

# **Marine Mammal Monitoring Plan**

## **Falls Bridge Replacement Project**

### **Submitted To**

National Marine Fisheries Service  
Office of Protected Resources  
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## Acronyms and Abbreviations

dB	Decibel
DTH	Down-the-hole
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
M	Meters
MaineDOT	Maine Department of Transportation
PLAN	Marine Mammal Monitoring Plan
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PSOs	Protected Species Observers
PTS	Permanent Threshold Shift
RMS	Route Mean Square
SEL	Sound Exposure Level
SPL	Sound Pressure Level

# 1 Introduction

The Maine Department of Transportation (MaineDOT) will implement the following Marine Mammal Monitoring Plan (Plan) during pile installation and removal for the Blue Hill Falls Bridge Replacement Project (Project) in Blue Hills, Maine.

## 1.1 Purpose and Need

This Plan was prepared as required in the Incidental Harassment Authorization (IHA) request under the Marine Mammal Protection Act (MMPA). The Project has the potential to generate elevated levels of in-air and underwater noise that could exceed Level A (injury) and Level B (disturbance) harassment thresholds established by NMFS under the technical guidance (NMFS 2016).

Level A harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment means any act of pursuit, torment, or annoyance that 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.

Harbor porpoise (*Phocoena phocoena*), Atlantic white-sided dolphin (*Lagernorhynchus acutus*), Common dolphin (*Delphinus delphis*), Harbor seal (*Phoca vitulina*), Gray seal (*Halichoerus grypus*), Harp seal (*Pagophilus groenlandicus*), and Hooded seal (*Cystophora cristata*) have the potential to occur within the project area, and incidental take has been authorized for each (Table 1 of the IHA).

This Plan describes the methods that will be implemented to avoid, minimize and mitigate potential harassment of marine mammals during pile installation and removal. Qualified Protected Species Observers (PSOs) will be always present on-site during pile installation and removal. Marine mammal species information, numbers, behavior, frequency of observation, and tidal cycles will be recorded during each event.

This Plan must be used in conjunction with the Blue Hill Falls Bridge IHA and associated incidental take statement (ITS) issued by NMFS. All marine mammal monitoring must be conducted in compliance with this Plan, the MMAP, and the IHA and ITS. If discrepancies exist among the documents, the project IHA and ITS supersede this Plan.

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## 2 Avoidance and Minimization Measures

### 2.1 Soft Starts

The contractor will be responsible for initiating soft start procedures for impact pile driving activities. Soft start procedures will require an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. The purpose of the soft start is to provide an audible warning to marine mammals within the harassment zones, giving them the opportunity to vacate the area before noise reaches the threshold of disturbance.

### 2.2 Harassment Zones

#### 2.2.1 Level A Harassment

Sound propagation and the distances to the sound isopleths defined by NMFS for Level A harassment of marine mammals were estimated using the User Spreadsheet version 2.2 (NMFS 2020). This method uses estimates of sound pressure levels and duration of the activity to calculate the threshold distances at which a marine mammal exposed to those values would experience a permanent threshold shift. Differences in hearing abilities among marine mammals are accounted for by use of weighting factor adjustments for the five functional hearing groups (NMFS 2016b). The cumulative Single Strike Equivalent ( $SEL_{cum}$ ) method was used for calculating isopleths. Using this method resulted in larger isopleths than those produced using the peak source level method.

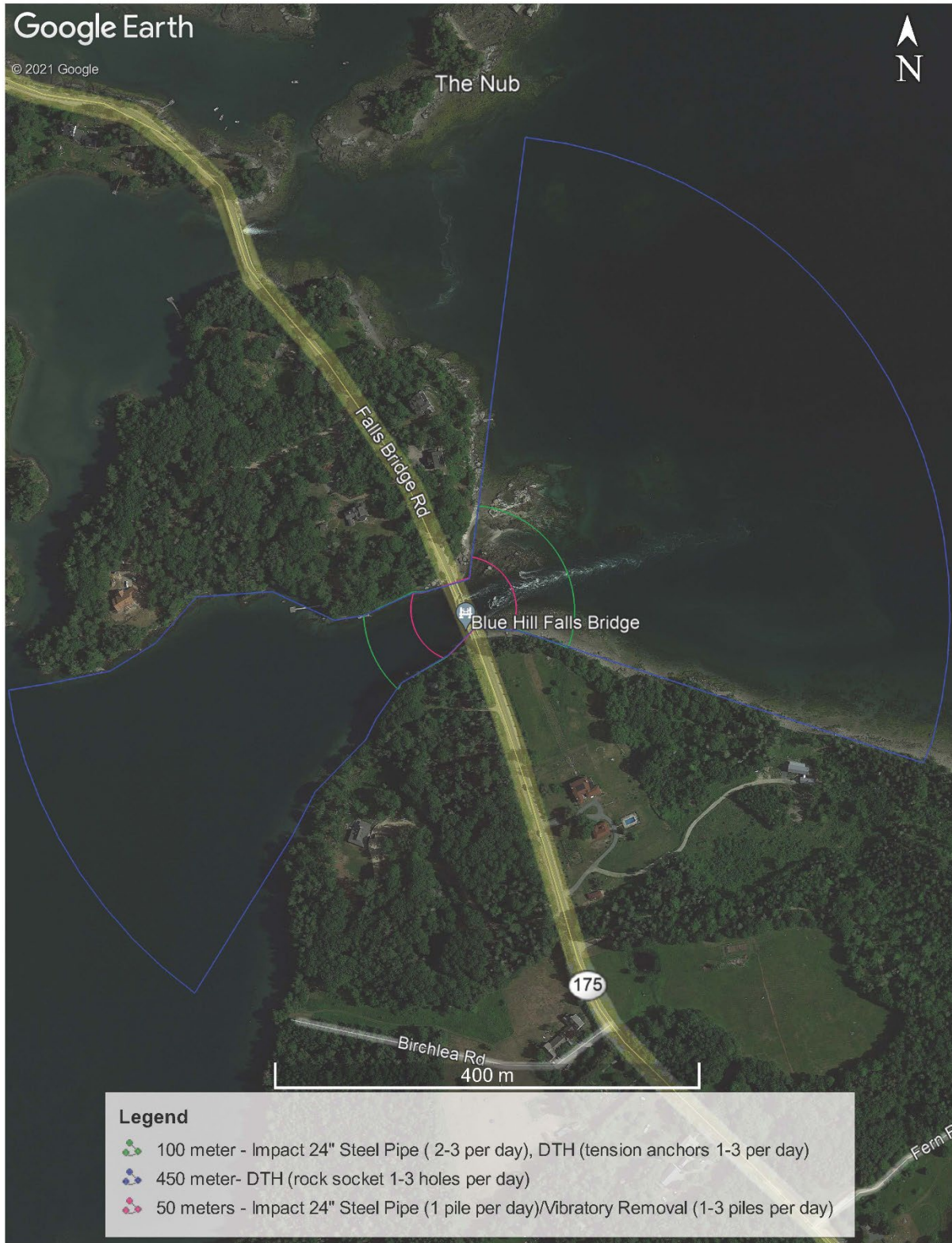
Based on estimated productivity rates, Level A harassment isopleths were calculated for numbers of piles that are likely to be installed each day (Table 2-1). This allows the contractor to reduce the size of monitoring zones if fewer than three piles are planned for installation/removal that day.

Shutdown zones will be implemented to prevent injury to marine mammals (Table 2-1; Figure 2-1 and Figure 2-2). The shutdown zones are larger than the species-specific Level A harassment zones as defined under the MMPA. To avoid and minimize potential Level A exposure, pile installation and removal activities will cease when a marine mammal enters the designated shutdown zone.

**Table 2–1. Calculated Distance to Level A Harassment Isoleths and Shutdown Zones during Pile Installation and Removal**

Activity	Pile/Hole Diameter(s)	Minutes per Pile or Strikes per Pile	Piles Installed or Removed per day	Level A Harassment Isoleth Distance (m)			Shutdown Distance (m)	
				Cetaceans		Pinnipeds	Cetaceans	Pinnipeds
				MF	HF	Phocid		
Impact	24-inch steel pipe	20 Strikes	3 piles	3	73	33	100	50
			2 piles	2	56	25		
			1 pile	1	35	16	50	
DTH (Rock Socket)	24-inch steel pipe	60 Minutes	Based on Minutes of DTH (estimated 60 minutes per pile)	6	199	89	450	200
		120 Minutes		10	315	142		
		180 Minutes		13	413	186		
DTH (Tension Anchor)	8-inch steel pipe	60 Minutes		2	43	20	100	50
		120 Minutes		2	68	31		
		180 Minutes		3	89	40		
Vibratory Removal	24-inch steel pipe	30 Minutes	3 piles	2	25	11	50	50

Notes: LF = MF = Mid-Frequency; HF = High-Frequency; DTH = Down-the-hole pile installation



**Figure 2–1. Shutdown Zones for Cetaceans during Pile Installation and Removal for Falls Bridge Replacement Project**





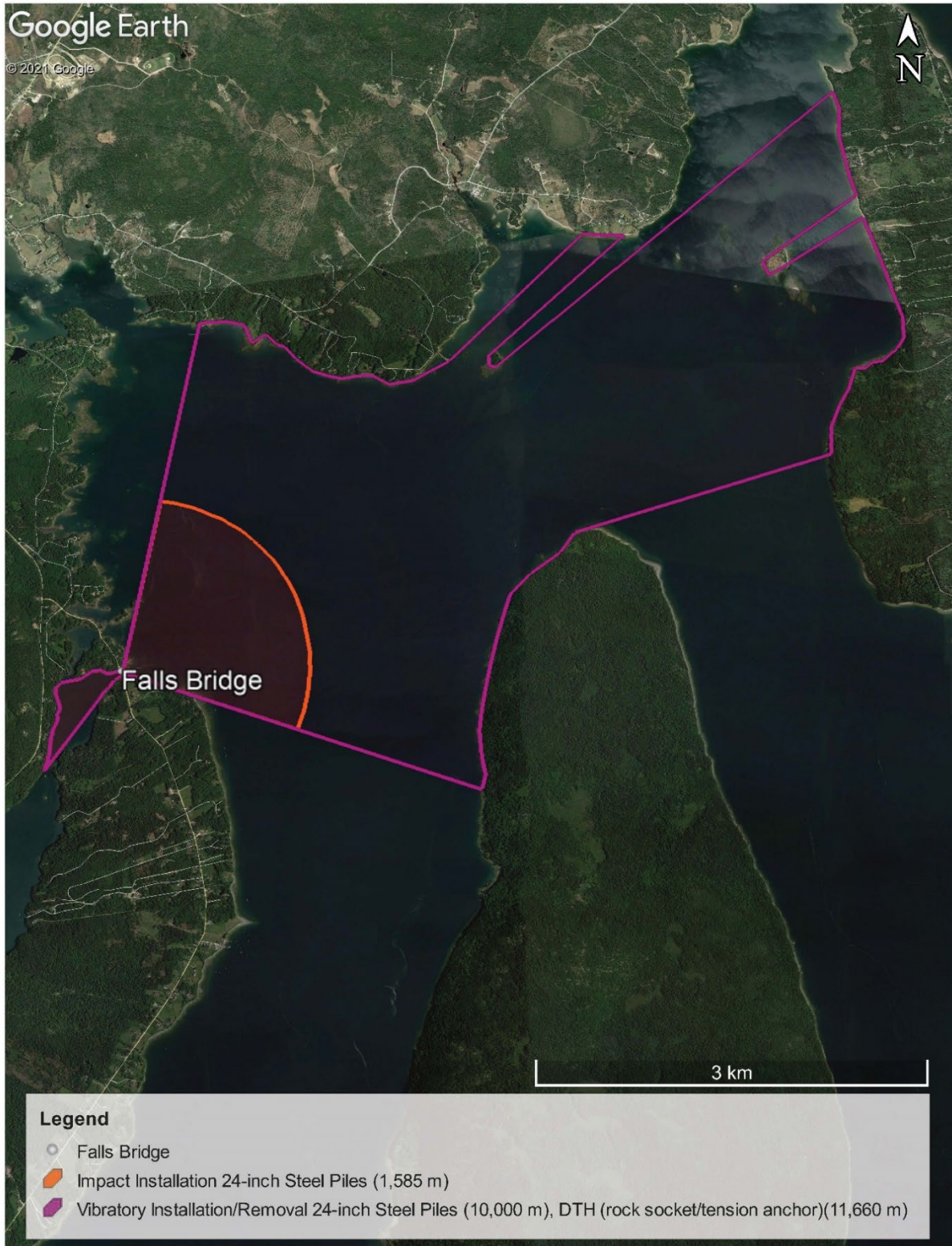
**Figure 2–2. Shutdown Zones for Pinnipeds during Pile Installation and Removal for Falls Bridge Replacement Project**

### 2.2.2 Level B Harassment

Level B harassment zones for the Project have been determined using the practical spreading loss model and are presented in Table 2-2. Due to the channel constriction present at low tide on the bay side of the bridge, the areas of level B isopleth will be significantly smaller at low tides than they are at high tides. Area of Level B Isopleth is provided for both high and low tide and shown visually in figures 2-3 and 2-4, respectively.

**Table 2–2. Calculated Distance to Level B Harassment Isopleths by Pile Size, Type, and Method of Installation/Removal**

Pile type, size & pile driving method	Distance to Level B Isopleth (m)	Area of Level B Isopleth (km <sup>2</sup> ) at High Tide	Area of Level B Isopleth (km <sup>2</sup> ) at Low Tide
<b>Impulse (Level B Isopleth = 160 dB)</b>			
24-inch Steel Pipe Pile (Impact)	1,585	2.4	0.28
<b>Continuous (Level B Isopleth = 120 dB)</b>			
24-inch Steel Pipe Pile (Vibratory)	10,000	20.6	1.15
24-inch Steel Pipe Pile DTH (Rock Socket)	11,660	20.6	1.15
8-inch Steel Pipe Pile DTH (Tension Anchor)	11,660	20.6	1.15



**Figure 2–3. Level B Harassment Zones (and shutdown zones for species not covered by this IHA) during Pile Installation and Removal for Falls Bridge Replacement Project**



**Figure 2–4. Level B Harassment Zones (and shutdown zones for species not covered by this IHA) during Pile Installation and Removal at Low Tide for Falls Bridge Replacement Project**

### 2.2.3 Airborne Noise

In-air noise levels created during impact installation of 24-inch steel piles have been recorded at 108 dBA as measured from 50 feet (15.24 meters) (WSDOT 2018). These numbers were used for the purposes of determining airborne noise levels associated with the Project.

The distance to which airborne sound will attenuate to the threshold for Level B harassment for harbor seals and other pinnipeds (e.g., grey seals, harp seals, hooded seals) was determined and is present in table 2-3. There are no documented or observed seal haul-outs within the Level B Harassment zone for airborne noise (Figure 2-5) so we do not request take for airborne noise effects.

**Table 2–3. Distances to Level B Harassment Thresholds for Airborne Noise**

Pile type, size & pile driving method	Harbor Seals (90 dB)	Other Pinnipeds (100 dB)
<b>Impulse (Impact Hammer)</b>		
All steel pipe piles $\leq$ 24-inch	120 meters (394 ft)	38 meters (125 ft)



**Figure 2–5. Airborne Level B Harassment Zones for Pinnipeds during Impact Pile Installation for Falls Bridge Replacement Project**

## 2.3 Marine Mammal Monitoring

The contractor will employ, at a minimum, two PSOs and establish monitoring locations (Figure 2-6) as described in this Plan. PSOs will monitor all marine mammal activities within the Level A and Level B harassment zones (Figures 2-1 through 2-4).

### 2.3.1 Monitoring Overview

No in-water work will occur between April 1 and June 30. These dates generally coincide with the highest numbers of harbor seals and harbor porpoises in the Project area. From July 1 to March 31, monitoring will take place from 30 minutes prior to initiation of pile driving activity (i.e., pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity. Pre-start clearance monitoring will be conducted during periods of visibility sufficient for the lead PSO to determine the shutdown zones clear of marine mammals. Pile driving will not commence until the determination is made.

Additional Requirements:

- MaineDOT and/or the selected contractor will implement the shutdown zones indicated in Table 2-1. If a marine mammal is observed entering or within the shutdown zones, pile driving activity will be delayed or halted,
- if pile driving is delayed or halted due to the presence of a marine mammal, the activity will not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal,
- pile driving activity will be halted upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the harassment zone (Table 2-1),
- the MaineDOT and/or selected contractor will avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 meters of such activity, activity will cease or vessels will reduce speed to a minimum necessary to maintain steerage.
- MaineDOT will hold a pre-construction meeting with the contractor(s), construction personnel, PSOs, and action agency representatives. The purpose of the meeting will be to inform all on-site personnel of the requirements set forth in the IHA (e.g., monitoring, reporting, shutdown procedures).
- A clear authorization and communication system will be in place to ensure that both PSOs and the construction crew understand their roles and responsibilities. PSOs and the construction manager will be equipped with a hand-held radio and/or phone, to ensure an immediate line of communication should a shutdown be necessary

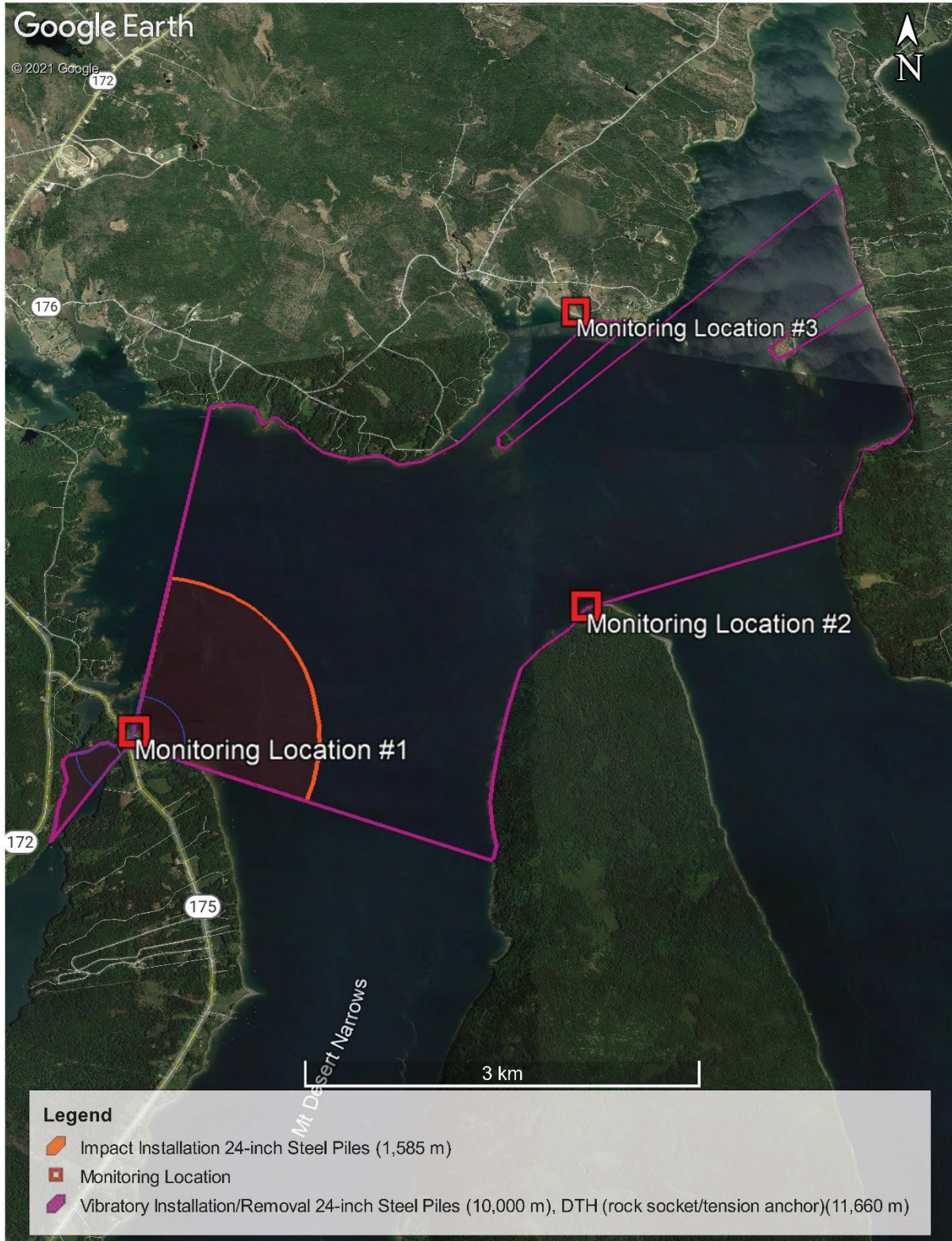
### 2.3.2 Protected Species Observer Qualifications

Monitoring will be conducted by qualified, NMFS-approved PSOs, in accordance with the following:

- PSOs will be independent (i.e., not construction personnel) and have no other assigned tasks during monitoring periods.
- At least one PSO will have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.
- Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training.
- If a team of three or more PSOs is required, a lead observer or monitoring coordinator will be designated. The lead observer will have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.
- PSOs will be approved by NMFS prior to beginning any activity that may result in harmful noise levels

All PSOs will have the authority to stop work if a marine mammal enters the designated shut down zones (Table 2-1).





**Figure 2–6. Protected Species Observer Potential Monitoring Locations**

## 2.4 Data Collection

All data collection will be recorded on the forms provided in Appendix A of this Plan. Each data entry will be checked for quality assurance and quality control. All data will be submitted to NMFS along with the final monitoring report, or as requested.

### 2.4.1 Environmental Conditions and Construction Activities

Environmental conditions, construction activities, and communications will be documented on the *Blue Hill, Rt. 175 Falls Bridge Marine Mammal Daily Environmental Conditions, Construction, and Communication Activity Log* data form. Environmental conditions, including weather conditions, wind speed, wind direction, Beaufort sea state, percent glare, visibility, and cloud cover will be recorded at the beginning and end of activities, and recorded every 30 minutes or as conditions change. Construction activities will be documented at the time they occur and will include activities such as soft start procedures, type of pile driving, and other startup/shutdown information. All communications with the construction crew, including necessary shutdowns, will be documented on this form.

### 2.4.2 Sightings

All marine mammal observations will be documented on the *Blue Hill, Rt. 175 Falls Bridge Marine Mammal Observation Sheet* provide in Appendix A of this Plan. Authorized take by species is detailed in the Project IHA and provided in Table 2-4 below. Recorded data will consist of start and end times for each sighting; number of individuals; sex and age class, when distinguishable; behavior and movement; distances from Project activities to the sighting; type of in-water activity at the time of sighting; and when Project activities were stopped in response to the sighting. PSOs will record if Level A and/or Level B take occurs, including the number of animals and species taken. PSOs will also record observations that may help determine if the same or different individuals are being taken because of Project activities over the course of a single day. While monitoring and tracking a sighting, PSOs will also continue to scan the water to identify other marine mammals potentially entering the harassment zones.

**Table 2-4. Authorized Incidental Take**

Common name	Scientific name	Stock	Level A Harassment	Level B Harassment
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf Maine/Bay of Fundy	0	3,200
Atlantic white-sided dolphin	<i>Lagernorhynchus acutus</i>	Western North Atlantic	0	40
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic	0	40
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic	96	7,824
Gray seal	<i>Halichoerus grypus</i>	Western North Atlantic	0	320
Harp seal	<i>Pagophilus groenlandicus</i>	Western North Atlantic	0	4
Hooded seal	<i>Cystophora cristata</i>	Western North Atlantic	0	4

### 3 Reporting

The MaineDOT will submit a draft report with the results from all monitoring activities within 90 calendar days of the completion of monitoring or 60 calendar days prior to the requested issuance of any subsequent IHA for construction activity at the same location, whichever comes first. A final report will be prepared and submitted within 30 days following resolution of any NMFS comments on the draft report. If no comments are received from NMFS within 30 days of receipt of the draft report, the report will be considered final. The report will contain the informational elements described in this Plan and, at minimum, will include the following:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including
  - How many and what type of piles were driven and by what method (e.g., impact, vibratory, down-the-hole);
  - Total duration of driving time for each pile (vibratory driving) and number of strikes for each pile (impact driving); and
  - For down-the-hole drilling, duration of operation for both impulsive and non-pulse components.
- Environmental conditions during monitoring periods (at beginning and end of PSO shift, every 30 minutes of survey, and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;
- Locations of observation station(s) used and dates of when each location was used
- Numbers, species, dates, group sizes, and locations of marine mammals observed
- Distances to marine mammal sightings, including closest approach to construction activities
- Descriptions of marine mammal behavior in Level A and B harassment zones
- Detailed information about implementation of any mitigation (e.g., shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal.
- Tables, text, and maps to clarify observations as needed

If a marine mammal stranding is observed, NMFS or U.S. Fish and Wildlife Services will be contacted immediately through the Maine Marine Animal Reporting Hotline (1-800-532-9551).

## 4 Literature Cited

HDR. 2020. Application for Marine Mammal Protection Act Incidental Harassment Authorization, Metlakatla Seaplane Facility Refurbishment Project.

NMFS. 2020. National Marine Fisheries Service. Manual for Optional User Spreadsheet Tool (Version 2.2; December) for: 2018 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. Silver Spring, Maryland: Office of Protected Resources, National Marine Fisheries Service

WSDOT (Washington State Department of Transportation). 2018. Biological Assessment Preparation for Transportation Projects – Advanced Training Manual. Available at: <https://www.wsdot.wa.gov/Environment/Biology/BA/BAGuidance.htm#Manual>

## 5 Appendices

## **Appendix A. Data Forms**

**Blue Hill, Rt. 175 Falls Bridge Marine Mammal Observation Sheet:**

Project WIN: 017712.00

Lead Observer Name: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_

Date: \_\_\_\_\_

Lead Observer Contact: \_\_\_\_\_

Monitoring Location: \_\_\_\_\_

Sighting #	Time (military)	Species	# of Individuals	Entered Harassment Zone A (Yes or No)	Entered Harassment Zone B (Yes or No)	Location <sup>1</sup>	Behavior <sup>2</sup> /Construction Activity

<sup>1</sup>Direction, Distance Estimate or Mark on Figure with Sighting Number

<sup>2</sup>Travel, Disoriented, Feeding, Fight, Play, Swimming Toward, Swimming Away, Mill, Dive, Hauled Out, Other (describe), Unknown

**Blue Hill, Rt. 175 Falls Bridge Marine Mammal Daily Environmental Conditions, Construction, and Communication Activity Log:**

Monitoring Location \_\_\_\_\_

Observer Name (s) \_\_\_\_\_

Page \_\_\_ of \_\_\_

Date \_\_\_\_\_

Environmental Conditions (Recorded every 30 minutes or as conditions change)									Construction and Communication Activities (include all start-up and shut-down activities and all communication to construction crew)		
Time	Weather Conditions	Wind Speed (mph)	Wind Direction	Beaufort Sea State	Glare (%)	Visibility (m)	Cloud Cover (%)	Comments	Time	Type of Construction Activity (Ramp up, Startup, Shutdown, Type of Pile Driving)	Communication/Comments

**Weather Conditions:** (S) Sunny, (PC) Partly Cloudy, (L) Light Rain, (R) Steady Rain, (F) Fog, (OC) Overcast, (LS) Light Snow, (SN) Snow  
**Beaufort Scale:** (0) Calm, (1) Ripples – up to 4”, (2) Small wavelets – up to 8”, (3) Large wavelets – up to 2’, (4) Small waves – up to 3’, (5) Moderate waves – up to 6’, (6) Large waves – up to 9’