swimming and diving near ferry terminal
06/30/22	Wolf Point	8:30	8:30	STSL	1 1 1	200	5500	Naked Eye	HE	SWIM DIVE	None	1 STSL surfacing in same location, oriented North
06/30/22	Wolf Point	10:29	10:29	STSL	1 1 1	150	5800	Naked Eye	HE	SWIM DIVE	None	1 STSL swimming North and diving
06/30/22	Wolf Point	10:44	10:44	STSL	1 1 1	150	5800	Naked Eye	HE	SWIM DIVE	None	Same STSL surfacing in same location
06/30/22	Wolf Point	12:00	12:15	STSL	1 1 1	100	5800	Naked Eye	HE	SWIM DIVE	None	1 STSL swimming North and diving. Surfacing every few minutes

Date	Location	Sighting Time	End Time	Species	Group Size (Min, Max, Best)	Distance from PSO (m)	Distance from Work (m)	Optics	Sighting Cue	Behavior	Mitigation Measure	Notes
07/01/22	Project Site	8:31	8:37	STSL	1 1 1	1850	1800	Naked Eye	HE	SWIM TRAVEL	None	Swimming close to far shore, looking around; probable hunting; variable at first, then travel S

APPENDIX D. EXAMPLE MARINE MAMMAL STRANDING FORM

MARINE MAMMAL STRANDING REPORT - LEVEL A DATA

FIELD #: _____ NMFS REGIONAL #: _____ NATIONAL DATABASE#: _____
(NMFS USE) (NMFS USE)

COMMON NAME: _____ GENUS: _____ SPECIES: _____

EXAMINER Name: _____ Affiliation: _____

Address: _____ Phone: _____

Stranding Agreement or Authority:

CONFIDENCE CODE (Check ONE): ☐ Unconfirmed - Low ☐ Confirmed - Minimum ☐ Confirmed - Medium ☐ Confirmed - High

INITIAL OBSERVATION <input type="checkbox"/> Same Information for Level A Examination DATE: Year: _____ Month: _____ Day: _____ First Observed: <input type="checkbox"/> Beach/Land/Ice <input type="checkbox"/> Floating <input type="checkbox"/> Swimming LOCATION: State: _____ County: _____ City: _____ Body of Water: _____ Locality Details: _____ Lat (DD): _____ N Long (DD): _____ W <input type="checkbox"/> Actual <input type="checkbox"/> Estimated How Determined: (check ONE) <input type="checkbox"/> GPS <input type="checkbox"/> Map <input type="checkbox"/> Internet/Software <input type="checkbox"/> Other _____ CONDITION AT INITIAL OBSERVATION (Check ONE) <input type="checkbox"/> 1. Alive <input type="checkbox"/> 4. Advanced Decomposition <input type="checkbox"/> 2. Fresh Dead <input type="checkbox"/> 5. Mummified/Skeletal <input type="checkbox"/> 3. Moderate Decomposition <input type="checkbox"/> 6. Condition Unknown	LEVEL A EXAMINATION Examined? <input type="checkbox"/> YES <input type="checkbox"/> NO DATE: Year: _____ Month: _____ Day: _____ First Examined: <input type="checkbox"/> Beach/Land/Ice <input type="checkbox"/> Floating <input type="checkbox"/> Swimming LOCATION: State: _____ County: _____ City: _____ Body of Water: _____ Locality Details: _____ Lat (DD): _____ N Long (DD): _____ W <input type="checkbox"/> Actual <input type="checkbox"/> Estimated How Determined: (check ONE) <input type="checkbox"/> GPS <input type="checkbox"/> Map <input type="checkbox"/> Internet/Software <input type="checkbox"/> Other _____ CONDITION AT EXAMINATION (Check ONE) <input type="checkbox"/> 1. Alive <input type="checkbox"/> 4. Advanced Decomposition <input type="checkbox"/> 2. Fresh Dead <input type="checkbox"/> 5. Mummified/Skeletal <input type="checkbox"/> 3. Moderate Decomposition
LIVE ANIMAL INFORMATION INITIAL LIVE ANIMAL DISPOSITION (Check one or more) <input type="checkbox"/> 1. Left at Site <input type="checkbox"/> 5. Died at Site <input type="checkbox"/> 2. Immediate Release at Site <input type="checkbox"/> 6. Died During Transport <input type="checkbox"/> 3. Relocated and Released <input type="checkbox"/> 7. Euthanized <input type="checkbox"/> 4. Disentangled <input type="checkbox"/> 8. Transferred to Rehabilitation: <input type="checkbox"/> a. Partially <input type="checkbox"/> b. Completely <input type="checkbox"/> 9. Other: _____ Date: Year: _____ Month: _____ Day: _____ Facility: _____ CONDITION/DETERMINATION (Check one or more) <input type="checkbox"/> 1. Sick <input type="checkbox"/> 7. Location Hazardous <input type="checkbox"/> 2. Injured <input type="checkbox"/> a. To animal <input type="checkbox"/> b. To public <input type="checkbox"/> 3. Out of Habitat <input type="checkbox"/> 8. Unknown/CBD <input type="checkbox"/> 4. Deemed Releasable <input type="checkbox"/> 9. No Rehabilitation Options <input type="checkbox"/> 5. Abandoned/Orphaned <input type="checkbox"/> 10. Other: _____ <input type="checkbox"/> 6. Inaccessible	DEAD ANIMAL INFORMATION CARCASS STATUS (Check one or more) <input type="checkbox"/> 1. Frozen for Later Examination/Necropsy Pending <input type="checkbox"/> 2. Left at Site <input type="checkbox"/> 5. Landfill <input type="checkbox"/> 8. Towed: Lat _____ Long _____ <input type="checkbox"/> 3. Buried <input type="checkbox"/> 6. Incinerated <input type="checkbox"/> 9. Sunk: Lat _____ Long _____ <input type="checkbox"/> 4. Rendered <input type="checkbox"/> 7. Composted <input type="checkbox"/> 10. Unknown/Other _____ NECROPSIED <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Limited <input type="checkbox"/> Complete <input type="checkbox"/> Carcass Fresh <input type="checkbox"/> Carcass Frozen/Thawed CARCASS CODE AT NECROPSY <input type="checkbox"/> Code 2 <input type="checkbox"/> Code 3 <input type="checkbox"/> Code 4 NECROPSIED BY: _____ Date: Year: _____ Month: _____ Day: _____ PHOTOS/VIDEOS TAKEN: <input type="checkbox"/> YES <input type="checkbox"/> NO Photo/Video Disposition: _____
MORPHOLOGICAL INFORMATION SEX (Check ONE) ESTIMATED AGE CLASS (Check ONE) <input type="checkbox"/> 1. Male <input type="checkbox"/> 1. Adult <input type="checkbox"/> 4. Pup/Calf <input type="checkbox"/> 2. Female <input type="checkbox"/> 2. Subadult <input type="checkbox"/> 5. Unknown <input type="checkbox"/> 3. Unknown <input type="checkbox"/> 3. Yearling <input type="checkbox"/> Whole Animal <input type="checkbox"/> Partial Animal Straight Length: _____ <input type="checkbox"/> cm <input type="checkbox"/> in <input type="checkbox"/> Actual <input type="checkbox"/> Estimated <input type="checkbox"/> Not Measured Weight: _____ <input type="checkbox"/> kg <input type="checkbox"/> lb <input type="checkbox"/> Actual <input type="checkbox"/> Estimated <input type="checkbox"/> Not Weighed SAMPLES COLLECTED (Check one or more) <input type="checkbox"/> 1. Histology <input type="checkbox"/> 2. Other Diagnostics <input type="checkbox"/> 3. Life History <input type="checkbox"/> 4. Skeletal <input type="checkbox"/> 5. Other _____ PARTS TRACKING (Check one or more) <input type="checkbox"/> 1. Scientific Collection <input type="checkbox"/> 2. Educational Collection <input type="checkbox"/> 3. Other: _____	OCCURRENCE DETAILS <input type="checkbox"/> Restrand GE# _____ (NMFS Use) Group Event: <input type="checkbox"/> YES <input type="checkbox"/> NO If Yes, Type: <input type="checkbox"/> Cow/Calf Pair <input type="checkbox"/> Mass Stranding <input type="checkbox"/> UME # Animals: _____ <input type="checkbox"/> Actual <input type="checkbox"/> Estimated Was the Marine Mammal Human Interaction Report completed? <input type="checkbox"/> YES <input type="checkbox"/> NO Findings of Human Interaction: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Could Not Be Determined (CBD) If YES evidence of: 1. Vessel Interaction <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> CBD 2. Shot <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> CBD 3. Fishery Interaction <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> CBD 4. Other Human Interaction: _____ If YES, what was the likelihood that the human interaction contributed to the stranding event? <input type="checkbox"/> Uncertain (CBD) <input type="checkbox"/> Improbable <input type="checkbox"/> Suspect <input type="checkbox"/> Probable Gear/HI Items Collected? <input type="checkbox"/> YES <input type="checkbox"/> NO Gear Disposition: _____ Other Findings Upon Level A: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Could Not Be Determined (CBD) If Yes, Choose one or more: <input type="checkbox"/> 1. Illness <input type="checkbox"/> 2. Injury <input type="checkbox"/> 3. Pregnant <input type="checkbox"/> 4. Other: _____ How Determined (Check one or more): <input type="checkbox"/> External Exam <input type="checkbox"/> Internal Exam <input type="checkbox"/> Necropsy <input type="checkbox"/> Other: _____

TAG DATA		ID#	Color	Type	Placement*	Applied	Present	Removed
Tags Were:					(Circle ONE)			
Present at Time of Stranding (Pre-existing):	<input type="checkbox"/> YES <input type="checkbox"/> NO				D DF L R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Applied during Stranding Response/Release:	<input type="checkbox"/> YES <input type="checkbox"/> NO				LF LR RF RR			
Applied during Rehabilitation/Release:	<input type="checkbox"/> YES <input type="checkbox"/> NO				D DF L R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Absent but Suspect Prior Tag:	<input type="checkbox"/> YES <input type="checkbox"/> NO				LF LR RF RR			
					D DF L R	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
					LF LR RF RR			

* D= Dorsal; DF= Dorsal Fin; L= Left Lateral Body R= Right Lateral Body LF= Left Front; LR= Left Rear; RF= Right Front; RR= Right Rear

ADDITIONAL IDENTIFIER: _____ (If animal is restranded, please indicate any previous field numbers here)

ADDITIONAL REMARKS:

DISCLAIMER

THESE DATA SHOULD NOT BE USED OUT OF CONTEXT OR WITHOUT VERIFICATION. THIS SHOULD BE STRICTLY ENFORCED WHEN REPORTING SIGNS OF HUMAN INTERACTION DATA.

DATA ACCESS FOR LEVEL A DATA

UPON WRITTEN REQUEST, CERTAIN FIELDS OF THE LEVEL A DATA SHEET WILL BE RELEASED TO THE REQUESTOR PROVIDED THAT THE REQUESTOR CREDIT THE STRANDING NETWORK AND THE NATIONAL MARINE FISHERIES SERVICE. THE NATIONAL MARINE FISHERIES SERVICE WILL NOTIFY THE CONTRIBUTING STRANDING NETWORK MEMBERS THAT THESE DATA HAVE BEEN REQUESTED AND THE INTENT OF USE. ALL OTHER DATA WILL BE RELEASED TO THE REQUESTOR PROVIDED THAT THE REQUESTOR OBTAIN PERMISSION FROM THE CONTRIBUTING STRANDING NETWORK AND THE NATIONAL MARINE FISHERIES SERVICE.

PAPERWORK REDUCTION ACT INFORMATION

PUBLIC REPORTING BURDEN FOR THE COLLECTION OF INFORMATION IS ESTIMATED TO AVERAGE 30 MINUTES PER RESPONSE, INCLUDING THE TIME FOR REVIEWING INSTRUCTIONS, SEARCHING EXISTING DATA SOURCES, GATHERING AND MAINTAINING THE DATA NEEDED, AND COMPLETING AND REVIEWING THE COLLECTION OF INFORMATION. SEND COMMENTS REGARDING THIS BURDEN ESTIMATE OR ANY OTHER ASPECT OF THE COLLECTION INFORMATION, INCLUDING SUGGESTIONS FOR REDUCING THE BURDEN TO: CHIEF, MARINE MAMMAL AND SEA TURTLE CONSERVATION DIVISION, OFFICE OF PROTECTED RESOURCES, NOAA FISHERIES, 1315 EAST-WEST HIGHWAY, SILVER SPRING, MARYLAND 20910. NOT WITHSTANDING ANY OTHER PROVISION OF THE LAW, NO PERSON IS REQUIRED TO RESPOND, NOR SHALL ANY PERSON BE SUBJECT TO A PENALTY FOR FAILURE TO COMPLY WITH, A COLLECTION OF INFORMATION SUBJECT TO THE REQUIREMENTS OF THE PAPERWORK REDUCTION ACT, UNLESS THE COLLECTION OF INFORMATION DISPLAYS A CURRENTLY VALID OFFICE OF MANAGEMENT AND BUDGET (OMB) CONTROL NUMBER.



APPENDIX E. SOUND SOURCE VERIFICATION REPORT