MaineDOT/ Eastport Port Authority Incidental Harassment Authorization Questionnaire

Eastport Breakwater Replacement

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5/6/2014

This document describes the impacts of the construction of a new pile supported pier and breakwater in Eastport Maine.

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Table of Abbreviations

MaineDOT	Maine Department of Transportation
SPL	Sound Pressure Level
RMS	Route Mean Square
dB	Decibel
SEL	Sound Exposure Level
UNK	Unknown
M	Meters
°C	Degrees Celsius
°F	Degrees Fahrenheit
ORPC	Ocean Renewable Power Company
NMFS	National Marine Fisheries Service
FERC	Federal Energy Regulatory Commission
Maine DMR	Maine Department of Marine Resources
ESA	Endangered Species Act
MMPA	Marine Mammal Protection Act
NOAA	National Oceanic Atmospheric Administration
EPPA	Eastport Port Authority
IHA	Incidental Harassment Authorization
BMPs	Best Management Practices
NTUs	Nephelometric Turbidity Units

1.1. Question # 1-Description of Specified Activity

The Eastport Breakwater is located in Washington County, in Cobscook Bay, at the easternmost edge of Maine and the Continental U.S. Its location lies near the mouth of the St. Croix River at the end of a long peninsula adjacent to Quoddy Head.

The Eastport Breakwater consists of a solid fill multi use pier. It is 'L' shaped with one leg perpendicular to the shoreline and the outer leg parallel (see plans in Appendix A) The existing Eastport breakwater is on the verge of being taken out of service due to public safety concerns. Emergency repairs have been recently completed to prevent shutdown, however, these repairs are temporary and will not last very long. The breakwater serves the local fishing community by providing a safe harbor for berthing as well as a loading and off-loading point for the fishing fleet. The breakwater also serves as a berth for larger commercial and passenger ships as well as docking areas for coast guard ships.

The MaineDOT and the Eastport Port Authority have decided to replace and expand the pier and breakwater system. The objectives of the replacement project are to provide a long term low maintenance port facility capable of supporting the current activities on the pier. The project will include the removal of the original 1962 filled sheet pile structure, the replacement of the approach pier, expansion of the existing pier head to provide an equivalent working deck surface, and the construction of a new wave attenuator.

Several structure types were reviewed but the recommended structure is an open pier supported by 151 piles. The open pier structure developed in the preliminary design consists of steel pipe piles, reinforced concrete pile caps and a precast prestressed plank deck with structural overlay. Vertical forces are supported by vertical piles and lateral forces are supported by batter piles. Batter piles are designed to resist tension as well as compression resulting in the need for rock anchors to resist tension loads. The proposed approach pier is 40 feet by 300 feet and the proposed main pier section that is parallel to the shoreline is 50 feet by 400 feet.

The replacement pier will consist of two different sections. The approach pier will be replaced in kind by placing fill inside of a sheet pile enclosure, supported by driven piles. . The sheet piles can be installed by use of a vibratory hammer only. The main pier, fender system, and wave fence system will be pile supported with piles ranging from 16 inch – 36 inch diameter pipe piles. These piles will be driven with a vibratory hammer to a point and must be seated with an impact hammer to ensure stability. The breakdown of the size an amount of piles can be found in Table 1. MaineDOT does not dictate how piles will be driven but it is likely that these piles will be driven with crane mounted hammers. Pile driving operations vary between contractors and the equipment they possess.

The vibratory hammer will drive the pile by applying a rapidly alternating force to the pile by rotating eccentric weights resulting in a downward vibratory force on the pile. The vibratory hammer will be attached to the pile head with a clamp. The vertical vibration in the pile functions by disturbing or liquefying the soil next to the pile, causing the soil particles to lose their frictional grip on the pile. The pile moves downward under its own weight, plus the weight of the hammer. It takes approximately one to three minutes to drive one pile. An impact hammer will be used to ensure the piles are embedded deep enough into the substrate to remain stable for the life of the pier. MaineDOT does not know what type/size of impact hammer will be used to complete the work. It is likely that a diesel impact hammer will be used. These hammers work by dropping a mass on top of the pile repeatedly to drive it into the substrate. Diesel combustion is used to push the mass upwards and allow it to fall onto the pile again to drive it.

Table 1- Proposed pile types and amounts (approximate amounts)

Pile Size and Type	Amount proposed
16” steel pipe pile	32
20” steel pipe pile	97
24” steel pipe pile	14
36” steel pipe pile	8
Steel sheet pile	215

The breakwater/ wave attenuation component of the facility consists of two sections. Section 1 will consist of sheet pile along the inshore side of the reconstructed main pier. This location reduces overall length and eliminates interference with the berthing face. Section 2, a full depth wave attenuator consisting of king piles and sheet piles, will extend from the main pier to an existing concrete dolphin south of the pier. Each king pile is designed as a cantilever beam to resist lateral loads. The king piles may also be able to be used to anchor the floating docks.
Electrical and water utilities will be installed inside of the approach pier and also under the main pier. This will require a small amount of trenching under the main pier to bury portions of these lines.

Demolition of the old breakwater/pier system is likely to be staged after a portion of the construction of the new pier is completed to provide access. The existing pier is a solid fill pier that is surrounded by sheet piles. Demolition will include removal of the fill material between the sheet piles, and cutting the sheet piles off at the mud line for removal. The fill will likely be removed with an excavator. Hydroacoustic impacts are also expected from using an underwater saw to cut off piles at the mud line.

The project will be going out to bid through the public bid system. At this time, means and methods of construction are not determined. To allow for maximum flexibility and competitive bidding, MaineDOT strives to apply proper effect minimization measures to activities that may cause harassment while not dictating the entire construction means of

a project. This is done using contract language that requires the contractor to implement best management practices or meet specific performance standards. . For instance, instead of limiting a contractor to a particular type of impact hammer, the contract would state the sound level limits that may not be exceeded to comply with regulatory requirements.

During the planning of the project multiple minimization measures were included into the scope. The pile size was reduced and kept at to the minimal size and t quantity needed to support the expected weight on the pier and stand up to the wave and tidal pressures in this area.

Standard MaineDOT construction best management practices (BMPs) will be used throughout the project. The erosion and sedimentation control BMPs can be found at the following link: http://www.maine.gov/mdot/env/envdocs.htm . A spill prevention, control, and countermeasure (SPCC) plan will also be required for the project. This plan will make sure that all contaminants are properly stored and a cleanup plan is in place in case of any spills.

The primary component of the project expected to affect marine mammals is the sound generated by vibratory and impact hammers, underwater saws, and down-hole hammers. The data included in Table 2 below is found in Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish, prepared for Caltrans, 2009. The remaining data comes from the references below.

Caltrans states that drilling and saw cutting are anticipated to produce underwater sound pressure levels (SPLs) in excess of 120 dB Route Mean Square (RMS), but are not anticipated to exceed the 180 dB re 1 µPa (RMS) (Caltrans 2014).

Installation of some of the pile anchors will require the use of a down hole hammer. The hydroacoustic impacts of a down hole hammer are largely unknown. Hydroacoustic measurements from work on the Memorial Bridge between Maine and New Hampshire suggest that these impacts may reach Peak SPL limits of 240 dB dB re 1 µPa (Goodspeed 2012). The down hole hammer will be required for installation of 14 – 24 " steel pipe piles.

Table 2- Summary of data for unattenuated pile strikes with an impact hammer and down hole hammer

Pile Type/Size	Relative Water Depth	Average Sound Pressure Measured in dB		
		Peak	**RMS**	**SEL**
12 " / Steel Pipe	<5 meters	192	177	--
24 " / Steel Pipe	~15 meters	207	194	178
36 "/ Steel Pipe	~ 10 meters	210	193	183
Down Hole Hammer	~3 meters	240	---	---

Table 3- Summary of data for unattenuated pile driving with a vibratory hammer/ underwater saw

Pile Type/Size	Relative Water Depth	Average Sound Pressure Measured in dB		
		Peak	**RMS**	**SEL**
12 " / Steel Pipe	<5 meters	171	150	150
36 "/ Steel Pipe	~ 5 meters	180	170	170
24"/ Steel Sheet	~ 15 meters	182	165	165
Underwater Saw	UNK	--	120-180	--

1.2. Question # 2- Dates and Duration, Specified Geographic Region

The Eastport Breakwater is located in the downtown area of Eastport at the end of Sullivan Street just off Water Street. Eastport is located at the eastern terminus of State Route 190 in the State of Maine, USA. See Figure 1 and Figure 2 below for project Geographic Region.

To maintain contractor flexibility and the competitive bid process, MaineDOT does specify exact construct date/times for project elements. A conceptual construction schedule is provided in Table 4 to aid in the assessment of construction impacts. The start date of the project may need to be adjusted depending on timeliness of environmental permitting approvals.

Table 4 - Potential construction schedule of the Eastport Pier/Breakwater project.

Activity	Duration	Expected Timeframe	Approximate hours of in water noise producing activities with sound levels over 120 dB RMS	Pile type to be driven/ Activity resulting in harassment *
Approach Pier Work	15-17 weeks	September 2014- January 2015	140	Sheet Piles
Construction	32-34	January	190	16-24 inch steel pipe

of New Pile Supported Pier	weeks	2015-August 2015		piles
Demolition of Old pier	1 week of sheet removal, 6 weeks old fill removal	August 2015-September 2015	25	Vibratory Extractor/Underwater Saw
Breakwater Construction	6 weeks	October 2015-December 2015	50	N/A
Installation of Fender Piles	2 weeks	October 2015-December 2015	15	24-36 inch steel pipe piles

* Please See Table 7 for approximate monthly hydroacoustic impact time estimates

Figure 1- Project Location Map

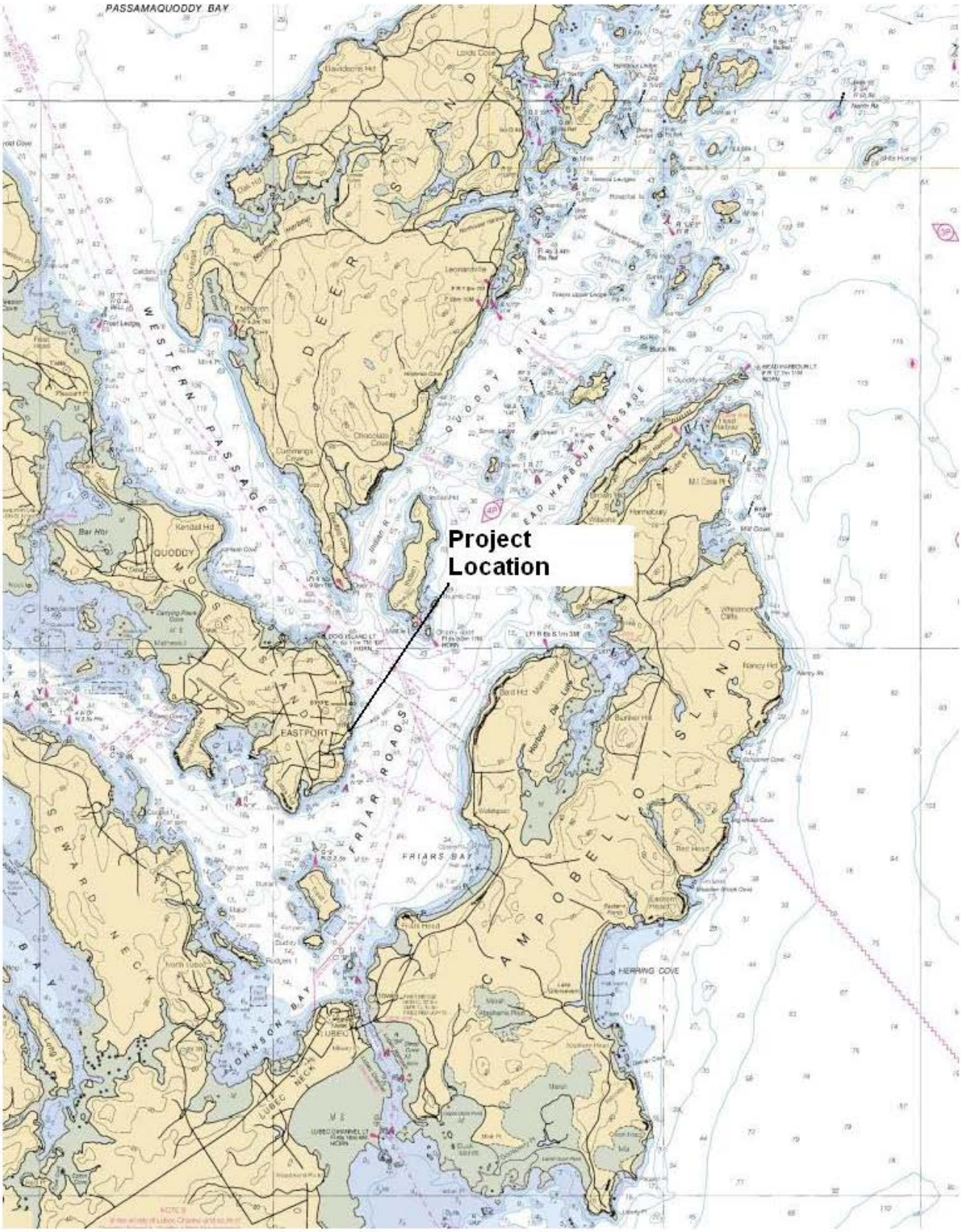

Figure 2- Project Vicinity Map

Eastport Breakwater, MaineDOT WIN 20806.00

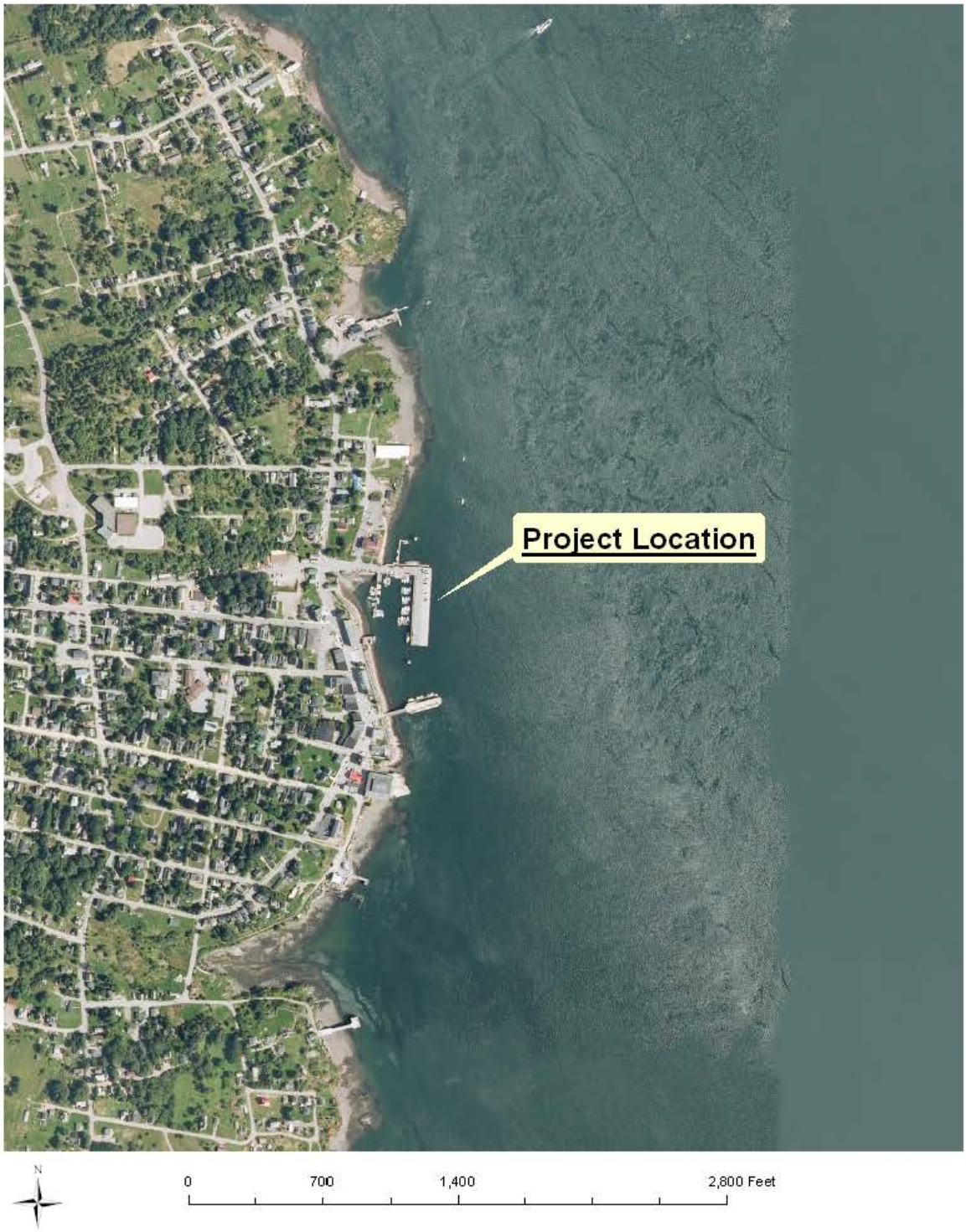

Figure 3- Aerial Photo of Immediate Project Area

Site Characteristics

Salinities:
Measured at Todd's Point (2000 feet to the north of the proposed project) (Larson 1979)
Low Tide- 25 ppt at the surface and 30 ppt at a depth of 10 M
High Tide- 27 ppt at the surface and 30 ppt at a depth of 10 M

Water Depth:
8-55 feet (2.4 M – 17M)

Temperature:
40 – 60° F (4.5-15.5° C)

Substrate:

The geotechnical report from the project stated that the project contains mud in areas not previously dredged, primarily sands and gravel.

1.3. Question # 3- Species and Numbers of Marine Mammals

The best available data for Marine Mammal presence in the vicinity of the project retrieved was monitoring surveys completed in preparation for the Ocean Renewable Power Company (ORPC) tidal generation project between Eastport and Lubec (as described in further detail below) (ORPC 2011). Though the ORPC project site is on the other side of the peninsula from the pier (See Figure 3), it is suspected that species presence and timing would be similar between the two sites.

ORPC has been conducting incidental visual observations of marine mammals in the Cobscook Bay since 2007, during turbine testing, travel to and from ORPC's research vessel *Energy Tide 2*, and acoustic, fisheries, subtidal, and avian surveys (Table 1). During this time, ORPC personnel and contractors, who have received specialized training in marine mammal observation and documentation, have recorded approximately 252 observational periods over 222 days. During these periods, ORPC observed two dolphins, 47 harbor porpoises, and 57 seals. The most intensive effort was conducted in 2010, when approximately 71 marine mammals were observed over the course of 132 observation days between March 8 and December 31. Of these, there were two dolphins, 27 harbor porpoises, and 42 harbor seals. This information is documented in ORPC's Marine Mammal Monitoring Plan for the Cobscook Bay Tidal Power Project (ORPC 2011).

All 2010 marine mammal observations were made near the Cobscook Bay deployment area. No observations of any whale species have been made in Cobscook Bay by

ORPC personnel or those contracted to work for ORPC since the observation program began in 2007. Table 4 represents the number of each species observed and the months in which the observations were made.

Other species that may occur in the vicinity of the project include the North Atlantic Right Whale, humpback whale, fin whale, minke whale, and sei whale. These marine mammal species are generally associated with open ocean habitats and occur locally, but likely more in offshore locations in the Bay of Fundy.

As noted in Table 4, there is the potential for a marine mammal species to be present in the project area year round. The data collected in preparation for the ORPC project indicates that presence is greater in the summer months.

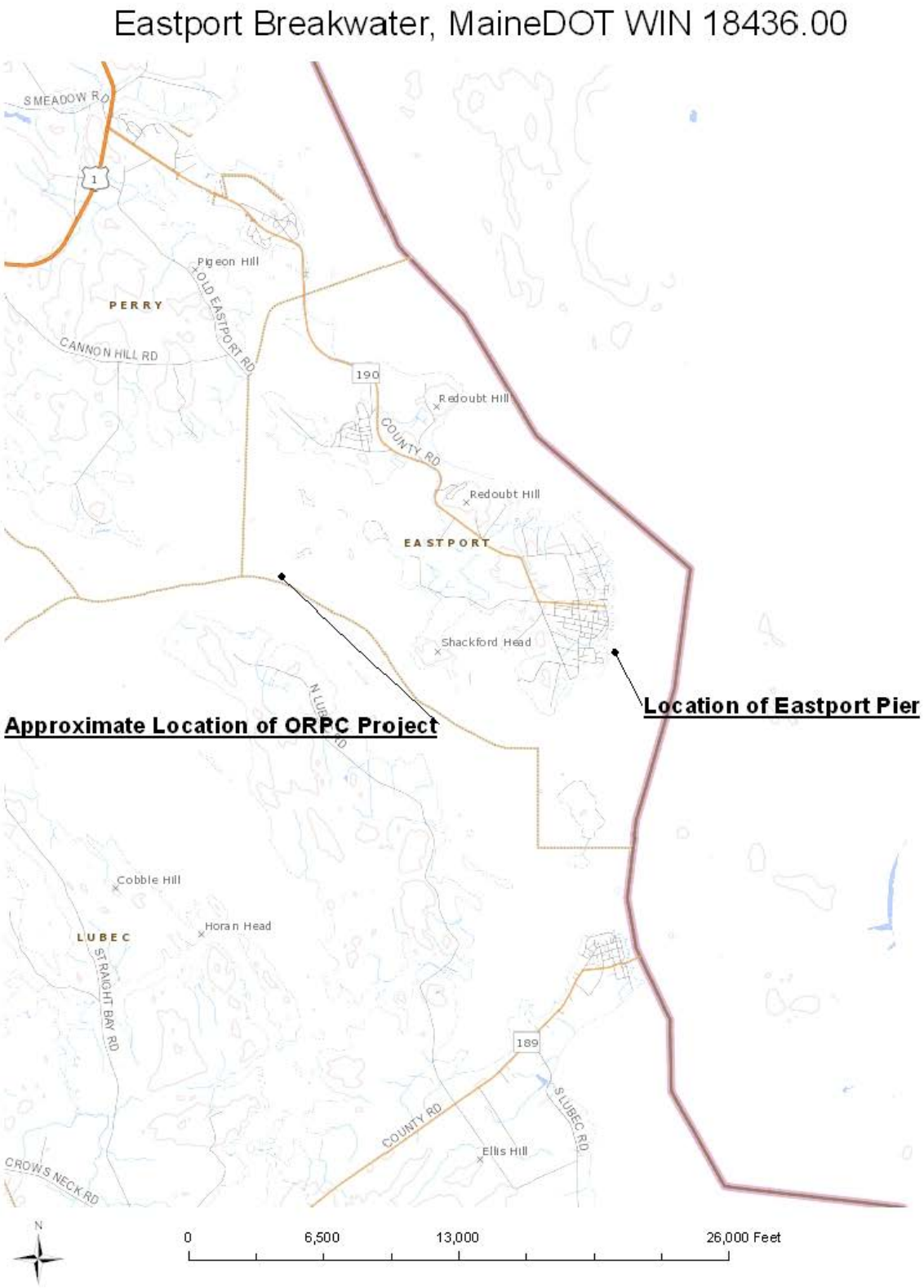

Figure 4- Map of Proximity of the ORPC project to Eastport Pier Project

Table 4. *Marine Mammal Observations in Cobscook Bay and Western Passage (location shown in Figure 2) between December 2007 and December 2010.*

Month	**Number of 4-hour Observation Periods Over 3 yrs**	**Number of Observed Harbor and Grey Seals (3yrs)**	**Number of Observed Harbor Porpoise (3yrs)**	**Number of Observed Atlantic White-Dolphins (3 yrs)**
January	4	0	0	0
February	9	0	1	0
March	17	1	0	0
April	40	4	3	0
May	17	1	3	0
June	21	8	1	0
July	21	4	10	0
August	30	16	24	2
September	25	9	5	0
October	24	8	0	0
November	18	4	0	0
December	26	2	0	0
Total Number Observed		**57**	**47**	**2**

1.4. Question # 4- Affected Species Status and Distribution

Gray seal (*Halichoerus grypus*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and Atlantic white-sided dolphin (*Lagenorhynchus acutus*) are commonly observed in Cobscook Bay (NMFS, 2009). Other species that could occur in the Project vicinity include North Atlantic right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaengliae*), fin whale (*Balaenoptera physalus*), minke whale (*Balaenoptera acutorostrata*), and sei whale (*Balenoptera borealis*). However, because these marine mammal species are generally associated with ocean habitats in more

offshore locations, they are unlikely to occur in Cobscook Bay and takes are not requested for these species (NMFS letter to FERC dated November 24, 2010).

The area is likely used for transient populations of all of the marine mammals noted in table 4 (personal communication MaineDMR, 2014). The area is likely used for foraging by seals, harbor porpoise, and Atlantic White sided dolphins when forage species can be found in the project area. Pile driving and removal could potentially harass those few pinnipeds that are in the water close to the project site, whether their heads are above or below the surface.

1.4.1. Pinnapeds

Harbor Seals

The harbor seal is a common species of seal that is distributed in the cold temperate waters of the North Atlantic and North Pacific. Males and females are not sexually dimorphic, males and females are generally the same size, and therefore, it is difficult to tell the sexes apart. The color of harbor seals varies from light grey to dark brown with various black spots. Males and females are approximately 4.9 ft and 220 lb and the maximum lifespan is about 35 years (NOAA, 2013).

Harbor seals use terrestrial habitat "haul-out sites" throughout the year, particularly during the pupping and molting periods. In northern New England, they typically haul-out on tidal ledges. Haul-out behavior is strongly influenced by tide stage, air temperature, time of day, wind speed, and precipitation. Human disturbance can also affect haul-out behavior although harbor seals appear to acclimate to some human activity (e.g., lobster boats along the coast of Maine) (Weilgart 2007).

In general, the most numerous prey species in these samples were sandlance, silver hake, Atlantic herring, and redfish. Other species included cod, haddock, pollock, flounders, mackerel, and squid.

Numbers

The 2001 survey, conducted in May/June, included replicate surveys and radio tagged seals to obtain a correction factor for animals not hauled out. The corrected estimate (pups in parenthesis) for 2001 was 99,340 (23,722).

The Western North Atlantic Stock (containing the Gulf of Maine) report published by NOAA states that there is currently not enough information to provide a minimum population estimate or population number trends.

Status

Harbor Seals are not listed as endangered or threatened under the ESA or as depleted under the MMPA. They are not considered a strategic stock under the MMPA because human caused mortality in the species is low relative to the stock size. The potential biological removal cannot be calculated for the species (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997)

Distribution

In the western North Atlantic, harbor seals are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas. Although the stock structure of the western North Atlantic population is unknown, it is thought that harbor seals found along the eastern U.S. and Canadian coasts represent one population. In U.S. waters breeding and pupping normally occurs in waters north of the New Hampshire/Maine border (NOAA 2013).

Harbor seals are year-round inhabitants of the coastal waters of eastern Canada and Maine, and occur seasonally along the southern New England and New York coasts from September through late May. A general southward movement from the Bay of Fundy to southern New England waters occurs in autumn and early winter. A northward movement from southern New England to Maine and eastern Canada occurs prior to the pupping season, which takes place from mid-May through June along the Maine Coast. The overall geographic range throughout coastal New England has not changed significantly during the last century.

Gray Seals

Gray seals have a wide variety of coloring. Males tend to have a dark brown-gray to black coat with a few light patches. Females are generally light gray-tan, lighter on the chest, with dark spots and patches. Adult males, and some older adult females to a lesser extent, have a characteristically long nose with wide nostrils. Adults gray seals can weigh between 550 and 880 pounds and measure between 7.5 and 10 feet in length (NOAA 2013). Gray seals have been known to dive to depths up to 300 m for as long as 20 minutes.

Numbers

Gray seals currently pup at three established colonies: Muskeget Island, Massachusetts, Green Island, Maine, and Seal Island, Maine (NOAA 2012). They have been observed using the historic pupping site on Muskeget Island in Massachusetts since 1990. Pupping has taken place on Seal and Green Islands in Maine since at least the mid 1990s. Aerial survey data from these sites indicate that pup production is increasing. A minimum of 2,620 pups (Muskeget= 2,095, Green= 59, Seal= 466) was born in the U.S. in 2008 (Wood LaFond 2009 in NOAA 2012).

Present data is insufficient to calculate the minimum population estimate for U.S. waters. These estimates are not available, the stock size appears to be increasing (NOAA 2012).

Status

Gray Seals are not listed as endangered or threatened under the ESA or as depleted under the MMPA. They are not considered a strategic stock under the MMPA because human caused mortality in the species is low relative to the stock size. The potential biological removal cannot be calculated for the species (MMPA Sec. 3. 16 U.S.C. 1362; Wade and Angliss 1997).

Distribution

The gray seal is found on both sides of the North Atlantic, with three major populations: eastern Canada, northwestern Europe and the Baltic Sea (Katona et al. 1993 as referenced in NOAA 2012). The western North Atlantic stock is equivalent to the eastern Canada population, and ranges from New York to Labrador (Katona et al. 1993 as referenced in NOAA 2012).

1.4.2. Cetaceans

Harbor Porpoises

Harbor porpoises have a small, robust body with a short, blunt beak. Females are slightly larger than males. They have a medium-sized triangular dorsal fin. Their back is dark gray while their belly and throat are white. They have a dark gray chin patch and also intermediate shades of gray along their sides. Females reach sexual maturity at 3-4 years and may give birth every year for several years in a row. They feed on demersal and benthic species, mainly schooling fish and cephalopods.

Harbor porpoises normally inhabit northern temperate and subarctic coastal area and commonly found in bays, estuaries and harbors less than 650 ft (200 m) deep (NOAA 2014). Harbor porpoises are small, stocky and are one of the smallest ocean cetaceans. Their backs are very dark gray or dark brown with a small triangular dorsal fin. Their belly is white and their sides are gray.

Harbor porpoises are usually seen in singles, pairs, or in small groups of 2 to 5 (NOAA 2014). This species is very shy and tend not to approach boats and noisy ports (UNE 2014). Because they avoid boats and people, they are rarely seen. The harbor porpoise inhabits shallow, coastal waters with water temperatures less than 15°C (60°F) (UNE 2014)

Harbor porpoises have a swimming pattern that can be used to help in their identification. The swimming pattern includes a series of several short, rapid surfacings followed by an extended dive of several minutes (UNE 2014). These characteristics will also aid in project observers ability to distinguish between the two cetaceans potential present at the Eastport Breakwater project. They do exhibit some seasonal migration related to prey availability. They are also usually inshore during the summer and offshore during the winter. They are also known to migrate north in the summer and south in the winter (NOAA 2013).

Numbers

The best current abundance estimate of the Gulf of Maine/Bay of Fundy harbor porpoise stock is the result of the 2011 survey—79,883 (CV=0.32) (NOAA 2013).

Status

This is a strategic stock because average annual human-related mortality and serious injury exceed PBR. The total U.S. fishery-related mortality and serious injury for this stock is not less than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant and approaching zero mortality and serious injury rate (NOAA 2013).

Distribution

Harbor porpoises can be found in the North Atlantic and North Pacific Oceans, and the Mediterranean and Black Seas (NOAA 2014). There are 10 stocks, or distinct populations in the U.S., including one for the Gulf of Maine-Bay of Fundy.

Atlantic White Sided Dolphins

Atlantic white-sided dolphins have a robust body, short beak, and a distinct color pattern, including a bi-colored beak. Females grow to about 8 ft in length and males to about 9 feet (NOAA 2012). The average adult Atlantic white-sided dolphin weighs about 400-500 lbs. and has a lifespan of approximately 25 years (NOAA 2012).

Atlantic white-sided dolphins are social animals (NOAA 2012). They have been seen in large groups of 500 animals as well as groups of just a couple individuals (NOAA 2012). They commonly undertake acrobatic displays.

Atlantic white-sided dolphins feed by seizing prey. Atlantic white-sided dolphins feed primarily on small schooling fish, shrimp, and squid. They often feed in association with large whales, and groups apparently cooperate when feeding on schooling fish.

Numbers

The best available current abundance estimate for white-sided dolphins in the western North Atlantic stock is the result of the 2011 survey—48,819 (CV=0.61). (NOAA 2013).

Status

This is not a strategic stock because the 2006-2010 estimated average annual human related mortality does not exceeds PBR. The status of white-sided dolphins, relative to OSP, in the U.S. Atlantic EEZ is unknown. A trend analysis has not been conducted for this species. The species is not listed as threatened or endangered under the Endangered Species Act.

Distribution

Atlantic white-sided dolphins are found in the western North Atlantic from 35°-80° N, from North Carolina to Greenland (NOAA 2013). This species exhibits seasonal movements, moving closer inshore and north in the summers and offshore and south in the winters.

Table 5- Marine mammals likely to be affected.

SPECIES	STATUS OF STOCK	DISTRIBUTION	POPULATION SIZE	TYPICAL HABITATS
Gray seal (*Halichoerus grypus*)	MMPA	Western North Atlantic stock located in eastern Canada and the northeastern United States	Over 250,000 in western North Atlantic	Coastal waters, islands, sandbars, ice shelves and icebergs. When hunting, they use the entire water column--from the surface to the sea floor.
Harbor porpoise (*Phocoena phocoena*)	MMPA	In the North Atlantic, range from West Greenland to Cape Hatteras, NC	89,054 in Gulf of Maine/Bay of Fundy area	Northern temperate and subarctic coastal and offshore waters: bays, estuaries, harbors, and fjords less than 650 ft deep.
Harbor seal (*Phoca vitulina*)	MMPA	On the East Coast, found from the Canadian Arctic to southern New England, New York and occasionally the Carolinas	91,000 in New England	Temperate coastal habitats and use rocks, reefs, beach, and drifting glacial ice as haul out and pupping sites
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	MMPA	Found in the western North Atlantic from 35°-80° N, from North Carolina to Greenland. Exhibits seasonal movements, moving closer inshore and north in the summers and offshore and south in the winters	63,000 in the western North Atlantic	Found only in temperate waters Of the North Atlantic Ocean. Inhabit the oceanic waters of the continental shelf and slope.

Source: http://www.nmfs.noaa.gov/pr/species/mammals/
MMPA = Protected under the Marine Mammal Protection Act

1.5. Question # 5- Type of Incidental Taking Authorization Requested

MaineDOT/ Eastport Port Authority requests the issuance of an *Incidental Harassment Authorization* for Level B harassment pursuant to Section 101 (a) (5) of the Marine Mammal Protection Act (MMPA) for incidental takes by harassment of the four species of marine mammals identified in Table 5 that may occur during pile placement and removal activities (the harbor seal, the grey seal, the harbor porpoise and the Atlantic white sided dolphin). Sound levels from construction activities at the Eastport Breakwater have the potential to exceed the harassment levels (120 dB RMS) defined in Table 6 for both continuous and impact sound levels. MaineDOT/ Eastport Port Authority's construction description and plans show the number and size of piles along with describing the expected methods of installation.

MaineDOT/ Eastport Port Authority proposes to identify an area surrounding sound-producing activities within which sound levels would result in Level A harassment and Level B harassment. MaineDOT/Eastport Port Authority proposed to monitor these areas during activities that may produce sound levels resulting in marine mammal harassment. If a marine mammal enters the Level B area, it will be noted as a take authorized in the IHA. Sound-producing activities will cease if a marine mammal approaches the Level A area to that the project will not injure any marine mammals and will not require a Letter of Authorization. See monitoring plan in Question 13 for more details.

Table 6- NOAA guidelines for root mean square (RMS) pressure levels for Level A and Level B harassment of marine mammals due to continuous (vibratory hammer) and impulse (impact hammer) sources.

Type	Level A (possibly resulting in injury)	Level B (possibly resulting in behavioral modification)
Vibratory Hammer and Underwater Saw (continuous)	180 dB RMS	120 dB RMS
Impact Hammer/ Down Hole Hammer (impulse)	180 dB RMS for Cetaceans 190 dB RMS for Pinnipeds	160 dB RMS
Airborne construction noise	Not established	90 dB RMS (Harbor Seals) 100 dB RMS (Other Pinnipeds)

Vibratory driving of any of the pile types is not expected to exceed the 180 dbRMS Level A harassment limits. See data from Caltrans in Table 2 and Table 3. These activities are expected to reach Level B harassment limits.

Use of an impact hammer during pile driving has the potential reach Level A harassment limits in the vicinity of the project. Though the limit of the impacts around the activity are currently unknown, data from the ORPC project expected level A harassment limits at a distance of 10 meters from the pile (ORPC 2012). Hydroacoustic monitoring conducted at the breakwater site during the start of in water noise producing impacts will help define the level A harassment monitoring zone. It is expected to be similar to that of the ORPC data. Figure 5 shows monitoring isopleths based on ORPC data that MaineDOT will use to initially establish Level B (and Level A) harassment zones. Site specific data once construction activities start may refine these zones.

It is expected that the seating of each pipe pile with an impact hammer will take approximately 1 hour and require approximately 50 blows with an impact hammer.

Although the characteristics of these noises are not well studied, noises from saw cutting and drilling are expected to be similar to vibratory pile driving (Caltrans 2014). Caltrans states that drilling and saw cutting are anticipated to produce underwater sound pressure

levels (SPLs) in excess of 120 dB RMS, but are not anticipated to exceed the 180 dB re 1 μPa (RMS).

MaineDOT/EPPA is requesting an Incidental Harassment Authorization for Level B Harassment caused by sound from pile-driving hammers, down-hole hammers, and underwater saws.

1.6. Question # 6- Take Estimates for Marine Mammals

Species for which authorization is sought include the four species cited in Question 4 that have the highest likelihood of occurring in the project area: gray seal, harbor porpoise, harbor seal, and Atlantic white-sided dolphin. In the worst case, the project may result in the harassment of 45 seals, 39 porpoise, and 2 Atlantic white sided dolphins during the pile driving phase of this project. These amounts were calculated by the totaling the noise producing activities per month and multiplied by the effort (mammals per hour) of the observations. Calculations are summarized in Table 7.

The monitoring plan described in Question 13 includes a mitigation action plan based upon trained observers and deployment activity curtailment. This plan was developed to minimize loud noise-generating activities if marine mammals are observed in within the defined survey areas, and to cease such noises if the animals come within the level A harassment zones of the project, or 100 ft whichever further from the of the project area. MaineDOT/ Eastport Port Authority does not expect to create noise at levels that harasses marine mammals for prolonged periods of time as the driving of piles is intermittent work by nature.

There may be some limited peripheral harassment if a marine mammal comes into the work area underwater and is not spotted by our observers. Based upon the history of marine mammal sightings summarized in Table 4 above, there is chance of such an interaction. Based on other marine mammal observations in the area, it is possible that seals or porpoises could enter the construction area during the pile placement.

There may be some limited peripheral harassment if a marine mammal comes into the work area underwater and is not spotted by our observers.

Table 7. Calculated Incidental Harassment Incidents by Species and by Month of the IHA.

Month	Total Number of 4 Hour Observation Periods (3yrs)	Calculated # of hours of Observations Per Month/ year	Estimated Hrs of Pile Driving per month	Total Observed Harbor and Grey Seals (3yrs)	Calcu Takes Seals	Total Observed Harbor Porpoise (3yrs)	Calcu Takes Porpoise	Total Observed Atlantic White-Dolphins (3 yrs)	Calcu Takes White Dolphins
January	**4**	**4.6**	**28**	**0**	**0**	**0**	**0**	**0**	**0**
February	**9**	**12**	**24**	**0**	**0**	**1**	**2**	**0**	**0**
March	**17**	**31.4**	**24**	**1**	**1**	**0**	**0**	**0**	**0**
April	**40**	**53.2**	**24**	**4**	**2**	**3**	**2**	**0**	**0**
May	**17**	**22.4**	**24**	**1**	**2**	**3**	**0**	**0**	**0**
June	**21**	**28.0**	**24**	**8**	**7**	**1**	**2**	**0**	**0**
July	**21**	**28.0**	**24**	**4**	**4**	**10**	**9**	**0**	**0**
August	30	40	36.5	16	15	24	22	2	2
September	25	33.2	12.5	9	4	5	2	0	0
October	24	32.0	22	8	3	0	0	0	0
November	18	24.0	22	4	4	0	0	0	0
December	26	34.6	22	2	3	0		0	
			Total 287 hrs						
Observation Periods =4 hours average				**TOTAL TAKES**	**45**		**39**		**2**

This table is based directly on data provided in the ORPC application IHA questionnaire submitted on December 11, 2011 (ORPC 2012). Any fractions of expected take were rounded up to the next highest number to ensure the estimate of take is conservative. The data that was used to develop these take estimates did not differentiate between harbor seals and gray seals. Therefore, the take estimates to not make the distinction between the two species.

The table does not differentiate between harassment of airborne noise or hydro acoustic effects. The hydroacoustic effects are expected to expand well beyond the airborne noise and will likely result in any marine mammals in the area to avoid construction before entering the 81 M zone of airborne effects of pile driving.

1.7. Question # 7- Anticipated Impact of the Activity

Activities that would impact marine mammals include pile driving with a vibratory hammer, driving piles with an impact hammer, use of a down hole hammer, underwater saw cutting during sheet pile removal. Because the effects would be temporary, it is anticipated that no effect on the reproduction, survival, or recovery of the identified species would occur.

Marine mammals are very vocal and they depend on sound for many parts of the life history. Hearing in marine mammals is important for communication, avoiding predators, and finding food. For dolphins and porpoises, hearing is also critical to their ability to echolocate. Observed effects of noise on marine mammals include: changes in vocalizations, respiration, swim speed, diving, and foraging behavior; displacement, avoidance, shifts in migration path, stress, hearing damage, and standings (Weilgart 2007).

Hydroacoustic effects may also cause temporary and permanent shifts in their hearing sensitivity. Though the guidance is still in draft format, NMFS has provided guidance on these hearing shifts and the document can be found at: http://www.nmfs.noaa.gov/pr/acoustics/.

Based on NOAA species/stock data, the proposed takes by harassment through temporary behavior alterations to less than 1 % of the total estimated population for all species. Eastport Port Authority/MaineDOT contacted the Maine Department of Marine Resources (DMR) Protected Resource Division to obtain information on the species in the Greater Cobscook Bay Area. DMR did not have data specific to the Eastport Breakwater Project vicinity, but did confirm that the area was not near any haul-outs or pupping areas.

1.8. Question # 8- Anticipated Impact on the Availability of Marine Mammals for Subsistence Uses

There are no traditional subsistence hunting areas in the project areas.

1.9. Question # 9/10- Anticipated Impacts on Habitat

The project area contains foraging habitat for all four species mentioned above. MaineDOT drafted an essential fish habitat assessment for this project and the background data revealed that the project site contains multiple forage species. Some of

the forage species include river herring, mackerel, and rainbow smelt. The forage species will also be affected by hydro acoustic impacts and turbidity releases expected from the project.

Small turbidity releases are expected from the pile driving, pile removal, and fill removal activities of the project. The turbidity releases are expected to be localized and minimal. The pile driving activities release minimal turbidity due to the small amount of disturbance during driving. There may be elevated turbidity during the placement of the new utilities, but BMPs such as a silt curtain will be utilized. The small increases in turbidity are not expected to the cause changes in behavior in the marine mammals around the project. The turbidity releases will be confined to the exclusion area being monitored for the hydroacoustic impacts.

There will be no construction debris left as a result of the project. The sheet piles from the old pier will be cut off at the mud line and everything else will be removed from the site. The sediment quality in the vicinity of the pier is not expected to be changed from the current situation. Boat traffic likely affects the sediment characteristics in the area of the pier due to prop wash. The area has supported this use since the construction of the first pier and this is not expected to change.

The pier is not expected to create passage or movement obstructions to marine mammals in the area. Movement through the open portion pier is available if a marine mammal was in the immediate vicinity of the pier. The wave attenuator will block passage in and out of the inner mooring area but there is a still a pathway available to the southern side of the proposed pier.

The existing footprint of the solid fill portion of the pier is 27,750 square feet. The project will remove all 11,032 square feet (the approach pier). This is a net increase of 17,700 square feet of reclaimed sea floor bottom and open water surface area.

A project with similar elements measured water quality before, during, and after pile removal and pile replacement. The study found that construction activity at the site had "little or no effect on dissolved oxygen, water temperature, and salinity", and turbidity (measured in nephelometric turbidity units [NTU]) at all depths nearest the construction activity was typically less than 1 NTU higher than stations farther from the construction area throughout construction (Roni and Weitkamp 1996).

Marine mammals in the area are not likely to be close enough to the Eastport Breakwater project to experience the turbidity effects. If any marine mammals do experience elevated turbidity, it will be easy for them to avoid the localized areas of higher turbidity.

For the most part, any adverse effects on prey species during project construction will be short term. Given the large numbers of fish and other prey species in the St. Croix estuary/Western Passage area, the short-term nature of effects on fish species, and the mitigation measures, the proposed project is not expected to have measurable effects on the distribution or abundance of potential marine mammal prey species.

There are no known haul outs within the zones expected to be impacts by the project. Therefore, effects to haul-outs are not analyzed as part of this questionnaire. Though this is an increase in usable area for marine mammals, it is expected that the project will have little effect on the amount of available habitat in the region in general.

MaineDOT/ Eastport Port Authority do not anticipate any permanent loss of the habitat for the marine mammal populations involved.

1.10. Question # 11- Mitigation Measures

This project is in the planning phase and a contractor has not been selected to complete work on the project. The pile driving method and hammer used to drive the support piles will determined by the contractor who is awarded the project. Instead of specifying the type of hammer and exact mitigation measures, MaineDOT/ Eastport Port Authority will commit to ensuring the noise pressure levels from the activity will only result in Level B harassment of Marine Mammals.

Mitigation measures for pile driving include the following. These mitigation measures include items included in the design and construction of the project.

- The project was designed to use the smallest diameter piles possible to avoid the elevated noise impacts from larger piles.
- Sound attenuation measures will be employed on all pile driving activities that may potentially reach 180 dB RMS at 10 meters from the pile. Mitigation measures may include pile cushions, bubble curtains, or decreased power of the hammer being used.
- Before driving efforts take place, MaineDOT/ Eastport Port Authority contractor will employ a soft start technique to attempt to avoid impacts or louder driving activities.
- Marine mammal monitoring activities will be reported back to the construction team and the hydro acoustic monitor. For instance, if a harbor seal enters into the Level B harassment area (~500 m) and the pile driving activity has the potential of producing noise levels capable of Level A harassment (180 dB RMS), the marine mammal monitor must communicate that to the construction team to ensure pile driving ceases before the animal enters the Level A harassment exclusion area.

1.11. Question # 12- Arctic Plan of Cooperation

There are no Artic subsistence marine mammals to consider at the Project site.

1.12. Question # 13- Monitoring and Reporting

To ensure noise pressure limits are known during pile driving, MaineDOT/ Eastport Port Authority will monitor noise pressure limits from certain activities and provide reports of this monitoring to NOAA office of protected resources.

Hydroacoustic monitoring-

MaineDOT/ Eastport Port Authority will require its contractor to submit a hydroacoustic monitoring plan for review and approval prior to pile driving activities. The following principles will be elements of the plan:

- Monitoring for dB RMS levels at 10 Meters from the pile
- Monitoring at 100 meters to proof the Marine Mammal Monitoring areas
- Real time reporting of measured noise levels to construction team.

Marine Mammal Presence Monitoring-

The ORPC IHA questionnaire originally calculated potential Level B harassment zones of 2.5 miles from the pile driving activities. ORPC submitted a monitoring report for the work it completed in the spring of 2012 and concluded that the Level A and Level B harassment ranges for while driving 30 inch piles with a wooden cushion was greatly reduced from the predictions.

Table 8- Expected Level A and Level B Harassment Zones. See figure 5 below for a depiction of these harassment zones and monitoring isopleths.

Type	Level A range (180 dB RMS) in meters	Level B range (120 dB RMS for vibratory and 160 dB RMS for impact) in meters
Vibratory	N/A	500
Impact	10	275

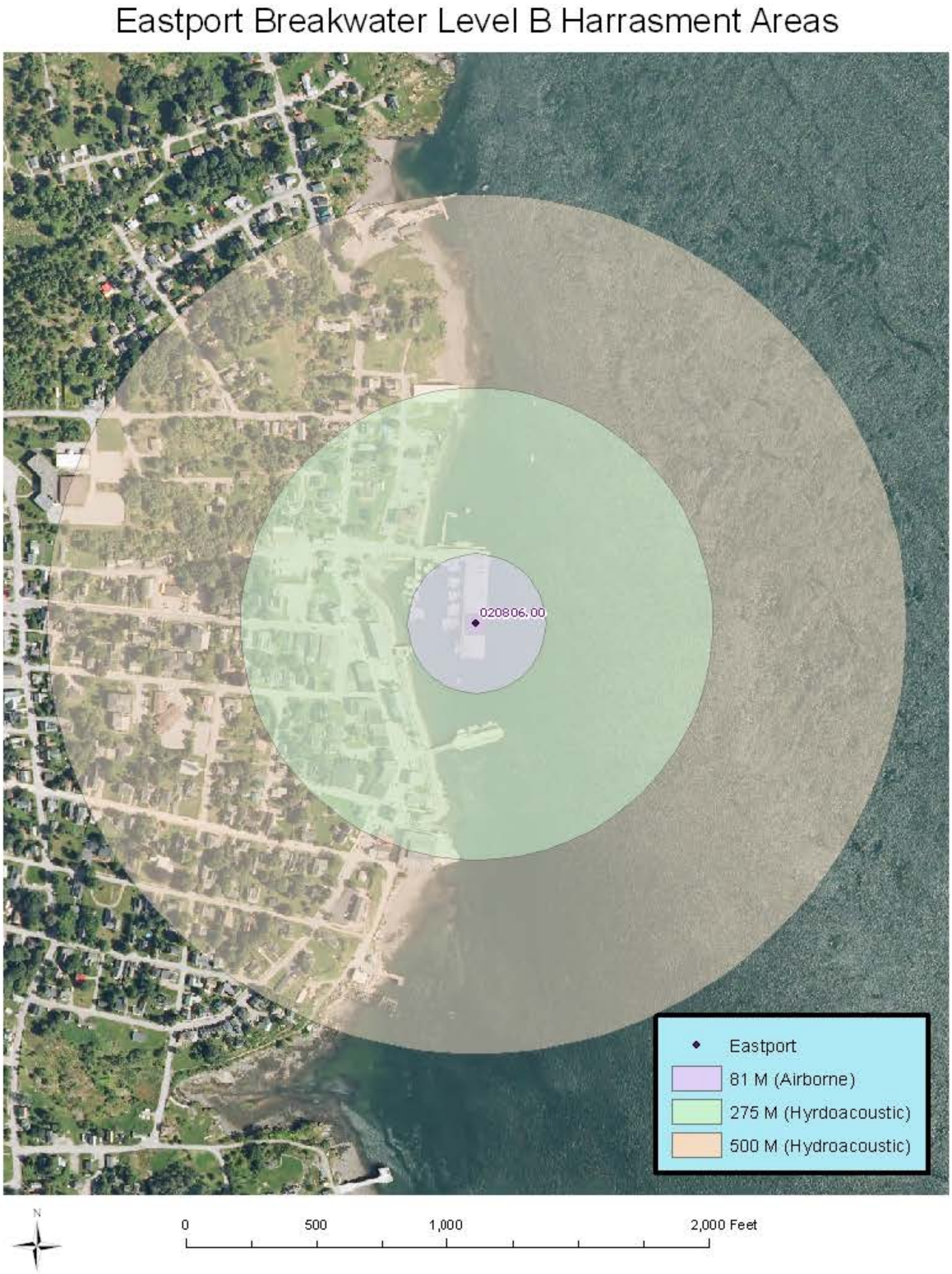

Figure 5- Monitoring Isopleths

MaineDOT/ Eastport Port Authority's contractor will be responsible for providing qualified Marine Mammal observers to monitor for species presence during a subset of driving events. This monitoring will take place noise producing expected to reach the reach Level A harassment range (see Tables 1 and 2). This observer must be qualified to complete these marine mammal observations. Before the contractor chooses an individual or firm, the MaineDOT Environmental Office will review the credentials of the monitoring to ensure qualifications are met.

The observation will take place from the pier area itself. Because the range of observer will be approximately 500 meters from the shoreline and the observation zone is limited by surrounding piers and the shoreline behind the project, MaineDOT believes that only one observer is necessary.

The ORPC project analysis assumed that in air noise levels from pile driving will reach 112 dB (ORPC 2012). The NMFS guidance does not give guidelines for Level A harassment of marine mammals with in air noise. The use of the exclusion area for hydroacoustic impacts will ensure that any harassment from in air acoustics will be minimal and should not result in Level A harassment.

Data on all observations will be recorded and will include the following information:

(1) Location of sighting;

(2) Species;

(3) Number of individuals;

(4) Duration of sighting;

(5) Behavior of marine animals sighted;

(6) Direction of travel;

(7) When in relation to construction activities did the sighting occur (e.g., before, "soft-start", during, or after the pile driving or removal).

Following recommendations in ORPCs June 2012 monitoring report, the marine mammal monitor will be able to monitor the expected effected area from the area where the driving is occurring. This will help in communication with the construction team.

Interaction of Hydroacoustic and Marine Mammal Presence Monitoring-

Marine mammal monitoring activities must be reported back to the construction team and the hydro acoustic monitor. For instance, if a harbor seal enters into the Level B harassment area (~500 m) and the pile driving activity has the potential of producing noise levels capable of Level A harassment (180 dB RMS), the marine mammal monitor must communicate that to the construction team to ensure pile driving ceases before the animal enters the Level A harassment exclusion area.

1.13. Question # 14- Suggesting Means of Coordination

Data collected from the pile driving noise pressure monitoring will be shared and could be used in analyzing effects of future projects.

A post project report on the amount of take that occurred along hydroacoustic measurements and marine mammal observations will be provided to NOAA. The post project report will be submitted within 90 days of project completion.

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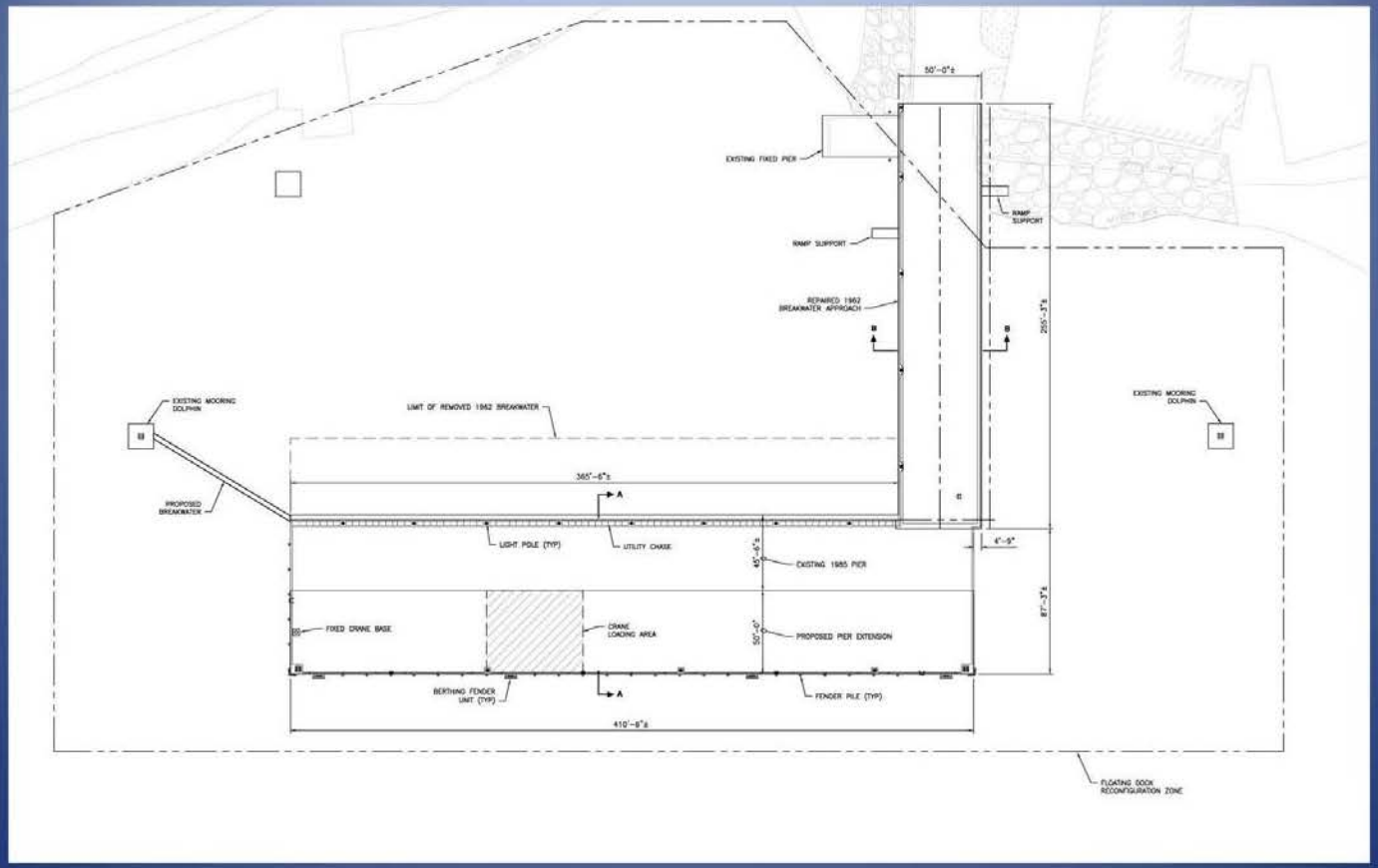
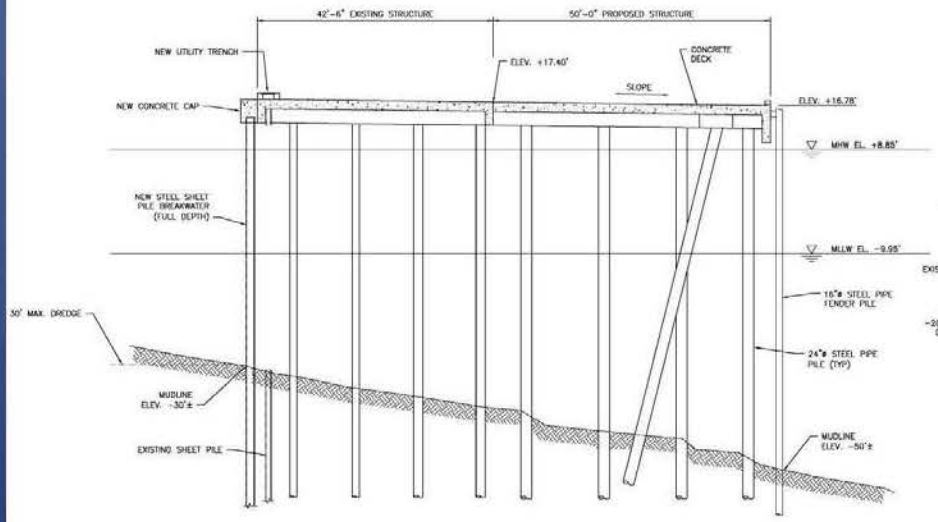


EASTPORT BREAKWATER CONCEPT DESIGN DECK PLAN

EXISTING FLOATING DOCKS WILL BE RELOCATED FOLLOWING CONSTRUCTION
EASTPORT BREAKWATER FINAL LAYOUT



PROPOSED SECTION A-A

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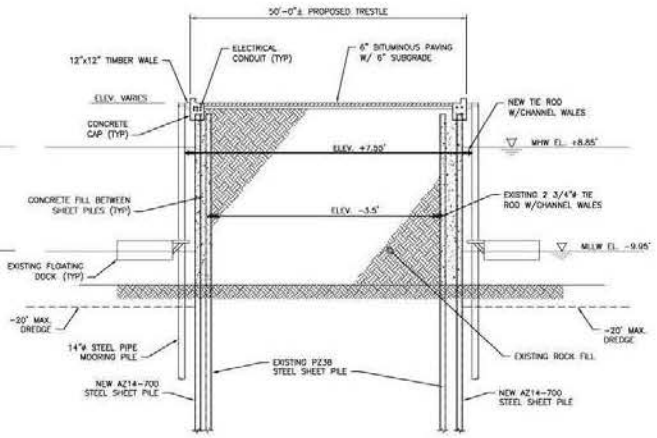

PROPOSED SECTION B-B

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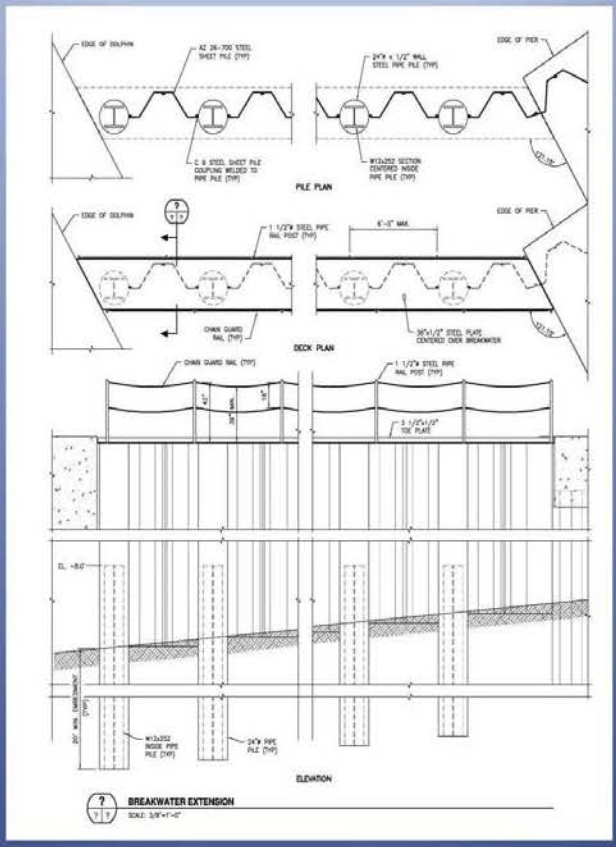
EASTPORT BREAKWATER CONCEPT DESIGN CROSS SECTIONS



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