TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

APPLICATION for INCIDENTAL HARASSMENT AUTHORIZATION

UNDER THE MARINE MAMMAL PROTECTION ACT

LOWER NEW YORK BAY LATERAL MAINTENANCE PROJECT

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LIST OF ABBREVIATIONS AND ACRONYMS

AEP	auditory evoked potential
Ambrose Channel	Ambrose Navigation Channel
CeTAP	Cetaceans and Turtle Assessment Program
CFR	Code of Federal Regulations
CRESLI	Coastal Research and Education Society of Long Island
CV	coefficient of variation
dB	decibels
dB re 1 µPa	decibels relative to 1 micropascal
dB re 1 μPa^2-s	decibels relative to 1 micropascal squared second
DP	dynamic positioning
DPS	distinct population segment
EEZ	exclusive economic zone
ESA	Endangered Species Act
GIS	Geographic information system
Hz	hertz
IHA	Incidental Harassment Authorization
kHz	kilohertz
km^2	square kilometers
LNYBL	Lower New York Bay Lateral
L_{pk}	peak sound pressure
L_{rms}	root-mean-square sound pressure level
L_{ZFeq}	equivalent average source level
L_{ZFmax}	unweighted maximum source level
MMPA	Marine Mammal Protection Act
MMSC	Marine Mammal Stranding Center
NEFSC	Northeast Fisheries Science Center
NMFS	National Marine Fisheries Service *(also* NOAA Fisheries Service)
NOAA Fisheries Service	National Oceanic and Atmospheric Administration, National Marine Fisheries Service (*also* NMFS)
OSP	Optimum Sustainable Population
Project	Lower New York Bay Lateral Maintenance Project
PSO	Protected Species Observer

PTS	permanent threshold shift
SEL	sound exposure level
SEL_{cum}	cumulative sound exposure level
SMA	seasonal management area
SPL	sound pressure level
Transco	Transcontinental Gas Pipe Line Company, LLC
TSS	total suspended sediment
TTS	temporary threshold shift
UME	Unusual Mortality Event
USBL	ultra-short baseline
USCG	U.S. Coast Guard
ZOI	Zone of Influence

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1.0 DESCRIPTION OF THE ACTIVITY

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 Introduction to the Proposed Activity

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of Williams Partners L.P., owns and operates the existing Lower New York Bay Lateral (LNYBL), a 26-inch-diameter, concrete-coated natural gas pipeline that crosses approximately 34 miles of open marine and estuarine waters in Raritan Bay, Lower New York Bay, and the Atlantic Ocean from Morgan, New Jersey, to Long Beach, New York) (Figure 1-1). During routine monitoring of the existing LNYBL, Transco identified seven discrete sections of the gas pipeline with either limited cover or exposure resulting from dynamic conditions. The proposed LNYBL Maintenance Project (Project) is the maintenance of pipeline sections within seven corresponding "work areas" that encompass all in-water temporary workspaces within New York and New Jersey where Project-related activities may cause sediment disturbance. The "Project area" consists of the combined spatial extent of the seven work areas.

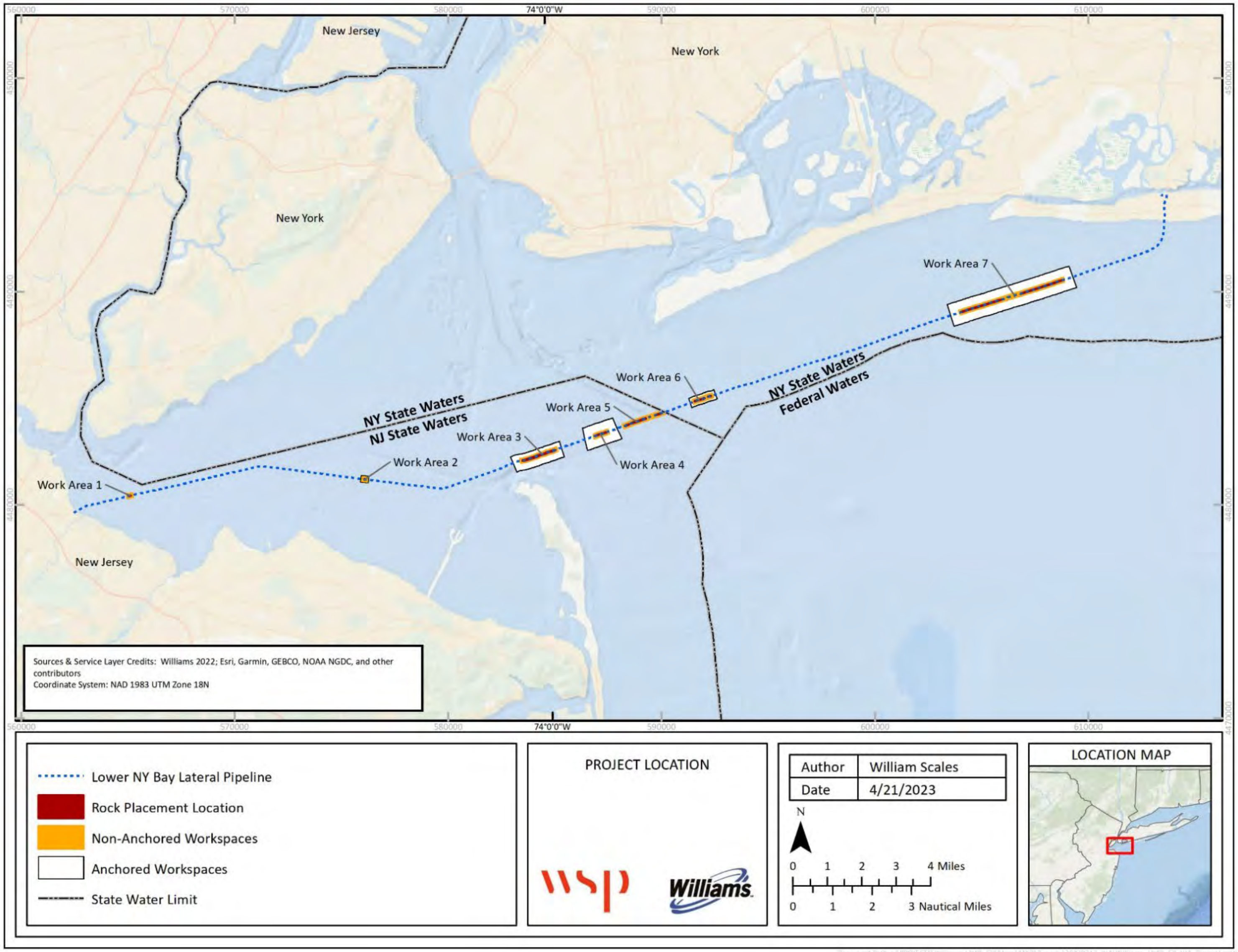
Of the seven work areas, two are located in New York and five are located in New Jersey (Figure 1-1). One (work area 5) is located partially within the federally designated Ambrose Navigation Channel (Ambrose Channel) and is subject to erosional tidal forces within this channel, which have been exacerbated by nearby sand mining on both sides of the pipeline corridor. Additionally, a portion of work area 3 (temporary workspace only) overlaps with the federally designated Sandy Hook Navigation Channel (Sandy Hook Channel), and the work area is subject to erosional forces associated with high tidal currents near the Sandy Hook peninsula resulting from sand deposition on the Sandy Hook landmass spit. Work areas 1, 2, 4, 6, and 7 are neither within nor substantially influenced by currents or erosion associated with navigation channels.

To address the limited cover in the identified work areas, Transco proposes two types of maintenance activities. At work areas 1, 2, 4, 5, 6, and 7, Transco proposes rock placement over the pipeline. At work area 3, Transco proposes a combination of sheet pile installation and rock placement to provide additional stability and protection, and to mitigate future seabed lowering and erosion along the north flank of Sandy Hook Channel. Table 1-1 lists the proposed maintenance activities at each of the work area locations.

Table 1-1. Proposed Maintenance Activities

General Area	Work Area	State	Maintenance
West of Raritan Channel Areas	1, 2	New Jersey	Rock Placement
Sandy Hook Channel	3	New Jersey	Rock Placement and Sheet Piling
Sandy Hook to Ambrose Channel	4	New Jersey	Rock Placement
Ambrose Channel	5	New Jersey	Rock Placement
East of Ambrose Channel	6, 7	New York	Rock Placement

Figure 1-1. Project Location



Rock will be placed over an estimated 26.52 acres (1,155,200 square feet) across the seven work areas, including 17.28 acres (752,700 square feet) in New Jersey waters (work areas 1 through 5) and 9.24 acres (402,500 square feet) in New York waters (work areas 6 and 7). An additional 0.18 acre (8,000 square feet) of seabed may be temporarily disturbed by the placement of barge anchors to be used for the work, including approximately 0.15 acre (6,400 square feet) in New Jersey and approximately 0.04 acre (1,600 square feet) in New York.

The proposed activity was selected following a review of multiple potential activities, including sand placement, the use of concrete mattresses, concrete forms, grout bags, sheet piles, screw piles, pipeline lowering, subsea geotubes and flow modification, and rock placement. Based on its ease of installation and industry-proven effectiveness, rock placement is the recommended maintenance measure. Sheet pile installation near Sandy Hook Channel would help maintain placement of the rock in that area.

The Project would occur in waters that support several marine mammal species. The Marine Mammal Protection Act (MMPA) of 1972 prohibits the taking of marine mammals, which is defined as to "harass, hunt, capture, kill, or attempt to harass, hunt capture or kill," except under certain situations. Section 101(a)(5)(D) allows the issuance of an Incidental Harassment Authorization (IHA) provided that an activity results in small numbers of takes, negligible impacts on marine mammals, and would not adversely affect subsistence use of these animals. The activities associated with the Project (e.g., sheet pile installation) may result in incidental taking by Level A injury and Level B acoustic harassment of marine mammals protected under the MMPA. Transco is submitting an IHA requesting Level A takes for four of the 15 and Level B takes for 13 of the 15 marine mammal species that may occur in the vicinity of the work area. The remaining two species are unlikely to be found within the acoustic footprint of the Project.

1.2 Project Purpose and Need

The purpose of the Project is to promptly restore cover and limit the rate of erosion over the seven discrete sections of the offshore submerged LNYBL pipeline to ensure continued and uninterrupted natural gas service to several hundred thousand customers. The target cover depth after the Project is completed will be equivalent to or greater than the originally designed burial depth of 4 feet of soft substrate. This assumes 1 foot of rock or other hard substrate (e.g., concrete) is equivalent to 2 feet of soft substrate (i.e., unconsolidated sand/silt/clay), per 49 Code of Federal Regulations (CFR) Part 192.327.[1]

1.3 Project Action Area

The Action Area comprises the area of potential effect on marine mammal species due to the proposed Project activities. The Action Area for the proposed Project activities includes the areas of rock placement west of the Raritan Channel (work areas 1 and 2), at Sandy Hook Channel (work area 3), between Sandy Hook Channel and Ambrose Channel (work area 4), within Ambrose Channel (work area 5) and east of Ambrose Channel (work areas 6 and 7). Additionally, sheet piles will be placed within work area 3. The

[1] 49 CFR 192.327 requires pipe installed in a navigable river, stream, or harbor to be installed with a minimum cover of 48 inches in soil or 24 inches in consolidated rock between the top of the pipe and the underwater natural bottom.

Action Area also includes the area where marine mammal species may encounter turbidity resulting from rock placement and sheet pile installation, the area where marine mammals may be disturbed by underwater noise generated during sheet-pile installation, and the transit routes that work vessels associated with the Project will travel.

Vessels associated with the Project would travel between waterfront contractor yard(s) in or near the Port of New York/New Jersey and the work areas in the waters of Raritan Bay, Lower New York Bay, and the Atlantic Ocean. The route(s) Project vessels may travel would be selected based on the daily work location and sea conditions.

1.4 Maintenance Activity Sequence and Schedule

Transco would complete maintenance in several stages with overlapping schedules. The proposed rock cover design for all work areas consists of two layers of rock to be placed on the pipeline section. The inner (filter) layer will consist of fine-grade rock that protects the pipeline area from scour erosion. The outer (armor) layer will consist of larger rock that are expected to be able to withstand the local metocean conditions and will protect the pipe from third-party impacts. An armor layer is not proposed in Ambrose Channel because hydrodynamic modeling indicates that the filter-layer rock will remain stable[2] on the channel floor without the armor layer.

Rock material will be placed at each work area using barge- or vessel-mounted cranes with clamshell-type buckets and multibeam sonar to support accurate placement. Tugs will transport rock-filled scow barges from the port to the work areas. The crane will then lift the rock out of the scow barges and deposit it over the pipeline. Rock will be released at approximately mid-depth in the water column depending on the wave action and corresponding vessel heave at the time of deployment. The crane barge (or vessel) will be equipped with multibeam sonar and ultra-short baseline (USBL) acoustic positioning equipment to support accurate placement of rock on the seafloor. Attachment A outlines the potential list of all USBL and other hydrographic equipment that may be used to position equipment and the vessels and to survey the rock layer. When the scow barge is empty, it will be replaced immediately by another rock-filled barge to support a continuous (24-hour) work schedule for rock placement. The rock filter layer will be installed and surveyed prior to the installation of the rock armor layer.

Based on availability and water depths, several vessel options may be deployed at the various work areas, including spud barge, anchor barge, or dynamic positioning (DP) vessel. DP vessels will be utilized only in work areas with depths greater than 45 feet to avoid thruster damage, including work area 5 (Ambrose Channel in New Jersey) and work area 7 (New York). Therefore, little or no sediment disturbance is anticipated from DP vessel positioning.

In other work areas, either a spud barge or anchor barge will be used depending on vessel availability. If deployed, a spud barge will be positioned by two to four spuds, each approximately 30 to 48 inches in diameter. Barge set-up is expected to occur at a maximum of 85 locations during the Project, with up to

[2] Stability of the rock layers at the various work areas was evaluated based on a 100-year storm event.

15 set-ups in New York and 70 in New Jersey. This will involve placing up to 340 individual barge spuds, including up to 60 in New York and 280 in New Jersey. If deployed, an anchor barge will be anchored by four or eight anchors that contribute to an impact area of approximately 10 by 20 feet for each anchor within a work area that is 500 to 3,500 feet wide. Up to 40 anchor placements would occur during the Project, including up to eight in New York and 32 in New Jersey. Based on sediment characteristics at the various work areas, the spuds and/or anchors are expected to penetrate to depths ranging from 1 to 5 feet below the seafloor.

In addition to rock placement, 2,400 feet of sheet piles will be placed within work area 3, approximately 600 feet north of Sandy Hook Channel, to establish a retaining wall approximately 18 feet south of the pipeline that prevents the currents at Sandy Hook Channel from further eroding the underlying seabed. To reduce potential seabed erosion on the southern (channel) side of the sheet pile wall, armor rock placement will also be placed along the southern side of the sheet piles. The sheet piles will be installed using a barge-mounted vibratory hammer (vibro-hammer) and, when necessary, an impact hammer. A template will be fixed to the barge used for sheet pile installation, which will help position sheet piles and shorten the time needed for sheet pile installation compared to typical sheet pile installation methods. The sheet piles will be stored at a local port and will be brought out to the crane barge using supply barges with tugs. To reduce the required number of supply barges, the crane barge itself will have a supply of sheet piles to reduce the required number of supply barges. Sheet piles will be installed for approximately 2,400 feet. Each installed sheet pile will be surveyed for orientation to record the distance from the pipeline. Active sheet pile installation will occur during daylight hours over an approximate 90-day period; total operational time for the vibro-hammer or impact hammer is expected to be a maximum of 2.25 hours per day during that period. Sheet pile installation can be affected by weather and sea conditions. Therefore, to allow flexibility in scheduling, Transco assumes an additional 30-day contingency due to weather delays and downtime when sheet pile installation will not be occurring. In work area 3, rock placement will follow shortly after sheet pile installation at a given location while sheet piling continues at a nearby location.

Pending receipt of all necessary approvals, maintenance work is proposed to occur between June 1 and November 30, 2024. This includes an allowance for weather-related delays; if conditions are favorable, the Project may be completed by October 2024. Sheet pile installation is proposed to occur between June 1 and September 30, 2024, including a 30-day contingency.

1.5 Noise-Producing Project Elements.

As presented in the following sections, Transco has identified three distinct maintenance activities with noise-producing elements: 1) sheet pile installation 2) vessel operations and 3) rock placement position validation. Transco does not expect all of these activities to result in take of marine mammals, as explained below.

1.5.1 Sheet Pile Installation

As described previously, sheet piles will be placed parallel to the LNYBL for approximately 2,400 feet within work area 3 to establish a retaining wall south of the pipeline that prevents the currents at Sandy Hook Channel from further eroding the underlying seabed. The sheet piles will be installed approximately

600 feet north of Sandy Hook Channel using a barge- or vessel-mounted vibro-hammer and impact hammer. Sheet pile installation will occur during daylight hours over an approximate 120-day period (90 days of actual pile driving plus 30 days for weather contingency). Total operational time for the impact hammer and vibro-hammer is expected to be a maximum 2.25 hours per day during that period.

Vibratory Installation Method

Vibro-hammers are non-impulsive, continuous low-frequency noise sources because they continuously vibrate the sheet pile into the substrate until the desired depth is reached. A vibro-hammer uses spinning counterweights, causing the sheet pile to vibrate at a high speed. The vibrating sheet pile causes the soil underneath it to "liquefy" and allow the sheet pile to move easily into or out of the sediment. Vibro-hammers generally have source levels 10 to 20 decibels (dB) lower than impact devices, so their use is considered a way to reduce underwater noise when pile driving is necessary and suitable sediment conditions exist (Caltrans 2015).

Impact Installation Method

Once refusal is reached with the vibratory hammer, Transco will switch to a hydraulic impact hammer to attain an acceptable depth. A representative hydraulic impact hammer that may be used for the Project is the IHC Hydrohammer S Series—specifically, the S-30, S-40, and S-70. The rams of these Hydrohammers range from 1.5 to 3.5 metric tons with maximum speeds from 50 to 65 blows per minute. Maximum obtainable energy for the largest of the three models (S-70) is 51,630 foot-pounds (70 kilonewton meters) at its highest setting. The minimum rated energy for the smallest hammer (S-30) is 2,213 foot-pounds (3 kilonewton meters).

1.5.2 Vessel Operations

Several types of vessels will be required to support the Project. Table 1-2 lists the vessel types and positioning methods that would be used throughout the Project.

Table 1-2. Vessel Type and Positioning Method

Activity	Vessel Type	Typical Draft (feet) and Dimensions (L x W in feet)	Positioning Method
Sheet Pile Installation/Rock Placement	Barge	15-foot draft and 60 by 100 to 120 feet	***Vessel including Spud***
Sheet Pile Installation/Rock Placement	Barge	12-foot draft and 80 by 40 feet	***Anchor***
Sheet Pile Installation/Rock Placement	V-Hull	18-foot draft and 238 by 54 feet	***Dynamic Positioning***
Sheet Pile Installation/Rock Placement	Tug	8- to 10-foot draft and 118 by 36 by 10 to 295 by 98 by 39 feet	***Anchor Handling***
Crew Transfer/Supply	V-Hull	6-foot draft and 65 by 17 feet	***Rear Engine or Mooring to Work Barge***

Based on the proximity of the work areas to a major shipping center, Transco expects that the background ambient noise will be dominated by large vessels (e.g., container ships) and that noise impacts from Project vessels will be comparable to, if not less than, those generated by existing heavy vessel traffic. (For further details see Section 1.6.2) Therefore, Transco does not expect that the vessels associated with the Project would constitute a major noise source of concern relative to the noise from existing vessel traffic in the vicinity of the work areas and transit routes.

1.5.3 Rock Placement Validation Equipment

Transco proposes to use a single- or multibeam sonar (MBES), high-resolution side-scan sonar, and/or ultra-short baseline (USBL) beacons on the crane barge/vessel to monitor the placement of rock. This will ensure adherence to the design parameters. The MBES and USBL beacons will be used daily for short periods throughout the maintenance window. Multibeam echosounders can operate both within and outside the hearing range of marine mammals. Additionally, their narrow beamwidth greatly reduces the potential for take (NMFS 2021). USBL equipment is non-impulsive and considered navigational equipment. Attachment A provides a full list of all potential hydrographic equipment that may be used during Project maintenance work. Several pieces of equipment operate at very high frequencies (>180 kilohertz [kHz]) outside the generalized hearing range (see Section 1.6.5) of all marine mammals and thus will not result in take. Other sources that emit noise below 180 kHz include USBL positioning systems and other beacons. This equipment has a wide variety of configurations, source levels, and beamwidths and have been shown to produce extremely small acoustic propagation distances in their typical operating configuration (AECOM Technical Services Inc. and HDR Inc. 2020; CSA Ocean Sciences Inc. 2020; JASCO Applied Sciences [USA] Inc. 2021). Additionally, the National Marine Fisheries Services (NMFS) analyses of geophysical work for IHAs in the U.S. Atlantic have indicated that no Level A or B exposures are likely to result from the use of USBLs (87 Federal Register [FR] 66658; 87 FR 27575; 87 FR 78050). Transco does not anticipate that the operation of these systems will result in the take of marine mammals, and they are not discussed further in this application.

1.6 Sound Levels

1.6.1 Ambient Noise

Ambient noise is noise that already exists in the environment prior to the introduction of another noise-producing activity. Ambient noise can come from a number of sources, both natural and man-made. Natural sources of ambient noise include biological sources (i.e., vocalizations and other noises made by various marine species), wind, waves, rain, or naturally occurring seismic activity (i.e., earthquakes) (Richardson et al. 1995). Human-generated sources can include vessel noise (i.e., commercial shipping/container vessels), seismic air guns, and marine construction. Various factors contribute to ambient noise within the work areas and transit routes. One of the major contributors to ambient noise is the commercial shipping traffic near the work areas associated with the Port of New York and New Jersey. The Port of New York and New Jersey recorded 4,547 port calls in 2015 (USDOT Maritime Administration 2015). In 2020, it ranked as the fourth busiest port in the United States in terms of tonnage and third in the United States in terms of number of containers (USDOT 2023). The port can accommodate Post-Panamax vessels with an air draft of 215 feet and a hull draft of 50 feet (Port Authority of New York

& New Jersey 2020). Based on the proximity of the work areas to this major shipping center, Transco expects that ambient noise is dominated by large vessels (e.g., container ships) with source levels of 180 to 190 decibels relative to 1 micropascal (dB re 1 micropascal) root-mean-square sound pressure level (L_{rms}) at 1 meter and frequencies between 0.2 and 0.5 kHz (Jasny et al. 2005; Thomsen et al. 2009). Merchant et al. (2012) conducted an ambient noise study at the western entrance to the English Channel in Falmouth Bay, one of the busiest waterways in the world, and representative of the Transco Action Area. Merchant et al. (2012) found that intermittent ambient sound pressure reached up to 148.6 dB re 1 µPa due to multiple ships traveling through the area. This study demonstrates that even "ambient" noise levels in a project area can vary and even exceed Project noise levels due to existing anthropogenic sources. Naval Facilities Engineering Command Southwest (2017) found similar results during the Fuel Pier Replacement Project at Naval Base Point Loma in San Diego, California. Sound pressure levels recorded at distances between 537 meters and 810 meters were 7 to 8 dB higher than those recorded at 250 meters during demolition of 2.1-meter (84-inch) caisson piles.

Underwater noise associated with vessels is generally attributed to the low-frequency noise created by propeller cavitation. Because propeller use by Project vessels would be limited to tugs transporting barges and materials and the use of a DP vessel at work area 5 (Ambrose Channel) and work area 7, Transco expects that the underwater noise from these vessels would be comparable to, if not less than, those generated by existing vessel traffic in the vicinity of the Port of New Jersey and New York. Therefore, vessel noise is not considered further in this application.

1.6.2 Underwater Transmission Loss

To determine how underwater noise could impact the behavior of marine mammal species in the work areas, it is important to understand how sound can spread away from the noise source. As the sound moves away from the source, there is a loss of acoustic intensity with increasing distance from the source. This is known as transmission loss. It is necessary to calculate the transmission loss of a sound source in order to determine how much area around that sound source would encompass the noise threshold criteria. How a sound travels away from a source depends on a variety of factors, including the original source level; environmental factors such as local salinity and temperature; and physical factors such as water depth, currents, and composition of bottom sediments (when depth is a limiting factor). Transmission loss also varies based on the depth of the sound source and the receiver. Considering all these components can aid in understanding how the sound would travel away from the source.

An important factor in transmission loss is spreading loss (i.e., how the sound spreads out away from the source). There are two types of underwater spreading loss: spherical spreading, where the sound spreads out in spherical waves (6 dB loss per doubling distance), and cylindrical spreading loss, where the sound waves form a cylindrical wave away from the source (3 dB loss per doubling distance). These two types of spreading loss occur under different conditions. Spherical spreading occurs in a uniform medium, whereas cylindrical spreading occurs when the medium is not uniform (Richardson et al. 1995). Due to the complex nature of the marine environment, underwater sound is not expected to spread in a perfect spherical or cylindrical manner. Therefore, the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries Service) recognizes the Practical Spreading Loss model, which accounts for a 4.5 dB loss per doubling distance, as the best method to determine how sound travels away from a source if the site-specific environmental and physical information is not available. The Practical Spreading Loss model (outlined below) was used for the proposed Project to determine the approximate straight-line distance (isopleth) from the sound source (vibratory and impact sheet pile driving) to where the NOAA Fisheries Service Level A and Level B threshold criteria are estimated to be reached while driving an individual sheet pile.

<u>Practical Spreading Loss Model:</u>

$$TL = 15 \log (R1/R0)$$

where:

TL = Source Level – Noise Threshold Level
R1 = Range distance the noise criteria extends away from the source (in meters)
R0 = Reference range (i.e., @ 1 meter, @ 10 meters, etc.) (in meters)

1.6.3 In-Air Transmission Loss

To determine how noise could impact the behavior of protected pinnipeds in haul-out areas in the vicinity of the work areas (nearest haul-out is on Sandy Hook, 2.8 kilometers [1.78 statute miles] from the closest work area), it is important to examine transmission loss of in-air noise in addition to underwater noise. A spherical spreading loss model, which assumes average atmospheric conditions, is a standard model used to estimate transmission loss of in-air noise. The spherical spreading loss model, which results in a 6 dB decrease in sound pressure level (SPL) per doubling of distance, was used for the proposed Project to determine the approximate straight-line distance (isopleth) from the sound source (vibratory and impact sheet pile driving) to where the NOAA Fisheries Service threshold criteria are estimated to be reached while driving an individual sheet pile.

<u>In-Air Spherical Spreading Loss Model:</u>

$$TL = 20 \log (R1/R0)$$

where:

TL = Source Level – Noise Threshold Level
R1 = Range distance the noise criteria extends away from the source (in meters)
R0 = Reference range (i.e., @ 1 meter, @ 10 meters, etc.) (in meters)

1.6.4 Reference Pile Driving Sound Source Levels

Underwater source levels for vibratory pile driving were taken from data in the *Underwater Noise Assessment for the Mary River Project – Phase 2 Proposal* (Quijano et al. 2018). Source levels were calculated from measurements conducted while an ICE-28D vibratory hammer was used to drive sheet piles (MacDonnell and Martin 2014). The broadband 90th percentile source level at 1 meter of 182 decibels relative to 1 micropascal squared second (dB re 1 µPa^2-s) (L_{rms}) was derived.

Underwater source levels for impact pile driving were taken from *Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish* (Caltrans 2015), where a Delmag D19-42 impact hammer was used to drive 14-inch steel pipe piles. Source levels considered were 196 re 1 µPa (peak sound pressure level [L_{pk}]), 180 dB re 1 µPa (L_{rms}), and 170 dB re 1 µPa^2-s (sound exposure level [SEL]) at 20 meters.

In-air sound levels for vibratory and impact sheet pile driving were taken from the Naval Facilities Engineering Command Atlantic report *Pile-Driving Noise Measurements at Atlantic Fleet Naval Installations* (Illingworth and Rodkin 2017). The report presents measured unweighted maximum (L_{ZFmax}) and equivalent average (L_{ZFeq}) source levels of vibratory pile driving from a number of pile driving operations. As a conservative approach, the highest average source levels presented in the report for similar equipment, 98 dB re 20 µPa at 15 meters for the vibro-hammer and 103 dB re 20 µPa at 15 meters for the impact hammer, were used in the assessment of in-air noise.

The sheet pile driving scenario outlined in Table 1-3 was modeled. The number of days required to install the sheets was estimated by considering the installation parameters outlined in Table 1-3. Table 1-4 shows the parameters for total quantity and handling time of sheet piles.

Table 1-3. Sheet Pile Driving Scenarios

Scenario Number	Scenario Description	Number of days Modeled
1	One vibro-hammer operating for 15 minutes and one impact hammer operating for 2 hours in a 24-hour period, operating sequentially	90 active days over a 120-day period

Table 1-4. Estimated Sheet Pile Installation Parameters

Total Quantity (each)	Method	Maximum Duration per Sheet Pile (minutes)	Estimated Piles per Day
960	Vibratory/Impact	11	12

1.6.5 Attenuation to NOAA Fisheries Service Thresholds

In-Air Noise

To determine potential impacts on pinnipeds from in-air noise, the NOAA Fisheries Service has established an in-air harassment threshold for pinnipeds (except harbor seals) of 100 dB re 20 µPa L_{rms}, and another harassment threshold for harbor seals of 90 dB re 20 µPa L_{rms}. Table 1-5 outlines the distances from the different hammers associated with the pile-driving scenario described above to the in-air harassment thresholds.

The closest known haul-out sites for seals in the vicinity of the Project area are located on Sandy Hook, approximately 2.8 kilometers (1.78 statute miles) from the sheet pile driving work area (CWF 2018). Consequently, impacts from in-air noise resulting from vibratory and/or impact pile diving on hauled-out pinnipeds is not considered further in this application.

Table 1-5. Distances to In-Air Noise Harassment Thresholds

Scenario	Distance to Pinniped In-air Threshold (100 dB re 20 µPa L_{rms}) [meters (statute miles)]	Distance to Harbor Seal In-air Threshold (90 dB re 20 µPa L_{rms}) [meters (statute miles)]
Vibro-hammer is operating (15 minutes) and Impact hammer is operating (2 hours)	21 (0.01)	67 (0.04)

Key: dB re 20 µPa L_{rms} = decibels relative to 1 micropascal root mean squared pressure level

Underwater Noise

NOAA Fisheries Service recognizes two levels of incidental harassment or "take." Each level has different thresholds and models to determine potential take. Level A harassment has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment 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, but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

Level A Threshold Analysis: NOAA Fisheries Service issued acoustic guidance in 2016 (updated in 2018) for determining potential impacts on marine mammals, and established injury thresholds for Level A harassment (NOAA Fisheries Service 2016, 2018). NOAA Fisheries Service based the criteria on the potential for a sound source to result in permanent threshold shift (PTS). PTS occurs when exposure to noise results in permanent loss of hearing in a portion of the frequency spectrum, which can potentially have direct negative consequences for marine mammals. PTS can result from repeated exposures to reversible threshold shifts, or temporary threshold shift (TTS), or from catastrophic exposure to an intense sound that causes immediate damage to the ear.

The NOAA Fisheries Service threshold criteria differentiate between five hearing groups categorized based on the varied susceptibility of those groups to noise from different portions of the frequency spectrum (Table 1-6). The thresholds that apply to each hearing group used in this application are presented in Table 1-6. For non-impulsive sources such as vibratory pile driving, the technical guidance specifies a single cumulative sound exposure level (SEL_{cum} re 1 µPa^{2}s) for each hearing group, which are considered as thresholds for vibratory pile installation during the analysis for this IHA application. Transco calculated the Project isopleths for vibratory pile installation activities for Level A thresholds based on the expected activity duration in hours within a 24-hour period (modeling cumulative sound).

For impulsive sources such as impact pile driving, the technical guidance uses dual criteria of both cumulative sound exposure level (SEL_{cum} re 1 µPa^{2}s) and a peak threshold (L_{pk} re 1 µPa) for each hearing group, both of which are considered as thresholds for impact pile installation during the analysis for this IHA application. For the SEL_{cum} threshold, isopleths were calculated using the total number of pile strikes within a 24-hour period.

Table 1-6. Marine Mammal Generalized Hearing Groups

Functional Hearing Groups	Taxonomic Group	Generalized Hearing Range[a]
Low-frequency cetaceans	Baleen whales (e.g., humpback whale, blue whale)	7 Hz to 35 kHz
Mid-frequency cetaceans	Most dolphin species, beaked whales, sperm whale	150 Hz to 160 kHz
High-frequency cetaceans	True porpoise, river dolphins, (*Cephalorhynchus* dolphins)	275 Hz to 160 kHz
Phocid pinnipeds in-water	Phocid or true seals (e.g., harbor seal)	50 Hz to 86 kHz

Sources: Southall et al. 2007; Finneran and Jenkins 2012; NOAA Fisheries Service 2018
Key: dB = decibels; Hz = hertz; kHz = kilohertz
Note:
[a] The generalized hearing range is for all species within a group. Individual hearing may vary. Generalized hearing range based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for low-frequency cetaceans (Southall et al. 2007). No otariid pinnipeds are present near the work area therefore they have not been included.

The current NOAA technical guidance that is based on cumulative sound exposure in a 24-hour period for each individual animal (i.e., SEL_{cum}) assumes the individual remains stationary within the Project area and is exposed to the same level of sound for 24 hours. It does not account for animal movement out of the work areas. Transco expects that any animal exposed during actual driving events would partially recover during breaks in pile driving and/or leave the ensonified area. However, Transco is requesting Level A take for select species based on the conservative assumption that the animals remain stationary within the sound fields (see Section 6.0).

Level B Threshold Analysis: To determine potential behavioral impacts on marine mammals from underwater acoustic sources, NOAA Fisheries Service has established a harassment threshold of 120 dB re 1µPa L_{rms} for continuous sounds and 160 dB re 1µPa L_{rms} for impulsive or intermittent sounds. Based on the source levels noted in Section 1.6.4, Transco calculated the distance to the 120 dB threshold from the vibratory noise source and to the 160 dB threshold from the impulsive impact pile driving noise source. Sound levels capable of resulting in behavioral disturbance from vibratory and impact pile driving, as modeled, are presented in Table 1-7.

It is likely that some of the underwater noise produced from vibratory pile installation activities associated with the Project would be below ambient noise levels (see Section 1.6.1) before reaching the modeled isopleths of 13,594 meters (8.4 statute miles). However, Transco has conservatively requested Level B take based on the entire modeled Level B ensonified areas (see Section 6.0).

Level A Threshold Analysis: For the use of vibro-hammers for pile installation, based on the source levels noted in Section 1.6.4, Transco used formulas in the "Vibratory Pile Driving" tab of the Companion User Spreadsheet released by NOAA Fisheries Service to calculate the distances to in-water marine mammal injury thresholds (Table 1-7) (Attachment B). For the use of impact hammers for pile installation, based on the source levels noted in Section 1.6.4, Transco used formulas in the "Impact Pile Driving" tab of the Companion User Spreadsheet to calculate the distances to in-water marine mammal injury thresholds (Table 1-7) (Attachment B). Attachment B provides the spreadsheet used to calculate distances to thresholds.

Table 1-7. Calculated Noise Zones for Permanent Threshold Shift Injury Thresholds (Level A) and Behavioral Disturbance Thresholds (Level B)

NOAA Fisheries Service Reference Threshold[a,b,c]	Parameter	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Seals	Behavioral – all Species
Non-Impulsive (vibratory pile driving)	SEL_{cum}	199 dB	198 dB	173 dB	201 dB	120 dB (Continuous Noise)
Impulsive (impact pile driving)	SEL_{cum}	183 dB	185 dB	155 dB	185 dB	160 dB (Impulsive or Intermittent Noise)
	L_{pk}	219 dB	230 dB	202 dB	218 dB	
Pile Driving Scenario	**Parameter**	**Level A Threshold (meters)[d,e,f]**				**Level B Threshold (meters)[g]**
One Vibro-hammer (15 minutes) and One Impact Hammer (2 hours) over 24 hours	SEL_{cum}	935.8	33.3	1,114.7	500.8	430.9 (impact hammer) 13,594 (vibro-hammer)
	L_{pk}	N/A[h]	N/A[h]	8.0	N/A[h]	

Key: dB = decibels; Lpk = peak sound pressure level; NOAA = National Oceanic and Atmospheric Administration; PTS = permanent threshold shift; SEL_{cum} = cumulative sound exposure level

Notes:

[a] All in-water L_{rms} behavioral thresholds are re 1 µPa.

[b] The in-water SEL_{cum} injury thresholds are re 1 µPa^{2}s.

[c] The in-water L_{pk} injury thresholds are re 1 µPa.

[d] The Level A distance calculated represents the distance the sound is expected to propagate within a 24-hour period.

[e] Calculated values for Level A are cumulative and based on the total number of piles installed per 24-hour period.

[f] Distances to in-water marine mammal Level A (PTS) thresholds criteria were calculated using the "Vibratory Pile Driving” and “Impact Pile Driving” tabs of the Companion User Spreadsheet released in 2020 by NOAA Fisheries Service with the Acoustic Guidance.

[g] Distances to in-water marine mammal behavioral threshold criteria were calculated using the Practical Spreading Loss model.

[h] N/A (not applicable) indicates that the anticipated equipment will not exceed the identified noise threshold at the source.

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2.0 DATES, DURATION, AND REGION OF ACTIVITY

The date(s) and duration of each activity and the specific geographical region where it will occur.

2.1 Dates

In-water maintenance is anticipated to occur between June 1 and November 30, 2023. However, work in certain areas will be scheduled to avoid environmental time-of-year restrictions to the extent practicable (see Table 3-1 for proposed times frames of individual in-water maintenance activities). Pile-installation is currently planned to occur between June 1 and November 30, 2023, including a 30-day contingency for weather or other delays. The time-of-year restrictions considered for the Project are listed below, though the horseshoe crab spawning season is not expected to apply to any of the currently proposed work areas:

- **Atlantic sturgeon migration periods** (March 1 to June 30; October 1 to November 30) in nearshore Atlantic Ocean waters.
- **Anadromous fish migration period** (March 1 to June 30) in tidal waters identified as migratory pathways.
- **Winter flounder migration period** (November 15 to December 31) at the tip of Sandy Hook and adjacent navigation channel.
- **Winter flounder spawning season** (January 1 to May 31) in waters shallower than -20 feet mean lower low water.
- **Blue crab harvesting season** (December 1 to April 30) within a 500-foot buffer around channels where harvesting of crabs is allowed.
- **Blue crab overwintering period** (December 1 to March 31) at the tip of Sandy Hook and adjacent navigation channel.
- **Horseshoe crab spawning season** (April 15 to July 15) near the shoreline in Raritan Bay.

2.2 Duration

The Project will be completed within 6 months of commencement. This includes an allowance for weather-related delays; if conditions are favorable, the Project may be completed within 150 days. During this time, sheet pile installation will occur over an approximate 120-day period (90 days actual pile driving with 30 days for weather contingency). Total operational time for the sheet pile installation scenarios were assumed to be a maximum of 2.25 hours per day during that period (see Section 1.5.1).

2.3 Region of Activity

The Project would be located in the waters of Raritan Bay, the Lower New York Bay, and the Atlantic Ocean (see Figure 1-1). The Project area is located in the greater New York Bight region. The New York Bight is a triangular-shaped area of the continental shelf generally bounded by Montauk Point on eastern Long Island, Cape May in southern New Jersey, and the open shallows of the Atlantic Ocean. The depth of water in the area averages about 27 meters (90 feet), except in the northwest-southeast–trending Hudson Canyon, which has depths that exceed 73 meters (240 feet) (Ketchem et al. 1951). The New York Bight, as described by Stoffer and Messina (1996), refers to the bend, or curve, in the shoreline of the open coast and great expanse of shallow ocean between Long Island and the New Jersey coast. Water depths exceed

30 meters (100 feet) approximately 80 kilometers (50 statute miles) offshore. No significant features existing within the work areas to suggest that the habitat within the Project area is unique in relation to the greater expanse that defines the bight.

Prominent ocean currents occur within the region of the New York Bight. Prevailing wave energy forces sand movement westward along the southern shore of Long Island (Tanski 2007). Longshore currents near the Atlantic shoreline of the Rockaway Peninsula interact substantially with the Hudson-Raritan estuary, particularly along Ambrose Channel entering New York Harbor (Bruno and Blumberg 2009). Ocean currents near the Project area extend farther offshore and flow to the south, driven by the Hudson-Raritan plume. This brackish plume is prevalent during seasonal periods of peak river discharge and enters the ocean at the opening between Rockaway Point and Sandy Hook, New Jersey (Young and Hillard 1984). Local circulation patterns can run counter to this southerly current and cause it to slow down and reverse direction. Bottom substrate throughout the New York Bight and the Project area is generally sand (USGS and The Nature Conservancy 2010).

3.0 SPECIES AND NUMBERS OF MARINE MAMMALS AND AFFECTED SPECIES STATUS AND DISTRIBUTION

The species and numbers of marine mammals likely to be found in the activity area, and a description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

Because of the number of marine mammals discussed, Section 3.0 of the application has been combined with Section 4.0 so that all species-specific information can be provided together for ease of review. Each topic required in Section 4.0 (i.e., status, distribution, and seasonal distribution [when applicable]) is identified and addressed under subheadings in Section 3.0.

3.1 Species Present

Thirteen species of marine mammals are found in the New York Bight south of Long Island, New York (Table 3-1) (Hayes et al. 2020; Hayes et al. 2021; Hayes et al. 2022). All species could be present near the work areas throughout the year; however, due to seasonal migrations and preferred habitats, it is unlikely that all species would be present during the maintenance work for the entire duration of the Project.

Table 3-1. Marine Mammal Species Potentially in the Region of New York Bight

Common Name	Scientific Name	Endangered Species Act Status	Marine Mammal Protection Act Status	Time of Year Expected in Northeast Region	Presence in Project Area
Pinnipeds					
Gray Seal (Western North Atlantic Stock)	*Halichoerus grypus atlantica*	None	Non- strategic	September to May	Possible
Harbor Seal (Western North Atlantic Stock)	*Phoca vitulina concolor*	None	Non-strategic	September to May	Possible
Harp Seal (Western North Atlantic Stock)	*Pagophilus groenlandicus*	None	Non-strategic	January to May	Uncommon
Whales					
Fin Whale (Western North Atlantic Stock)	*Balaenoptera physalus*	Endangered	Depleted, Strategic	Year-round	Possible
Humpback Whale (Gulf of Maine Stock)	*Megaptera novaeangliae*	None	Non-depleted, Non-strategic	Year-round	Possible
Minke Whale (Canadian East Coast Stock)	*Balaenoptera acutorostrata acutorostrata*	None	Non-strategic	Spring/ Summer/Fall	Possible
North Atlantic Right Whale (Western North Atlantic Stock)	*Eubalaena glacialis*	Endangered	Depleted, Strategic	November to April	Possible

Common Name	Scientific Name	Endangered Species Act Status	Marine Mammal Protection Act Status	Time of Year Expected in Northeast Region	Presence in Project Area
Dolphins and Porpoises					
Atlantic White-Sided Dolphin (Western North Atlantic Stock)	*Lagenorhynchus acutus*	None	Non-strategic	Year-round	Uncommon
Common Bottlenose Dolphin (Western North Atlantic Offshore Stock)	*Tursiops truncatus truncatus*	None	Non-strategic	June to August	Possible
Common Bottlenose Dolphin (Western North Atlantic Northern Migratory Coastal Stock)	*Tursiops truncatus truncatus*	None	Depleted, Strategic	June to August	Possible
Harbor Porpoise (Gulf of Maine/Bay of Fundy Stock)	*Phocoena phocoena*	None	Non-strategic	November to May	Possible
Long-Finned Pilot Whale (Western North Atlantic Stock)	*Globicephala melas*	None	Non-strategic	June to August	Uncommon
Short-Finned Pilot Whale (Western North Atlantic Stock)	*Globicephala macrorhynchus*	None	Non-strategic	June to August	Uncommon
Common Dolphin (Western North Atlantic Stock)	*Delphinus delphis delphis*	None	Non-strategic	Mid-January to May	Possible
Atlantic Spotted Dolphin	*Stenalis frontalis*	None	Non-strategic	August to October	Possible

Sources: Hayes et al. 2020; Hayes et al. 2021; Hayes et al. 2022

3.2 Pinnipeds

Three species of pinnipeds occur in the Atlantic Ocean south of Long Island, New York: gray seal (*Halichoerus grypus atlantica*), harbor seal (*Phoca vitulina concolor*), and harp seal (*Pagophilus groenlandicus*). All three are most likely to occur in the region during winter and early spring (September to May).

3.2.1 Gray Seal

Gray seals are members of the true seal family (Phocidae). Adult gray seals are sexually dimorphic, with males generally being larger than females. Adult males can reach up to 3 meters (10 feet) in length and weigh up to 400 kilograms (880 pounds) (NOAA Fisheries Service 2022a). Adult females can reach up to 2.3 meters (7.5 feet) in length and weigh up to 250 kilograms (550 pounds) (NOAA Fisheries Service 2022a). This species, like other members of the Phocidae family, lacks external ear flaps, and the rear flippers do not rotate. Gray seals' appearance and coloration depends on their geographic location and differs between sexes. In general, adult females have a silver-grey coat with darker spots scattered over their body. Males can have similar color pattern, but they have a prominent, long-arched nose (NOAA Fisheries Service 2022a).

Gray seals are opportunistic predators that feed primarily on various species of crustaceans, squid, fish, and octopus (NOAA Fisheries Service 2022a). They consume between 4% and 6% of their body weight each day, hunting throughout the entire water column for prey. They often co-occur with harbor seals because their habitat and feeding preferences overlap (NOAA Fisheries Service 2022a). They primarily inhabit coastal waters. However, they do venture into deeper water, as they have been known to dive up to 475 meters (1,560 feet) to capture prey during feeding (NOAA Fisheries Service 2022a).

Gray seals, along with 40 other pinniped species and subspecies, are capable of hearing in both air and water. In general, the estimated bandwidth for functional hearing for pinnipeds in water is 75 hertz (Hz) to 75 kHz, and in air is 75 Hz to 30 kHz (Southall et al. 2007). Pinnipeds can produce a wide variety of low-frequency social sounds and have distinctly different hearing capabilities in air and water (Southall et al. 2007). Direct testing of hearing capabilities in water have been conducted on a variety of pinniped species, including both behavioral reactions to sounds and direct measurements of hearing through auditory evoked potential (AEP) methods (Southall et al. 2007; Finneran 2016).

3.2.1.1 Numbers

Current population estimates of the western North Atlantic gray seal are not available; however, estimates for portions of the total population are available for certain time periods (Hayes et al. 2022). For instance, in 2016, the best Canadian gray seal population estimate was 424,300 individuals (Hayes et al. 2022). The population within U.S. waters is estimated to be 27,131 (coefficient of variation [CV] = 0.19), derived from models using the total population size to pup ratios in Canada applied to U.S. pup count surveys.

Gray seals in the U.S. are known to pup at nine separate locations off the coast of Maine and Massachusetts (Woods et al. 2020). While pups have stranded on eastern Long Island beaches in New York, no pupping colonies are expected to occur in the Project area. Populations are likely increasing based on aerial survey data collected from the pupping sites; however, the rate of increase is unknown (Hayes et al. 2022). In addition to natural increases, the population increase of gray seals in the United States may partially be due to immigration of individuals from Canadian populations (Hayes et al. 2022).

3.2.1.2 Status

Gray seals are not categorized as depleted or strategic under the MMPA, are not listed as threatened or endangered under the Endangered Species Act (ESA), and are not state-listed in New York or New Jersey. The current status of the western North Atlantic gray seal stock, relative to the optimum sustainable population (OSP) level, in the U.S. Atlantic exclusive economic zone (EEZ) is unknown; however, the stock population is increasing in both Canadian and U.S. waters (Hayes et al. 2022). Populations may be increasing specifically in New York waters given increased numbers of stranded animals and increases in observations during aerial, ship, and land-based surveys (DiGiovanni et al. 2015). Although numbers may be increasing, the conservative assumptions of the take estimation (including the assumption that all gray seals are in the water at all times) should account for the possibility of increased numbers of gray seals since the most recent population estimate.

3.2.1.3 Distribution

The gray seal occurs on both sides of the North Atlantic, divided into three primary populations: (1) eastern Canada, (2) northwestern Europe, and (3) the Baltic Sea (Katona et al. 1993). The U.S. western North Atlantic Stock of gray seals is part of the eastern Canada population (Hayes et al. 2022). In U.S. waters, gray seals can be found year-round in the coastal waters of the Gulf of Maine, and year-round breeding of approximately 400 animals has been documented on areas of outer Cape Cod and Muskeget Island in Massachusetts (Hayes et al. 2022). Hayes et al. (2022) report that gray seals are potentially present in the Project area from September to May. The closest known haul-out sites for gray seals in the vicinity of the Project area are located 2.86 kilometers (1.78 statute miles). Additional haul-out sites are likely Little Gull Island in the Long Island Sound (CRESLI n.d.). Gray seals were initially observed on Great Gull Island in eastern Long Island Sound in 2005, and since that time, 29 gray seals from Great Gull Island have moved to Little Gull Island just to the east (DiGiovanni et al. 2015). DiGiovanni et al. (2015) reported that aerial surveys in March 2014 resulted in a count of 538 gray seals on Little Gull Island.

Gray seals have stranded along the New York and New Jersey coasts in recent years. Between 2015 and 2019, 95 gray seal strandings (mortalities) occurred in New York and 35 in New Jersey (Hayes et al. 2022). During 2013, 35 gray seals stranded (mortalities and living animals) along the Long Island coast (RFMRP 2014). Of those strandings, all occurred between January and June. These data, however, do not specify whether those strandings in New York waters were along the southern coast of Long Island or within Long Island Sound. In July 2018, NOAA Fisheries Service declared an Unusual Mortality Event (UME) for gray seals along the Atlantic coast due to infectious disease (3,152 stranded individuals, both harbor and gray seals, as of March 13, 2020) (NOAA Fisheries Service 2022b). Between July 1, 2018, and March 13, 2020, 172 seals had stranded in New York and 101 in New Jersey (NOAA Fisheries Service 2022b). Gray seals may be found in the Project area during winter, spring, and early summer, based on known occurrence information, sighting data, and their known range.

3.2.2 Harbor Seal

Harbor seals also are members of the true seal family (Phocidae). Adult harbor seals, like gray seals, are sexually dimorphic, with males generally being larger than females. Adult harbor seals can measure up to 1.8 meters (6 feet) in length and weigh up to 129 kilograms (285 pounds) (NOAA Fisheries Service 2022c). This species, like other members of the Phocidae family, lacks external ear flaps and the rear flippers do not rotate. Harbor seal coloration varies, but they commonly have a blue-gray color on their backs, with a speckling of both light and darker colors. When hauled out, they can be identified by their concave, dog-like snout and their “banana-like” position (characteristic resting pose with raised head and tail) (NOAA Fisheries Service 2022c).

Harbor seals are opportunistic hunters that feed on squid and schooling fish such as herring, alewife, flounder, cod, and hake. Much of their daily activity involves actively foraging in the water column and seabed (Reeves et al. 2002a). Their diving activities (assumed for foraging) are related to risk-reward models, where increased diving activity increases their overall likelihood of predator-related mortality (i.e., shark attacks); as a result, harbor seals experience relatively high mortality from predators. At Sable Island, Nova Scotia, shark-related mortality was as high as 45% for harbor seal pups in 1996 (Lucas and Stobo 2000). Haul-out sites effectively reduce predation by decreasing the total amount of time spent in the water and, therefore, the overall likelihood of predation by marine predators.

Harbor seals (similar to gray seals) are capable of hearing in both air and water. In general, the estimated bandwidth for functional hearing for pinnipeds in water is 75 Hz to 75 kHz, and in air is 75 Hz to 30 kHz (Southall et al. 2007).

3.2.2.1 Numbers

Harbor seals are the most common seal species in New York State (NYSDEC n.d.[b]); therefore, the harbor seal is expected to be the most prevalent pinniped both within and near the vicinity of the Project area, though occurrence in the area is generally limited to September through May. The best current abundance estimate of the western North Atlantic stock of harbor seals is 61,336 (CV=0.08), which is based on a 2018 survey (Hayes et al. 2022). The 2018 survey was designed to survey ledges of known historic occupancy in U.S. waters. The 2018 estimate was 19% lower than the 2012 estimate, which was 24% lower than the estimate made in 2001.

3.2.2.2 Status

Harbor seals are not categorized as depleted or strategic under the MMPA, are not listed as threatened or endangered under the ESA, and are not state-listed in New York or New Jersey. The current status of the western North Atlantic harbor seal stock, relative to the OSP level, in the U.S. Atlantic EEZ is unknown (Hayes et al. 2022). Populations may be increasing specifically in New York waters given increased numbers of stranded animals and increases in observations during aerial, ship, and land-based surveys (DiGiovanni et al. 2015). Although numbers may be increasing, the conservative assumptions of the take estimation (including the assumption that all harbor seals are in the water at all times) should account for the possibility of increased numbers of harbor seals since the most recent population estimate.

3.2.2.3 Distribution

Harbor seals can occur in all nearshore waters of the North Atlantic above 30 degrees north latitude (Burns 2009). The range of the western North Atlantic stock of harbor seals includes the Project area. Studies of harbor seals' mitochondrial DNA suggest that female harbor seals are regionally philopatric (tend to return to or remain near a particular site or area); therefore, population and/or management units are on the scale of a few hundred kilometers (Stanley et al. 1996). Despite a lack of understanding of the western North Atlantic population stock structure, studies suggest that all harbor seals along the eastern coasts of the U.S. and Canada represent a single population (Temte et al. 1991; Hayes et al. 2022).

The western North Atlantic stock of harbor seals is primarily found along the coastal and inshore regions of the northeastern United States and Canada, with the greatest concentrations occurring in coastal Maine, where they reproduce and reside year-round (Katona et al. 1993; Hayes et al. 2022). In the western North Atlantic, the harbor seal ranges from the eastern Canadian Arctic and Greenland south to the southern extent of New England and New York state and, on rare occasions, the Carolinas (Mansfield 1967; Baird 2001). Their presence in the region of the Project area is seasonal, with increasing numbers from October to March and a peak in mid-March (Hoover et al. 2013), when adults, sub-adults, and juveniles are expected to migrate south from Maine (in late summer/early fall). They return north to the coastal waters of Maine and Canada in late spring (Katona et al. 1993).

Pupping season generally occurs from mid-May through June, primarily along the Maine coast (Richardson 1976; Temte et al. 1991; Hayes et al. 2022). The closest known haul-out sites for harbor seals in the vicinity of the Project area are located 2.86 kilometers (1.78 statute miles) southwest of the Project site and 16.1 kilometers (10 statute miles) east (CRESLI n.d.; NYSDEC n.d.[b]). The Coastal Research and Education Society of Long Island (CRESLI) Seal Research Program has monitored seal populations for over 15 years and continues to conduct behavioral and population studies of seals around Long Island, including regular observations at a major haul-out site at Cupsogue Beach Park. Cupsogue Beach Park is located approximately 96.6 kilometers (60 statute miles) north of the Project area on the eastern shore of Long Island, New York. There are approximately 26 haul-out locations around Long Island, and CRESLI has documented a total of 18,321 harbor seals during 334 surveys since 2004 (CRESLI 2019).

Harbor seals have stranded along the New York and New Jersey coasts in recent years. Between 2015 and 2019, 58 harbor seals stranded (mortalities) in New York and 40 stranded (mortalities) in New Jersey (Hayes et al. 2022). In July 2018, NOAA Fisheries Service declared a UME for harbor seals along the Atlantic coast due to infectious disease (3,152 stranded individuals, both harbor and gray seals, as of March 13, 2020) (NOAA Fisheries Service 2022b). Between July 1, 2018, and March 13, 2020, 172 seals had stranded in New York and 101 in New Jersey (NOAA Fisheries Service 2022b). Harbor seals may be found in the Project area during winter, spring, and early summer, based on known occurrence information, sighting data, and their known range.

3.2.3 Harp Seal

Harp seals are members of the true seal family (Phocidae). Adult harp seals reach 1.5 to 1.8 meters (5 to 6 feet) in length and can weigh approximately 135 kilograms (300 pounds). This species, like other members of the Phocidae family, lacks external ear flaps and has rear flippers that do not rotate. Harp seals have light gray fur on their bodies, with the exception of their faces, and a black saddle-shaped patch on their dorsal side (NOAA Fisheries Service 2022d). Harp seals feed on many types of fish and invertebrates and can dive up to 1,300 feet (396 feet) deep for up to 16 minutes (NOAA Fisheries Service 2022d). Species on which they forage include arctic and polar cod, and capelin (Stenson et al. 1997).

As with gray and harbor seals, harp seals are capable of hearing in both air and water. In general, the estimated bandwidth for functional hearing for pinnipeds in water is 75 Hz to 75 kHz, and in air is 75 Hz to 30 kHz (Southall et al. 2007).

Harp seals in the North Atlantic and Arctic Oceans are considered to comprise three populations associated with the specific pack ice sites where pupping occurs (Hayes et al. 2022). In the United States, one stock, the western North Atlantic Stock, is recognized and consists of the harp seals that breed off the coasts of Newfoundland and Labrador (Front Herd) and those that breed near the Magdalen Islands in the Gulf of St. Lawrence (Gulf Herd) (Hayes et al. 2022). There is also a population that breeds off the West Ice near eastern Greenland and one that breeds on the ice in Russia's White Sea (Hayes et al. 2022).

3.2.3.1 Numbers

Current population estimates for harp seals are developed by fitting age-structured population models to estimates of total pup production in Canada. Population estimates are determined based on adult numbers and pup production at their whelping areas. In 2017, the Western Northern Atlantic stock of harp seals was estimated to be 7,600,000 (Hayes et al. 2022). The population appears to be relatively stable (Hayes et al. 2022).

3.2.3.2 Status

Harp seals are not considered depleted or strategic under the MMPA, are not listed as threatened or endangered under the ESA, and are not state-listed in New York or New Jersey. The status of the stock in U.S. waters in relation to its OSP level is unknown (Hayes et al. 2022).

3.2.3.3 Distribution

Harp seals occur throughout the North Atlantic and Arctic Oceans (Hayes et al. 2022). Harp seals from the western North Atlantic stock begin their migration south toward U.S. waters following summer feeding in the more northern Canadian waters. During this southerly migration, adults and some immature harp seals reach the Gulf of St. Lawrence in the winter, with some continuing into U.S. waters during winter and spring. The most southerly point of migration for this species has been New Jersey, from January through May (Harris et al. 2002; Hayes et al. 2022). Sightings of harp seals this far south have been increasing since the early 1990s. This southward shift in harp seal migration may be due to changing environmental conditions (Lacoste and Stenson 2000; Hayes et al. 2022).

The pupping season for harp seals occurs between late February and mid-March in the southern limits of their range (NOAA Fisheries Service 2022d). Following birth, pups are weaned quickly and adults again begin mating. Harp seals also go through a period of molting during the spring. During both of these times, large congregations of harp seals gather on pack ice (NOAA Fisheries Service 2022d).

While harps seals historically were a more northern North Atlantic and Arctic Ocean species, more recently, the numbers of harp seal strandings and sightings have increased as far south as New Jersey. Between 2015 and 2019, 86 harp seals stranded (mortalities) in New York and 15 stranded (mortalities) in New Jersey (Hayes et al. 2022). During 2013, eight harp seals stranded (mortalities and alive) on Long Island (RFMRP 2014). All of those strandings occurred between January and June. The data, however, do not specify whether those strandings in New York waters were along the southern coast of Long Island or within Long Island Sound. The closest known haul-out sites for seals in the vicinity of the Project area are located approximately 2.86 kilometers (1.78 statute miles) southwest of the Project site and 16.1

kilometers (10 statute miles) east (NYSDEC n.d.[a]). Additional haul-out sites are located over 145 kilometers (90 statute miles) away in Montauk and the neighboring islands to the north (CRESLI n.d.; NYSDEC n.d.[b]; RFMRP 2014).

Harp seals occurring in New York and New Jersey waters between January and May would be at the extreme limit of their range. Therefore, while these are a coastal pinniped species, and they can occur as far south as the waters off Long Island, there is a limited potential that they would occur in the vicinity of the Project. The Marine Mammal Stranding Center (MMSC) reported 17 strandings in New Jersey state waters in 2018 (MMSC 2018). Harp seal strandings in New York waters have decreased over the past decade (2011 to 2021) compared to 2000 to 2010 (NYMRC 2023).

3.3 Cetaceans

Ten cetacean species can occur in the Northeast and Mid-Atlantic region throughout the year and have been observed at some point in the waters offshore of Long Island. These cetaceans include both offshore and nearshore species, and their presence in waters off Long Island varies throughout the year. These species are the fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata acutorostrata*), North Atlantic right whale (*Eubalaena glacialis*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), coastal and offshore bottlenose dolphin (*Tursiops truncates truncatus*), harbor porpoise (*Phocoena phocoena*), long-finned pilot whale (*Globicephala melas*), short-finned pilot whale (*Globicephala macrorhynchus*), common dolphin (*Delphinus delphis delphis*), and Atlantic spotted dolphin (*Stenella frontalis*) (Hayes et al. 2022).

3.3.1 Fin Whale

The fin whale is a species of baleen whale from the Balaenopteridae family. Fin whales are the second largest of the whale species, reaching up to 22 meters (75 feet) in the Northern Hemisphere subspecies and 26 meters (85 feet) in the Southern Hemisphere subspecies (NOAA Fisheries Service 2022e). They are very streamlined whales with dark-colored dorsal sides and white-colored ventral sides (NOAA Fisheries Service 2022e). Fin whales feed primarily during the summer on krill, small schooling fish such as herring (*Clupea* spp.) and sand lance (*Ammodytes* spp.), and squid (NOAA Fisheries Service 2022e). They fast during the winter.

Fin whales are considered low-frequency cetaceans—i.e., they are most sensitive to sounds under 1 kHz (Richardson et al. 1995). Based on their vocal capabilities, fin whales' hearing range may extend as low as 10 Hz to 15 Hz. Fin whales produce two types of sounds, moans and tonal songs. Fin whale moans have frequency limits of 14 Hz to 118 Hz, with dominant frequencies at 20 Hz (Watkins 1981; Richardson et al. 1995). Tonal songs reportedly have dominant frequencies between 17 Hz and 25 Hz (Watkins 1981; Richardson et al. 1995).

Fin whales in the Atlantic Ocean have been classified as two different subspecies, one located in the North Atlantic and one in the southern Atlantic Ocean. The fin whales in U.S. waters along the East Coast are considered to be from the western North Atlantic stock (Hayes et al. 2022). Fin whales are one of the most common large whale species observed in U.S. waters along the East Coast, occurring from Cape

Hatteras, North Carolina, northward (CeTAP 1982; Hayes et al. 2022). New England waters are a major feeding ground for this species, with calving potentially occurring in the Mid-Atlantic region of the United States (Hain et al. 1992; Hayes et al. 2022). However, Hain et al. (1992) report that the locations where the majority of the North Atlantic fin whale population mates and calves are unknown.

3.3.1.1 Numbers

The best abundance estimate available for fin whales in the western North Atlantic, as reported by Hayes et al. (2022), is 6,802 (CV=0.24). This estimate is derived from 2016 NOAA Fisheries Service shipboard surveys conducted in U.S and Canadian waters north of the western North Atlantic (Garrison 2020; Palka et al. 2021; Hayes et al. 2022).

3.3.1.2 Status

The western North Atlantic stock of fin whales is categorized as depleted and strategic under the MMPA, is federally listed as endangered under the ESA (as of 1970), and is state-listed in New York (NYSDEC n.d.[c]) and New Jersey (NJDEP 2016) as endangered. The status of this stock relative to the OSP in the U.S. Atlantic EEZ is unknown (Hayes et al. 2022).

3.3.1.3 Distribution

In the U.S. waters of the Atlantic Ocean, fin whales are common primarily from Cape Hatteras northward. There are no known population-wide seasonal migrations, but some migrations within the population may occur into Canadian waters, from coastal waters out to open ocean waters, and possibly into subtropical and tropical waters (Hayes et al. 2022). Thus, fin whales can be found throughout the year in U.S. waters off the East Coast between the mid-Atlantic and New England waters. The species tends to occupy areas over the continental shelf proper as opposed to the shelf edge (CeTAP 1982) and is reported to prefer deeper offshore waters (NOAA Fisheries Service 2022e). During the 39-month period of studies (1978–1982) associated with the Cetaceans and Turtle Assessment Program (CeTAP) between Cape Hatteras, North Carolina, and the Gulf of Maine, seasonal affinities for fin whales were noted. An increase in sightings in the areas around Jeffrey’s Ledge, Stellwagen Bank, and just east of Cape Cod appear to show this is an important habitat during the spring and summer (CeTAP 1982). There also appears to be an increased abundance in the vicinity of the Delaware Bay/Delaware Peninsula region during the winter and spring (CeTAP 1982). Fin whales may occur near the Project area and have been observed in the waters off Long Island, more commonly off the eastern end of the island; however, some sightings have occurred offshore of New Jersey (CeTAP 1982).

Between 2015 and 2019, only one fin whale mortality was recorded in the vicinity of the Project area with a vessel strike as the likely cause (Hayes et al. 2022). Additionally, in December 2012, a fin whale stranded in Breezy Point, Queens (Newman et al. 2012). The director of the Riverhead Foundation for Marine Research and Preservation, the stranding response unit on Long Island, reported that it is rare to see a large whale near the shore in this area. The last time prior to 2012 a fin whale stranded in this area was in 1964, in the Hudson River (Newman et al. 2012). Another fin whale stranded on January 13, 2013 (RFMRP 2014), and the MMSC reported one stranded mortality in New Jersey waters in 2018 (MMSC 2018).

3.3.2 Humpback Whale

The humpback whale is a species of baleen whale from the Balaenopteridea family. Humpback whales, like all baleen whales, are sexually dimorphic, with females being larger than males. Adult humpback whales can reach up to 18 meters (60 feet) in length and can weigh up to 36,290 kilograms (80,000 pounds) (NOAA Fisheries Service 2022f). Humpback whales are best recognized (and named for) their long pectoral fins, which can reach up to 4.6 meters (15 feet) in length. Their body color is primarily dark gray, with variable amounts of white on their ventral sides and on the undersides of their pectoral fins (NOAA Fisheries Service 2022f). Humpback whales spend the vast majority of their time during the summer feeding and building up their fat stores, which are depleted during the winter (NOAA Fisheries Service 2022f). These whales filter feed primarily on small crustaceans (krill), plankton, and some fish species. When in New England waters, the whales are often more piscivores relative to other populations, feeding on herring (*Clupea harengus*), sand lance (*Ammodytes* spp.), and other species of small fish (Hayes et al. 2020).

As a baleen whale, humpback whales are considered low-frequency cetaceans, i.e., they are most sensitive to sounds less than 1 kHz (Richardson et al. 1995). Because of the complications related to measuring hearing ranges, sensitivities, and localization of large, free-ranging whales, it is assumed that the sound production range of the species is an indicator of the species hearing range (Richardson et al. 1995). Humpbacks are known to produce various vocalizations, including the humpback “song,” moans, grunts, pulse trains, and clicks (Richardson et al. 1995). While humpback whales are considered low-frequency cetaceans, there are components of their vocalizations that are greater than 1 kHz. For example, during mating, humpback whales produce songs with frequencies ranging from 30 Hz to 8 kHz (Payne and Payne 1985). They produce moans at frequencies between 20 Hz and 1.8 kHz, grunts at frequencies between 25 Hz and greater than 1.9 kHz (Thompson et al. 1986), and clicks at frequencies between 2 kHz and 8.2 kHz (Beamish 1979).

3.3.2.1 Numbers

The best population estimate of humpback whales for the Gulf of Maine stock was estimated at 1,396 (95% credible intervals 1,363–1,429; Hayes et al. 2020). An abundance estimate of 2,368 (CV=0.48) humpback whales was generated from a shipboard and aerial survey conducted from June 27 through September 28, 2016, between central Virginia and the lower Bay of Fundy (Hayes et al. 2020; Palka 2020). An ocean basin-wide estimate from the years of the North Atlantic humpback project was 11,570 (CV=0.068) (Stevick et al. 2003). The Gulf of Maine stock was estimated to be 823 in 2008 based on photo-identification; however, this is an outdated estimate, and the data are over 14 years old (Hayes et al. 2020). An abundance estimate of 335 individuals for the Gulf of Maine stock was calculated from aerial and ship-based surveys in 2011. These surveys did not include the Scotian Shelf, which is a known part of the Gulf of Maine stock range (Hayes et al. 2020).

The overall North Atlantic humpback whale population was found to be increasing, with an estimated average growth rate of 3.1% annually between 1979 and 1993 (Stevick et al. 2003). Population growth rates in the Gulf of Maine stock were estimated at 6.5% annually (Barlow and Clapham 1997).

3.3.2.2 Status

On September 8, 2016, NOAA Fisheries Service identified 14 distinct population segments (DPS) of the humpback whale and revised the species-wide listing (81 FR 21276). The Gulf of Maine stock of humpback whales, grouped under the West Indies DPS, was deemed not warranted for listing under the ESA. NOAA Fisheries Service has recently determined that the Gulf of Maine stock is considered not depleted because it does not coincide with an ESA-listed DPS, and it is not considered strategic because the mortality and serious injury record does not exceed the calculated Potential Biological Removal (Hayes et al. 2020). Humpback whales are state-listed in New York (NYDEC n.d.[c]) and New Jersey (NJDEP 2016) as endangered; however, the species' state status has not been reviewed since the change in federal status.

3.3.2.3 Distribution

Humpback whales are a global species and occur in all major oceans, including sub-polar, temperate, and equatorial regions. In the western North Atlantic, humpback whales occur all along the East Coast of the United States, in the Gulf of St. Lawrence, and off Newfoundland, Labrador, and western Greenland (Katona and Beard 1990), with other feeding grounds near Iceland and northern Norway (Christensen et al. 1992; Palsbøll et al. 1997). The individual North Atlantic feeding regions are associated with discrete subpopulations. For management purposes, the humpback whales known to feed in the Gulf of Maine with strong fidelity were designated as a U.S. stock (Hayes et al. 2020).

Many of the humpback whales from the North Atlantic feeding grounds can be found in wintering calving grounds throughout the West Indies (Katona and Beard 1990). However, not all whales from the North Atlantic migrate to the winter calving grounds. Some studies indicate that many humpback whales remain in higher latitudes during the winter (Clapham et al. 1993; Swingle et al. 1993).

The North Atlantic populations of humpback whales generally remain within their respective feeding groups throughout the summer in northern latitudes, where they develop a fatty layer (blubber) that facilitates their survival during migration periods and throughout the winter (NOAA Fisheries Service 2022f). The whales migrate south during the winter to breeding and calving grounds in the West Indies, where genetic mixing occurs among separate feeding groups (Katona and Beard 1990; Palsbøll et al. 1997; Stevick et al. 1998). However, a number of whales do not migrate and remain in mid- to high-latitude regions (Swingle et al. 1993) such as the Chesapeake Bay, Delaware Bay, and waters along southeastern states (Swingle et al. 1993; Wiley et al. 1995).

There have been anecdotal reports of increased sightings of live humpback whales in the Project area (Hynes 2016; Brown et al. 2018). Between 2011 and 2016, there have been at least 46 humpback whale sightings within Lower New York Bay, Upper New York Bay, and Raritan Bay, with a total of 617 humpback whale sightings in the New York Bight (Brown et al. 2018). Most sightings occurred during the summer months (July to September), with no documented sightings in the winter (Brown et al. 2018). Humpback whales were reported in confirmed human-caused mortality or serious injury in the waters off New York and northern New Jersey between 2011 and 2015. In April and August 2013, two humpback whales were reported as stranded along the Long Island coast (RFMRP 2014). NOAA Fisheries Service has declared a UME for humpback whales along the Atlantic coast due to increased stranding numbers for 2016 through

2022 (total of 168) (NOAA Fisheries Service 2022g). NOAA Fisheries Service suspects that the UME is related to human interactions (i.e., vessel strikes). Of the 168 strandings, 51 occurred off New Jersey and New York, which accounts for 30% of the total strandings along the Atlantic coast. During the summer, humpback whales are commonly observed well to the east of the Project area, off Montauk Point, Long Island, and in higher concentrations further north around George's Bank and in the Stellwagen Bank area in the Gulf of Maine (CeTAP 1982; Hayes et al. 2020).

Although densities of humpback whales are low nearby the Project area based on Roberts et al. (2016), anecdotal reports suggest that humpbacks are occasionally seen approaching or within the Project area. Based on the known distribution of this species in New York and New Jersey waters during the summer months, humpback whales could occur in the vicinity of the Project area during the in-water maintenance period.

3.3.3 Minke Whale

The minke whale is a species of baleen whale from the Balaenopteridae family. The minke whale is the smallest of the baleen whales in waters surrounding North America (NOAA Fisheries Service 2022h). Adult minke whales can reach up to 10.7 meters (35 feet) in length and weigh up to 9,200 kilograms (20,000 pounds) (NOAA Fisheries Service 2022h). Similar to other baleen whale species, there is a slight sexual dimorphism in this species, and females may be slightly larger than males. The minke whale has a sleek body with dark grayish-brown coloration and a pale chevron shape on the back behind the head. The ventral side is a lighter white color, and the tall dorsal fin is located approximately two-thirds of the way down the back (NOAA Fisheries Service 2022h). Like other baleen whales, minke whales feed seasonally. They feed on a variety of plankton, krill, and fish species, including cod and herring.

As with the other baleen whales, minke whales are considered low-frequency cetaceans—i.e., they are most sensitive to sounds under 1 kHz (Richardson et al. 1995). Because of their vocal capabilities, it is thought that the minke whale's hearing range extends to as low as 60 Hz (Richardson et al. 1995). Minke whales can produce various types of sounds, including down sweeps, moans/grunts, and clicks. Though minke whales are considered low-frequency cetaceans, there are components of their vocalizations that are greater than 1 kHz. For example, clicks have been reported within the frequency range of 3.3 kHz to 20 kHz (Beamish and Mitchell 1973). Other sounds produced by minke whales, such as down sweeps, moans, and grunts, fall within the frequency range of 60 Hz to 140 Hz (Schevill and Watkins 1972).

3.3.3.1 Numbers

Hayes et al. (2022) report that the best total estimated population of Canadian East Coast stock of minke whales is 21,968 (CV=0.31), derived from 2016 shipboard surveys conducted during June through August 2016 (Palka 2020). This estimate was derived from adding the results of two separate 2016 surveys whose areas did not overlap.

3.3.3.2 Status

The Canadian East Coast stock of minke whale is not categorized as depleted or strategic under the MMPA, is not federally listed as threatened or endangered under the ESA, and is not state-listed in the states of

New York or New Jersey. The status of minke whales relative to OSP in the U.S. Atlantic EEZ is unknown (Hayes et al. 2022).

3.3.3.3 Distribution

Minke whales are a global species with a widespread occurrence throughout high-latitude, temperate, and tropical waters (Hayes et al. 2022). Four subpopulations are currently recognized in the North Atlantic: (1) Canadian east coast, (2) west Greenland, (3) central North Atlantic, and (4) northeastern North Atlantic (Donovan 1991), as delineated based on sex and length, catch distributions, sightings, marking data, and pre-existing International Council for the Exploration of the Sea boundaries (Hayes et al. 2022). For management purposes, minke whales occurring off the East Coast of the United States are considered to be in the Canadian Eastern Coastal stock, which encompasses the area from the western half of the Davis Straight to the Gulf of Mexico (Hayes et al. 2022).

Minke whales generally occur near the surface and in the upper water column of the ocean throughout their range, except in polar seas. The relationships between the four North Atlantic stocks are unknown, and the presence of subpopulations is unknown (Hayes et al. 2022). Minke whales are distributed on both the continental shelf and in deeper waters offshore (Hayes et al. 2022). Minke whales in waters off the East Coast of the United States appear to have a strong seasonal component to their distribution throughout their range. During the spring and summer, they appear to be widely distributed from just east of Montauk Point, Long Island, northeast to Nantucket Shoals, and north toward Stellwagen Bank and Jeffrey's Ledge (CeTAP 1982). During the fall, their range is much smaller and their abundance is reduced throughout their range (CeTAP 1982). During the winter, these whales are largely absent from the vicinity of the Project area (Waring et al. 2012). During the 39-month period of studies associated with the CeTAP that took place between 1978 and 1982 between Cape Hatteras, North Carolina, and the Gulf of Maine, only three minke whales were observed south of Long Island during the fall months, and no sightings of minke whales were made south of Long Island during winter months (CeTAP 1982).

Between 2015 and 2019, three minke whales were reported in confirmed human-caused mortality or serious injury in the waters off New Jersey and New York (Hayes et al. 2022). Since January 2017, minke whale mortalities have increased along the Atlantic coast from South Carolina to Maine. NOAA Fisheries Service has declared a UME for minke whales along the Atlantic coast due to stranding numbers from 2017 to 2022 (total of 135 through November 16, 2022) (NOAA Fisheries Service 2022i). Of the 135 strandings, 20 occurred along the New York coast and 12 occurred along the New Jersey coast. Based on occurrence information, stranding records, and injury/mortality records, minke whales could occur in the vicinity of the Project area during the spring, summer, and fall months, specifically during the in-water maintenance period.

3.3.4 North Atlantic Right Whale

The North Atlantic right whale is a species of baleen whale from the Balaenidae family. Adult North Atlantic right whales measure up to 16 meters (52 feet) in length and can weigh up to 63,503 kilograms (70 tons) (NOAA Fisheries Service 2022j). The species is sexually dimorphic, with females being generally larger than males (NOAA Fisheries Service 2004). The North Atlantic right whale has several distinguishing features, including a stocky body, large head, a highly arched margin of the lower lip, a v-shaped blow, lack of a dorsal fin, and callosities in the head region (NOAA Fisheries Service 2022j; Reeves et al. 2002b).

North Atlantic right whales feed by skimming the surface with mouths open, filtering plankton through baleen plates (Reeves et al. 2002b). Copepods preferred by the right whale include *Calanus finmarchicus*, *Centropages typicus*, and *Pseudocalanus* spp. (Pendleton et al. 2005). These are predominantly cool-water oceanic species typically concentrated greater than 10 kilometers (6.2 statute miles) from shore (Turner and Dagg 1983). Right whales are most often seen foraging alone. However, potential feeding aggregations have been observed in areas such as offshore of Rhode Island (Reeves et al. 2002b; Kenney and Vigness-Raposa 2010).

The North Atlantic right whale is considered sensitive primarily to low-frequency sounds, similar to humpback, fin, and minke whales. Right whales have been recorded producing tonal sounds between 20 and 1,000 Hz (Parks and Tyack 2005), and vocalizations in the 20 to 200 Hz range (Mellinger 2004). The sounds recorded by Mellinger were reported as an “up call,” which represents an upsweep of frequencies from lower to higher and is a common vocalization produced by right whales. Right whales have also been recorded producing sounds called “moans” at less than 400 Hz (Watkins and Schevill 1972) and “gunshots” with the dominant frequencies ranging from 50 to 2,000 Hz (Parks et al. 2005).

3.3.4.1 Numbers

The best abundance estimate of the western North Atlantic stock of North Atlantic right whales is based on sighting histories of individual whales known through photo-identification databases as of January 2021 (Hayes et al. 2022). Based on this census, the best population estimate is 412 individuals, and the minimum population estimate is 408 individuals (Hayes et al. 2022). However, the most recent calculations approximate the population at fewer than 350 individuals (NOAA Fisheries Service 2022k). Since 2015, the data suggest that the overall abundance has declined. (Pace et al. 2017; Hayes et al. 2022). Previous abundance estimates spanning 1990 to 2011 indicated an increasing population of approximately 2.8% per year; however, from 2011 to 2018, overall abundance decreased by 14.35% (Hayes et al. 2022).

3.3.4.2 Status

The North Atlantic right whale is categorized as depleted and strategic under the MMPA, has been federally listed as endangered under the ESA since 1970 and is listed in New York State (NYSDEC n.d.[c]) and New Jersey (NJDEP 2016) as endangered. NOAA Fisheries Service has declared a UME for North Atlantic right whales along the Atlantic coast due to 34 confirmed mortalities between 2017 and 2022 (as of December 8, 2022; NOAA Fisheries Service 2022k). No critical habitat for the North Atlantic right whale exists in the Project area or anywhere within the waters off southern Long Island. The closest critical habitat to the Project area is the Great South Channel, located to the east of Cape Cod. Critical habitat is also located in Cape Cod Bay and in coastal Florida and Georgia from Sebastian Inlet to the Altamaha River (NOAA Fisheries Service 2004; NOAA Fisheries Service 2022j).

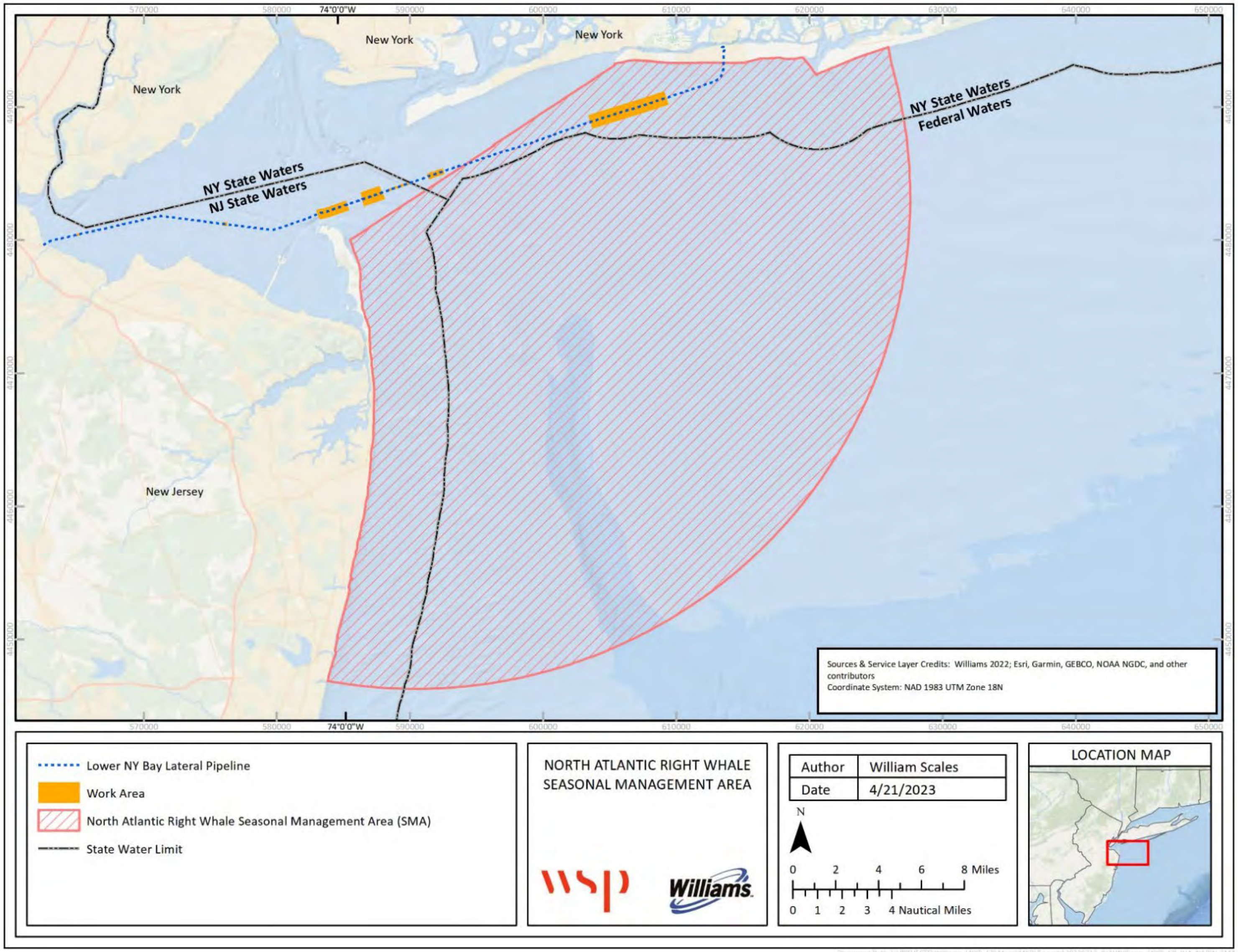
3.3.4.3 Distribution

The North Atlantic right whale occurs in U.S. waters spanning the entire East Coast from Florida to the Gulf of Maine and into Canadian waters of the Bay of Fundy and the Scotian Shelf (Hayes et al. 2022). The species is primarily found along the coastal region and inner continental shelf, which is likely due to the availability and distribution of their preferred prey—late stage juvenile and adult copepods, which are mostly found close to the coast (Baumgartner and Mate 2005; NOAA Fisheries Service 2004). For management purposes in the United States, there is only one stock of North Atlantic right whales, referred to as the Western Atlantic stock. While primarily found in the coastal waters of the United States, individuals have been observed in waters off Norway, Greenland, and the Azores (Hayes et al. 2022).

Right whales migrate annually between winter calving grounds in the lower latitudes to spring and summer foraging grounds in higher latitudes (NOAA Fisheries Service 2004). In U.S. waters, right whales generally can be seen in the winter off the coast of Georgia and northern Florida, where reproductive females go to calve, and in the summer they can be found in the waters of New England, foraging and nursing their young (NOAA Fisheries Service 2004). When in New England waters, right whales are most abundant in Cape Cod Bay, the Gulf of Maine, and the Great South Channel (NOAA Fisheries Service 2004). While these known congregation areas have been established as high-use areas, frequent travel along the East Coast of the United States is also common. Photo-identification has shown North Atlantic right whales making round-trip migrations to an area off the southeastern United States and back to Cape Cod Bay at least twice during the winter (Brown and Marx 2000).

During their migration between foraging grounds in the northeast region and calving grounds in the southern region, right whales are most likely to be found in the vicinity of the Project area from November through April. During this time, seasonal management areas (SMA) are in effect within a 37-kilometer (19-statute-mile) radius of several major ports along the U.S. East Coast. A portion of the Project area is within one such SMA, which is associated with the Port of New York and New Jersey (Figure 3-1). While the migration period for North Atlantic right whales generally ends each year on April 30, there is still the potential for this species to occur in the vicinity of the Project area during late spring and into the summer before returning in late fall/winter. In recent years, right whales have also been observed off Long Island during the summer, outside of the migration period (NEFSC 2016). According to the NOAA Fisheries Service Northeast Fisheries Science Center (NEFSC) North Atlantic right whale sighting advisory system, 50 right whale observations were reported in the waters south of Long Island and north of New Jersey between January 2007 and September 2016 (NEFSC 2016). Of those sightings, nine were close to the Project area. An additional sighting was made near the Project area in December 2016 (Raslich 2016). Right whales are not expected to be foraging along the southern coast of Long Island, including the Project area, as their main prey species are typically concentrated in offshore waters several statute miles seaward of the Project area (Turner and Dagg 1983), and right whale foraging behavior has never been documented near the coast of Long Island. Therefore, any right whales in the vicinity of the Project are expected to be transient, either migrating through the area from late fall until late April or spending short amounts of time within the waters southeast of Long Island.

Figure 3-1. North Atlantic Right Whale Seasonal Management Area



3.3.5 Atlantic White-Sided Dolphin

The Atlantic white-sided dolphin is a species of toothed whale from the Delphinidae family. Adult Atlantic white-sided dolphins range from 2.7 meters (9 feet) (males) to 2.5 meters (8 feet) (females) in length and can weigh from 163 to 229 kilograms (360 to 505 pounds) (NOAA Fisheries Service 2022l). Similar to other Delphinidae species, the Atlantic white-sided dolphin has a robust body shape with a short rostrum. However, this species has an identifiable color pattern, which includes a bi-colored rostrum; black dorsal side, fluke, flippers, and dorsal fin; white ventral side and lower rostrum; and gray sides. Their most distinguishing characteristic is the white patch that begins below the dorsal fin and is bordered by a yellow/tan streak down to the fluke (NOAA Fisheries Service 2022l).

Atlantic white-sided dolphins of the western North Atlantic stock generally show a preference for several fish and invertebrate species, including silver hake (*Merluccius bilineari*s), spoonarm octopus (*Bathypolypus bairdii*), and haddock (*Melanogrammus aeglefinus*). The dolphins consume Atlantic herring (*Clupea harengus*) most often in summer but do not heavily prey upon the fish during winter months, suggesting a seasonal variation in diet (Craddock et al. 2009).

Atlantic white-sided dolphins are considered mid-frequency cetaceans. In general, the estimated bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007). Atlantic white-sided dolphins, like many toothed whales, are very vocal animals, using echolocation for feeding and navigation and vocalizing for socialization (Southall et al. 2007). However, unlike large baleen whales, hearing has been directly tested in many toothed whales by both behavioral reactions to sounds and direct measurements to hearing through AEP methods (Southall et al. 2007).

3.3.5.1 Numbers

The total number of Atlantic white-sided dolphins in the western North Atlantic stock is based on population estimates, which have been calculated since 1978. The best available current population estimate is 98,233 (CV=0.71), which is based on June–September 2016 shipboard and aerial surveys from central Virginia to the lower Bay of Fundy (Palka 2016; Hayes et al. 2022).

3.3.5.2 Status

The western North Atlantic stock of the Atlantic white-sided dolphin is not categorized as depleted or strategic under the MMPA, is not federally listed as threatened or endangered under the ESA, and is not state-listed in New York or New Jersey. The status of these dolphins relative to the OSP in the U.S. Atlantic EEZ is currently unknown (Hayes et al. 2022).

3.3.5.3 Distribution

The Atlantic white-sided dolphin occurs throughout temperate and sub-polar waters of the North Atlantic, most prominently in continental shelf waters to depths of approximately 100 meters (330 feet) (Hayes et al. 2022). Atlantic white-sided dolphins of the western North Atlantic stock inhabit waters from central west Greenland to North Carolina and as far east as the mid-Atlantic ridge (Hamazaki 2002; Doksaeter et al. 2008; Hayes et al. 2022). Seasonal shifts in abundance occur throughout the western North Atlantic region, where the dolphins appear to be more prevalent from Georges Bank to the lower Bay of Fundy from June through September. From October to December, they appear to occur at intermediate densities from southern Georges Bank to the southern Gulf of Maine (Payne et al. 1990; Hayes et al. 2022). Sightings of dolphins south of Georges Bank (Hudson Canyon in particular) occur year-round, but generally at lower densities (Hayes et al. 2022).

Based on observations made during the CeTAP (1982) surveys, Atlantic white-sided dolphins were found primarily east and north of Long Island and the Project area. The Atlantic white-sided dolphins observed south of Long Island were farther offshore in the deeper water of the continental shelf proper and closer to the continental shelf slope. This species was largely absent from the overall region (Cape Hatteras, North Carolina, to the Gulf of Maine) during the winter (CeTAP 1982).

Historically, Atlantic white-sided dolphins have stranded along the coasts of New York and New Jersey. However, since 2015, no strandings have been reported in either state (Hayes et al. 2022). During 2013, two Atlantic white-sided dolphins stranded along the Long Island coast (RFMRP 2014); these strandings occurred in March and May.

Based on the known occurrence of this species in New England waters east and north of the Project area during the spring, summer, and fall, and the overall lack of presence throughout the region during the winter, the Atlantic white-sided dolphin is not expected to occur in the vicinity of the Project area during the in-water maintenance period. Due to their low density and unlikely presence in the Project area, Atlantic white-sided dolphins are not considered further in this analysis.

3.3.6 Bottlenose Dolphin

The bottlenose dolphin is a species of toothed whale from the Delphinidae family. Adult bottlenose dolphins range from 1.8 to 4.0 meters (6 to 13 feet) in length and can weigh up to 635 kilograms (1,400 pounds) (NOAA Fisheries Service 2022m). There are two genetically distinct bottlenose dolphin morphotypes described as coastal and offshore stocks. These species are sexually dimorphic, with males being slightly larger than females (NOAA Fisheries Service 2022m). The bottlenose dolphin is one of the most recognized marine mammal species, with a short, thick rostrum, light gray color, and robust body shape (NOAA Fisheries Service 2022m).

Bottlenose dolphins are generalist feeders, feeding on prey items that are native to the area or region they are in (NOAA Fisheries Service 2022m). Prey species for coastal bottlenose dolphins include various benthic invertebrates and fish species, while offshore bottlenose dolphins prey on various squid and fish species.

Like the Atlantic white-sided dolphin, both bottlenose dolphin stocks are considered mid-frequency cetaceans. The estimated general bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007). Bottlenose dolphins, like many toothed whales, are very vocal animals, using echolocation for feeding and navigation and vocalizing for socialization (Southall et al. 2007).

3.3.6.1 Numbers

The best abundance estimate for the western North Atlantic Northern Migratory Coastal stock of bottlenose dolphins is derived from aerial surveys conducted during the summer of 2016 covering the coastal and shelf waters (to depths of 20 meters [66 feet]) from Assateague, Virginia, to Sandy Hook, New Jersey. Based on this survey, the best abundance estimate is 6,639 (CV=0.41) (Hayes et al. 2020).

The best abundance estimate for the western North Atlantic Offshore stock of common bottlenose is derived from aerial surveys conducted in the summer of 2016 covering waters from central Florida to the Lower Bay of Fundy (Palka et al. 2020). Based on these surveys, the best abundance estimate is 62,851 (CV=0.52) (Hayes et al. 2020). Abundance estimates are not reported by stocks in density estimates by Roberts et al. (2016), so no abundance estimate can be extrapolated for the coastal stock from these models. Therefore, the take estimation analysis for bottlenose dolphins in this authorization application is based on the total combined population of coastal and offshore bottlenose (see Section 6.0).

3.3.6.2 Status

The western North Atlantic northern migratory coastal stock of bottlenose dolphin is categorized as depleted and strategic under the MMPA (Hayes et al. 2021). However, this species is not federally listed as threatened or endangered under the ESA and is not listed in the states of New York or New Jersey. The western North Atlantic offshore stock of bottlenose dolphin is not considered depleted or strategic under the MMPA and it is not listed as threatened or endangered under the ESA (Hayes et al. 2020).

3.3.6.3 Distribution

Bottlenose dolphins are a global species and inhabit most of the temperate and tropical waters of the world (NOAA Fisheries Service 2022m). For management purposes, bottlenose dolphins off the East Coast of the United States have been divided into two morphologically and genetically distinct morphotypes—coastal and offshore (Hayes et al. 2020; Hayes et al. 2021). These two morphotypes have been further divided into 16 stocks. Within the coastal morphotype, the stocks are divided into coastal migratory or estuarine bottlenose dolphins. Many of the estuarine morphotypes appear to be residents of their particular region or area, based on photo-identification. For example, the Biscayne Bay stock remain year-round within the bay and are genetically distinct from those dolphins residing nearby in the estuary of Florida Bay (Waring et al. 2016). Of the 16 bottlenose dolphin stocks present along the U.S. East Coast, the Northern Migratory Coastal stock is most likely to be found in the vicinity of the Project area, though the northern limit of the stock range as described in Hayes et al. (2021) is slightly south of the Project area.

The western North Atlantic northern migratory coastal stock of bottlenose dolphins can be found between Long Island, New York, and Cape Hatteras, North Carolina, from July through September (CeTAP 1982). During the winter, dolphins from this stock are rarely seen north of the North Carolina/Virginia border. Their movements north could be determined by water temperature (Garrison 2003). While in the Long Island region during the summer, this coastal stock remains between the shoreline and the 20-meter (66-foot) depth contour (Hayes et al. 2021). The offshore stock is primarily distributed along the outer continental shelf in waters greater than 25 meters (82 feet) (Hayes et al. 2020).

Bottlenose dolphins have stranded along the New York and New Jersey coasts in recent years. From 2014 to 2018, 50 bottlenose dolphins stranded in New York and 88 stranded in New Jersey (Hayes et al. 2020). A significant number of strandings occurred in 2013, with 38 strandings in New York and 153 strandings in New Jersey. The stock identity of these strandings is highly uncertain and may include individuals from the coastal and offshore stocks (Hayes et al. 2020). NOAA Fisheries Service declared a UME for bottlenose dolphins in the mid-Atlantic region beginning in early July 2013 and ending March 2015 (NOAA Fisheries Service 2021). This UME included elevated numbers of strandings in New York, New Jersey, Delaware, Maryland, and Virginia.

Based on the known distribution of this species in warmer southern waters during the winter and its occurrence in the vicinity of the Project area during the summer and fall, bottlenose dolphins could occur in the vicinity of the Project during the in-water maintenance period, specifically during the later spring and summer.

3.3.7 Harbor Porpoise

The harbor porpoise is a species of toothed whale from the Phocoenidae family. Adult harbor porpoises range from 1.5 1.7 meters (5 to 5.5 feet) in length and can weigh up to 77 kilograms (170 pounds) (NOAA Fisheries Service 2022n). This species is sexually dimorphic, with females being slightly larger than males. This species has a small, robust, dark gray body with white ventral side, triangular dorsal fin, and short rostrum (NOAA Fisheries Service 2022n). Harbor porpoises feed on both demersal and benthic species, primarily schooling fish and cephalopods (NOAA Fisheries Service 2022n).

Harbor porpoises are considered high-frequency cetaceans. In general, the estimated bandwidth for functional hearing in high-frequency cetaceans is 200 Hz to 180 kHz (Southall et al. 2007). Similar to the bottlenose dolphin (and other odontocetes), harbor porpoises are vocal animals, using echolocation for feeding and navigation and vocalizing for socialization (Southall et al. 2007). Direct behavioral reaction testing and AEP methods have provided audiograms for harbor porpoises (Southall et al. 2007).

3.3.7.1 Numbers

The best abundance estimate for the Gulf of Maine/Bay of Fundy stock of harbor porpoise from the 2016 NEFSC and Fisheries and Oceans Canada surveys, is 95,542 (CV=0.31) (Hayes et al. 2022). An abundance estimate of 75,079 (CV=0.38) harbor porpoises was generated from a U.S. shipboard and aerial survey conducted from June 27 through September 28, 2016, in a region covering 425,192 square kilometers (km^2;164,168 mi^2) (Palka et al. 2020; Hayes et al. 2022).

3.3.7.2 Status

The Gulf of Maine/Bay of Fundy stock of harbor porpoise is not categorized as depleted or strategic under the MMPA (Hayes et al. 2022). It is not federally listed as threatened or endangered; however, it is listed as a species of concern in New York and New Jersey state waters (NYSDEC n.d.[d]; NJDEP 2017).

3.3.7.3 Distribution

Harbor porpoises occur in the coastal and offshore waters of the Atlantic Ocean. In the western North Atlantic, the species ranges from West Greenland to Cape Hatteras, North Carolina, and in the eastern North Atlantic, the species ranges from the Barents Sea to West Africa (NOAA Fisheries Service 2022n). Within these areas, they most often occur in water less than 198 meters (650 feet) deep, especially in bays, estuaries, and harbors (NOAA Fisheries Service 2022n). For management purposes, NOAA Fisheries Service has divided harbor porpoises in U.S. waters into 10 stocks. Of those 10 stocks, only one, the Gulf of Maine/Bay of Fundy stock, occurs along the U.S. East Coast and thus could occur in the vicinity of the Project area.

The Gulf of Maine/Bay of Fundy stock of harbor porpoise can be found over the continental shelf between the Gulf of Maine/Bay of Fundy region and North Carolina in varying abundance, depending on the season (Hayes et al. 2022). During the summer, this stock can be found primarily concentrated in the northern Gulf of Maine and the southern Bay of Fundy (Hayes et al. 2022). While in this region, harbor porpoises inhabit waters less than approximately 150 meters (500 feet) deep (Hayes et al. 2022). During the fall and spring, this species occurs between Maine and New Jersey; however, during these months it is widely dispersed throughout this range (Hayes et al. 2022). During winter, harbor porpoises are also dispersed between New Jersey and North Carolina, with much lower densities also found between New York and Canada (CeTAP 1982; Hayes et al. 2022). To date, no research has supported either a migration triggered by water temperature or a specific migration route throughout its range. In 2011, six sightings were made inside the Long Island Sound and one just outside of it (NEFSC and SEFSC 2011). This suggests the possibility that harbor porpoise may occur more commonly in bays in winter, or possibly, ocean conditions and prey distribution resulted in unusual use of Long Island Sound in the winter of 2011.

Harbor porpoises have stranded along the New York and New Jersey coasts in recent years. Between 2015 and 2019, 31 harbor porpoises stranded in New York and 32 stranded in New Jersey (Hayes et al. 2022). During 2013, 14 harbor porpoises stranded along the Long Island coast (RFMRP 2014), and in 2018, the MMSC reported five strandings in New Jersey waters (MMSC 2018).

Based on the current understanding of the species' distribution, harbor porpoises could be present, in varying densities, in the region and within the vicinity of the Project area during fall, winter, and spring. Because the species is widely distributed throughout the region during this timeframe, harbor porpoises could be present in the vicinity of the Project area during the in-water maintenance period, specifically during winter through late spring.

3.3.8 Long-Finned Pilot Whale

The long-finned pilot whale is one of two species of pilot whale (*Globicephala* sp.,) and is a species of toothed whale from the Delphinidae family. Adult long-finned pilot whales, similar to the short-finned pilot whale, are larger than most members of the Delphinidae family. Adults range in length from 5.8 meters (19 feet) (females) to 7.6 meters (25 feet) (males) and can weigh between 1,300 kilograms (2,900 pounds) (females) and 2,300 kilograms (5,000 pounds) (males) (NOAA Fisheries Service 2022o). The long-finned pilot whale is very similar in appearance to the short-finned pilot whale; however, its pectoral fins are long and tapered in a sickle shape. This characteristic gives the species its common name. Because the largely distinguishing characteristic for this species is often below the water, it is difficult to differentiate long-finned and short-finned pilot whales during aerial and boat surveys (NOAA Fisheries Service 2022o).

Similar to short-finned pilot whales, long-finned pilot whales primarily occur in deeper waters. However, this species is more common in temperate to sub-polar oceanic waters (NOAA Fisheries Service 2022o). Long-finned pilot whales are deep divers, commonly diving to depths of 200 meters to 500 meters (656 feet to 1,640 feet) for feeding. While at depth, long-finned pilot whales feed on a variety of species, including cod, herring, hake, squid, octopus, and shrimp (NOAA Fisheries Service 2022o).

Long-finned pilot whales are considered mid-frequency cetaceans. In general, the estimated bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007).

3.3.8.1 Numbers

The best abundance estimate for the western North Atlantic stock of the long-finned pilot whale is derived from the sum of the northeast U.S. summer 2016 surveys from central Virginia to Maine and the Fisheries and Oceans Canada summer 2016 surveys from the United States to Labrador. Based on this information, the best abundance estimate is 39,215 (CV=0.30) (Hayes et al. 2022).

3.3.8.2 Status

The western North Atlantic stock of the long-finned pilot whale is not categorized as strategic under the MMPA, is not federally listed as threatened or endangered under the ESA (Hayes et al. 2022), and is not listed as a species of concern in New York or New Jersey state waters.

3.3.8.3 Distribution

Long-finned pilot whales are a global species and can inhabit the waters of colder temperate and sub-polar regions, such as southern Australia, Cape Province (South Africa), Chile, the Gulf of St. Lawrence, and Greenland. In U.S. waters, they range along the East Coast. For management purposes, long-finned pilot whales consist of only one stock, the western North Atlantic stock.

The western North Atlantic stock of the long-finned pilot whale ranges along the continental shelf of the U.S. East Coast between the Mid-Atlantic region and the Gulf of Maine. Long-finned pilot whales are difficult to differentiate from short-finned pilot whales during aerial and boat surveys, so their exact range in U.S. waters is similarly difficult to determine. However, the available data suggest that long-finned pilot whales are more common along the continental shelf off the northeast coast of the United States during winter and early spring (CeTAP 1982). During late spring through autumn, long-finned pilot whales move into the more northerly waters of Georges Bank and the Gulf of Maine (CeTAP 1982). Some spatial overlap also occurs with short-finned pilot whales in the Mid-Atlantic region between Cape Hatteras, North Carolina, and New Jersey during the summer (Hayes et al. 2022).

Long-finned pilot whales have been known to strand along the New York and New Jersey coasts; however, none have been confirmed in recent years (Hayes et al. 2022). Between June 2009 and May 2010, one pilot whale was reported stranded along the coast of Long Island, but it was not identified as either a short-finned or a long-finned pilot whale (RFMRP 2010). In 2013, two pilot whales stranded along the coast of Long Island, but they were not identified as either short-finned or long-finned pilot whales (RFMRP 2014). Based on this information, and the species preference for deeper pelagic and northern waters, this species is unlikely to occur in the vicinity of the Project area during the in-water maintenance period. Due to their low density, few recorded strandings, and unlikely presence in the Project area, long-finned pilot whales will not be considered further in this analysis.

3.3.9 Short-Finned Pilot Whale

The short-finned pilot whale is one of two species of pilot whales (*Globicephal*a sp.) and is a species of toothed whale from the Delphinidae family. Adult short-finned pilot whales are larger than most members of the Delphinidae family. This species is sexually dimorphic, with males being larger than females (NOAA Fisheries Service 2022p). Adult females can reach up to 3.67 meters (12 feet) in length, and males can reach up to 7.3 meters (24 feet) in length. Adults weigh between 1,000 and 3,000 kilograms (2,200 and 6,600 pounds) (NOAA Fisheries Service 2022p). The short-finned pilot whale can be identified by its bulbous head, lack of an obvious rostrum, dark black or dark brown body color, and a forward-located, broad-based dorsal fin (NOAA Fisheries Service 2022p). Short-finned pilot whales feed on species that are found mostly in water 305 meters (1,000 feet) or deeper. Their primary prey species is squid; however, they also feed on octopus and fish species (NOAA Fisheries Service 2022p).

Short-finned pilot whales are considered mid-frequency cetaceans. The estimated general bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007).

3.3.9.1 Numbers

The best abundance estimate for the western North Atlantic stock of the short-finned pilot whale is derived from 2016 shipboard and aerial surveys covering waters from central Florida to the lower Bay of Fundy. Based on this information, the abundance estimate was 28,924 (CV=0.24) (Hayes et al. 2022). The abundance estimate from New Jersey to the lower Bay of Fundy was calculated at 3,810 (CV=0.42), and the estimate from central Florida to New Jersey was calculated to be 25,114 (CV=0.27) (Hayes et al. 2022).

3.3.9.2 Status

The western North Atlantic stock of the short-finned pilot whale is not considered strategic under the MMPA, is not federally listed as threatened or endangered under the ESA, and is not listed in New York or New Jersey state waters. The status of this stock relative to the OSP in the U.S. Atlantic EEZ is unknown (Hayes et al. 2022).

3.3.9.3 Distribution

Short-finned pilot whales are a global species and inhabit tropical and subtropical areas, primarily in deeper waters (NOAA Fisheries Service 2022p). In U.S. waters, they range along both the Atlantic and Pacific coasts. For management purposes, NOAA Fisheries Service has divided short-finned pilot whales in U.S. waters into four stocks. Of those four stocks, only one, the western North Atlantic stock, occurs along the U.S. East Coast. The Western North Atlantic stock of the short-finned pilot whale ranges primarily along the continental shelf break between New England and Florida. Short-finned pilot whales are difficult to differentiate from long-finned pilot whales during aerial and boat surveys, so it is difficult to determine their exact range. However, the available data suggests that short-finned pilot whales are more common between Florida and North Carolina. There is also some spatial overlap with long-finned pilot whales in the Mid-Atlantic region between Cape Hatteras, North Carolina, and New Jersey (Hayes et al. 2022). Because both species prefer deeper offshore waters, they are not often observed in the waters overlying the continental shelf proper and are more commonly seen at the continental shelf break and farther offshore on the slope.

Pilot whales have stranded along the New Jersey coast in recent years. Between 2015 and 2019, four short-finned pilot whales stranded in New York, and none stranded in New Jersey (Hayes et al. 2022). Between June 2009 and May 2010, one pilot whale was reported stranded along the coast of Long Island, but it was not identified as either a short-finned or a long-finned pilot whale (RFMRP 2010). During 2013, two pilot whales stranded along the coast of Long Island, but these were not identified as either short-finned or long-finned pilot whales (RFMRP 2014). Based on this information, as well as the species' preference for deeper pelagic waters, it is unlikely that this species would occur in the vicinity of the Project area during the in-water maintenance period. Due to its low density, few recorded strandings, and unlikely presence in the Project area, the short-finned pilot whale will not be considered further in this analysis.

3.3.10 Common Dolphin

The common dolphin is a species of toothed whale from the Delphinidea family. Common dolphins are smaller than other members of the Delphinidae family. Adult common dolphins reach up to 1.8 meters (6 feet) in length and weigh approximately 77 kilograms (170 pounds) (NOAA Fisheries Service 2022q). Similar to other dolphin species, males can be slightly larger than females. Common dolphins can be identified by their bright colors and distinct patterns (NOAA Fisheries Service 2022q). These patterns include a dark gray, "V" shaped pattern that extends from the rostrum and along the back, a yellow/tan section on the sides, and a white patch on the ventral side that is located forward of the dorsal fin (NOAA Fisheries Service 2022q). They also have a somewhat longer rostrum, a sleek body form, and tall, triangular dorsal fin located along the mid-back (NOAA Fisheries Service 2022q). Common dolphins feed primarily on schooling fish and cephalopod species that can be found within the top 200 meters (650 feet) of the water column (NOAA Fisheries Service 2022q). Common dolphins are considered mid-frequency cetaceans. The estimated general bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007). Common dolphins, like many toothed whales, are very vocal, using echolocation for feeding and navigation and vocalizing for socialization (Southall et al. 2007).

3.3.10.1 Numbers

Hayes et al. (2022) report that the best abundance estimate for the western North Atlantic stock of common dolphins, derived from shipboard and aerial surveys in 2016, is 172,947 (CV=0.28). The abundance estimate for common dolphins between central Virginia and the lower Bay of Fundy was 80,227 (CV=0.31) (Hayes et al. 2022).

3.3.10.2 Status

The western North Atlantic stock of the common dolphin is not categorized as depleted or strategic under the MMPA, is not federally listed as threatened or endangered under the ESA, and is not listed in New York or New Jersey state waters. The status of common dolphins relative to the OSP in the U.S. Atlantic EEZ is unknown (Hayes et al. 2022).

3.3.10.3 Distribution

The common dolphin is among the most widely distributed cetacean species, occurring throughout the world in temperate and subtropical waters (Hayes et al. 2021). For management purposes, common dolphins in U.S. waters are divided into two separate stocks, the California/Oregon/Washington stock and the Western North Atlantic stock. Genetic data suggests that the population consists of a single stock within the Western North Atlantic (Luca et al. 2009).

Common dolphins occur worldwide, but the Western North Atlantic stock ranges from Newfoundland to South Carolina (Hayes et al. 2021). The dolphins occur over the continental shelf along the 100- to 2,000-meter (328- to 6,560-foot) isobaths (Doksaeter et al. 2008). Generally, these dolphins range along the continental slope and are commonly associated with features of the Gulf Stream (Hayes et al. 2018b; Hamazaki 2002). During the CeTAP surveys (1978-1982), this species was observed primarily along the shelf edge and into the deep ocean basin, especially throughout the spring, summer, and winter (CeTAP 1982). Generally, water temperature appears to drive their movements throughout their range. During mid-summer to autumn, common dolphins migrate to Georges Bank and the Scotian Shelf, and during mid-January to May, the dolphins range from Cape Hatteras to Georges Bank (Hain et al. 1981; Payne et al. 1984). During the summer and autumn, when water temperatures are higher than 11°C, common dolphins generally migrate to the Scotian Shelf and the continental shelf off Newfoundland (Sergeant et al. 1970; Gowans and Whitehead 1995).

Observations made during the CeTAP (1982) surveys indicate that common dolphins occur primarily east and north of Long Island and the Project area during all seasons. The common dolphins observed south of Long Island occurred farther offshore in the deeper water of the continental shelf proper, closer to the continental shelf slope (CeTAP 1982).

Common dolphins have stranded along the New York and New Jersey coasts in recent years. Between 2015 and 2019, 41 common dolphins stranded in New York and 14 stranded in New Jersey (Hayes et al. 2022).

In general, during the winter and early spring, this species occurs in deeper offshore waters, with the majority of observations along the continental slope and into the deep ocean basin. During the summer months, this species occurs in the waters off New England and further north. Consequently, occurrence of the common dolphin would be rare in the vicinity of the Project during the maintenance period. The Marine Mammal Stranding Center has reported 34 common dolphin strandings in New Jersey waters since 2020 (MMSC 2023). However, based on the high number of strandings in the area, this species may occur within the vicinity of the Project area during the maintenance period.

3.3.11 Atlantic Spotted Dolphin

The Atlantic spotted dolphin is a species of toothed whale from the Delphinidea family. Young-of-the-year Atlantic spotted dolphins can look similar to bottlenose dolphins because they have not yet developed the spots seen on adults (NOAA Fisheries Service 2022r). These distinctive spots begin to appear after their first birthday and darken as they mature (Hayes et al. 2020). Therefore, Atlantic spotted dolphins' color patterns vary with age and location. Adult Atlantic spotted dolphins measure approximately 1.5 to 2.3 meters (5 to 7.5 feet) in length and weigh approximately 100 to 143 kilograms (220 to 315 pounds) (NOAA Fisheries Service 2022r). Atlantic spotted dolphins are identifiable by their robust bodies with tall, curved dorsal fins located midway down their backs. Their beaks are moderately long, and they have 30 to 42 pairs of small, cone-shaped teeth in each jaw (Hayes et al. 2020).

Atlantic spotted dolphins typically travel in groups of less than 50 but sometimes up to 200. In coastal waters, groups usually consist of 5 to 15 individuals (Hayes et al. 2020). In groups, Atlantic spotted dolphins are sometimes organized by sex or age. To communicate with other members of their groups they blow bubbles through their blowholes and communicate with sound. Atlantic spotted dolphins eat small fish, invertebrates, and cephalopods such as squid and octopi (Hayes et al. 2020). Groups of Atlantic spotted dolphins often coordinate their movements to catch prey together, and individuals sometimes use their beaks to dig into the sand on the ocean floor to catch fish. Atlantic spotted dolphins are considered mid-frequency cetaceans. The estimated general bandwidth for functional hearing in mid-frequency cetaceans is 150 Hz to 160 kHz (Southall et al. 2007).

3.3.11.1 Numbers

Garrison (2020) and Palka (2020) report that the best abundance estimate for the western North Atlantic stock of Atlantic spotted dolphins, derived from vessel surveys covering waters from central Florida to the lower Bay of Fundy in 2016, is 39,921 (CV=0.27). The abundance estimate derived from aerial and shipboard surveys for Atlantic spotted dolphins between central Virginia and the lower Bay of Fundy in 2011 was 26,798 (CV=0.66) (Laake and Borchers 2004). An abundance estimate derived from a shipboard survey for Atlantic spotted dolphins between central Virginia and central Florida in 2011 was 17,917 (CV=0.42). Due to a lack of distinction made between the two Atlantic spotted dolphin ecotypes during surveys, there was no genetic determination of stock structure. The Atlantic scientific review group recommended that abundance estimates for coastal and offshore forms of the Atlantic spotted dolphin should be combined during abundance estimates.

3.3.11.2 Status

The western North Atlantic stock of the Atlantic spotted dolphin is not categorized as depleted or strategic under the MMPA, is not federally listed as threatened or endangered under the ESA, and is not listed in New York or New Jersey state waters. The status of Atlantic spotted dolphins relative to the OSP in the U.S. Atlantic EEZ is unknown (NOAA Fisheries Service 2020).

3.3.11.3 Distribution

The Atlantic spotted dolphin is distributed throughout the western North Atlantic in tropical and warm temperate waters (Leatherwood et al. 1976). For management purposes, Atlantic spotted dolphins in

U.S. waters are divided into three separate stocks, the Northern Gulf of Mexico stock, the Puerto Rico and U.S. Virgin Islands stock, and the western North Atlantic stock (Hayes et al. 2020). Atlantic spotted dolphins range from southern New England, south through the Gulf of Mexico, and from the Caribbean to Venezuela (Leatherwood et al. 1976; Perrin et al. 1994). Atlantic spotted dolphins are found in warm temperate, subtropical, and tropical waters, and warm currents such as the Gulf Stream may affect their distribution (Hayes et al. 2020). Genetic analyses and microsatellite DNA data revealed a significant genetic differentiation between samples from the Gulf of Mexico and the western North Atlantic. Additionally, genetic data indicated a separation of dolphins within western North Atlantic, suggesting that there might be multiple demographically independent populations of the Atlantic spotted dolphin (Adams and Rosel 2006; Viricel and Rosel 2014). One of the Atlantic spotted dolphin ecotypes is large, heavily spotted, and inhabits the continental shelf and is usually found inside or near the 200-meter isobath in continental shelf waters south of Cape Hatteras, North Carolina. The smaller, less spotted, island and offshore form can be located in the western North Atlantic in continental slope waters particularly north of Cape Hatteras (Mullin and Fulling 2003). The Atlantic spotted dolphin can be difficult to differentiate at sea in areas where the ecotypes co-occur.

In New York, observations made during the shipboard and aerial surveys (1995 to 2016) indicate that Atlantic spotted dolphins occur primarily east and south of Long Island and the Project area in all seasons. No Atlantic spotted dolphins have been stranded along the New York or New Jersey coasts in recent years.

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4.0 AFFECTED SPECIES STATUS AND DISTRIBUTION

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

Because of the large number of marine mammals discussed, Section 3.0 was combined with Section 4.0 to consolidate all species-specific information. For ease of review, all topics required in Section 4.0 (i.e., status, distribution, and seasonal distribution [when applicable]) are identified and addressed in subheadings in Section 3.0, above.

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5.0 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury and/or death), and the method of incidental taking.

The MMPA defines "harassment" as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) 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 [Level B harassment]" (50 CFR, Part 216, Subpart A, Section 216.3 - Definitions).

Level A is the more severe form of harassment because it may result in injury, whereas Level B results only in disturbance without the potential for injury. After analysis of estimated potential Level A and B take, this IHA application is requesting a small number of takes resulting from Level A injury for bottlenose dolphin, gray seal, harbor seal, and harp seal and Level B behavioral harassment for fin whale, humpback whale, minke whale, Atlantic white-sided dolphin, bottlenose dolphin, harbor porpoise, common dolphin, Atlantic spotted dolphin, gray seal, harbor seal, and harp seal.

Incidental Take Authorization Request and Method of Incidental Taking

The activities outlined in Section 1.0 have the potential to take marine mammals by acoustic behavioral harassment during vibratory and impact pile installation activities. Therefore, Transco requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for the incidental Level A (PTS causing injury) and Level B take (behavioral harassment) of small numbers of 11 marine mammal species by vibratory and impact pile installation activities during the summer and fall of 2023, as described in this application. This activity is associated with the maintenance of the LNYBL subsea pipeline offshore of New York and New Jersey in the New York Bight region. Sheet pile installation is proposed occur during daylight hours over an approximate 120-day period between June 1, 2024, and September 30, 2024 (90 days of actual pile driving plus 30 days for weather contingency).

More specifically, the requested authorization is for the incidental harassment of 11 species of marine mammals that might enter Level B ensonified areas and four species that might enter Level A ensonified areas during all phases of maintenance activities (Section 6.4.2). Modeled Level A and Level B isopleths were calculated using NOAA Fisheries Service's 2018 acoustic guidance, and the results were used to determine the number of takes requested for the marine mammals listed in Section 6.4.2. Section 6.0 outlines in detail how the takes were calculated.

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6.0 NUMBER OF MARINE MAMMALS THAT MAY BE AFFECTED

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5.0, and the number of times such takings by each type of taking are likely to occur.

This section summarizes the methods for calculating the number of marine mammals that are expected to be incidentally harassed during pile installation activities associated with Transco's proposed Project, described in Section 1.0. Section 6.1 discusses developing a viewshed. Section 6.2 discusses calculating ensonified areas. Section 6.3 discusses applying densities of species and calculating take estimates. Geographic information system (GIS) techniques were developed and used to assist in the methods and calculations.

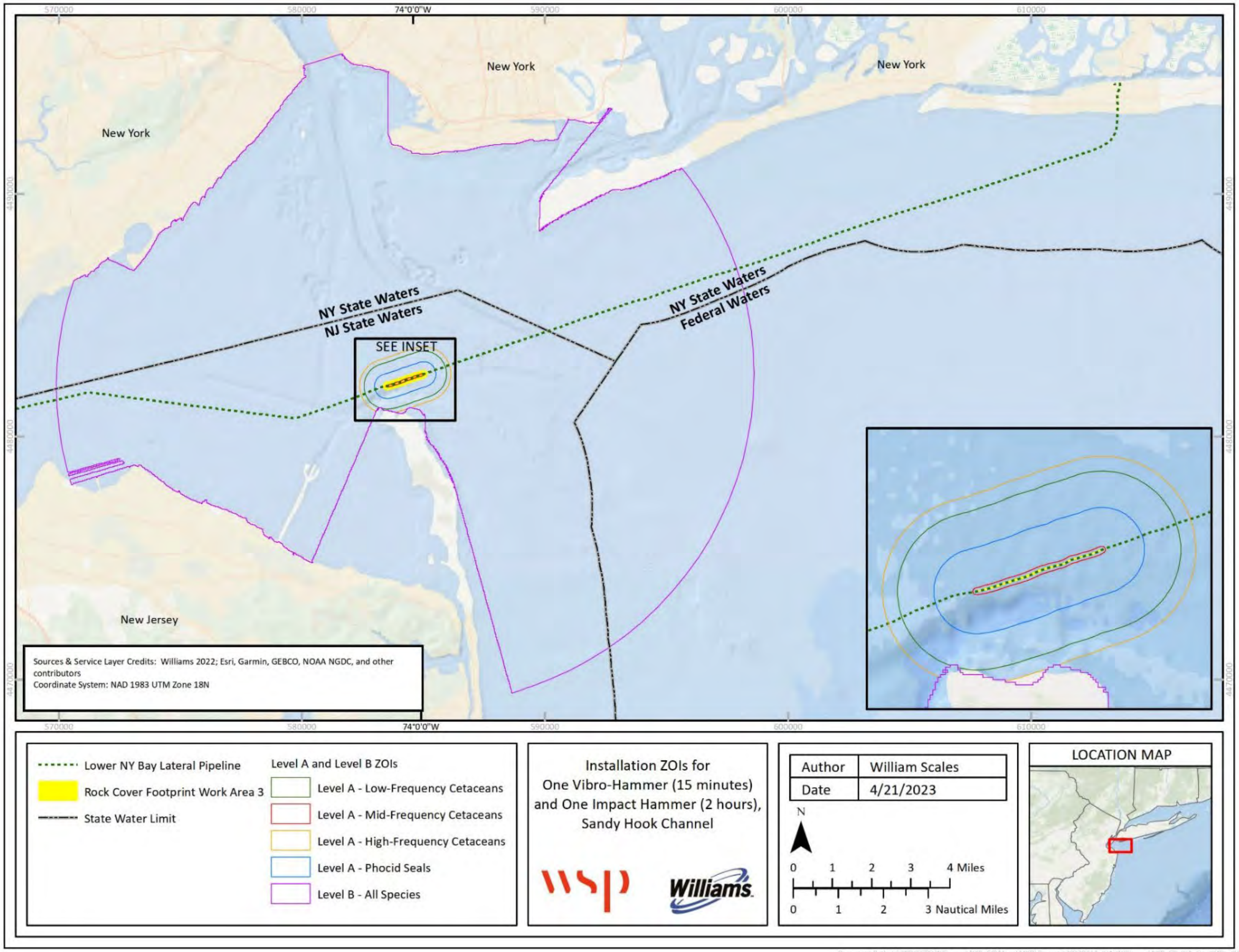
Pile installation activities discussed in this IHA application may result in Level A injury to a small number of bottlenose dolphins, gray seals, harbor seals, and harp seals. However, the mitigation measures proposed in Section 11.0 would greatly decrease the likelihood of a Level A take. Project-related activities may also result in Level B acoustic behavioral harassment of the following species: fin whale, humpback whale, minke whale, Atlantic white-sided dolphin, bottlenose dolphin, harbor porpoise, common dolphin, Atlantic spotted dolphin, gray seal, harbor seal, and harp seal. In addition, based on a review of anecdotal humpback whales sighting data near work area 3, a small number of Level B takes not calculated through density estimates from Roberts (2022) are being requested (Section 11.1).

6.1 Viewshed Analysis

Viewshed analysis is a standard technique used in GIS to determine whether an area is visible from a specific location (Kim et al. 2004). The analysis uses an elevation value of two points with direct "line of sight" to determine the likelihood of seeing the elevated point from the ground. Incorporating the viewshed analysis allowed GIS modeling of sound propagation to replicate how sound waves traveling through the water are truncated when they encounter land. GIS modeling used an artificial elevation model setting the water to zero (ground) and any land mass to 100 (elevated point) and focusing only on areas within the work areas where sound would propagate. Any land within direct "line of sight" to the sound source would prevent the sound from propagating farther.

Figure 6-1 shows an example of applying the viewshed analysis to a single representative sheet pile location for a vibro-hammer scenario. Everything in gray represents the area where sound would propagate based on the land contour. This simple model does not account for diffusion, which would be minimal with large landmasses; therefore, in the model no sound bends around landmasses. A similar approach has been used in previous authorized IHAs (Navy 2016).

Figure 6-1. Installation Zones of Influence for One Vibro-Hammer (15 Minutes) and One Impact Hammer (2 Hours), Sandy Hook Channel



6.2 Estimating Zone of Influence

Acoustic isopleths to the various Level A and Level B potential impact thresholds were calculated for each sheet installation scenario at the representative sheet pile locations within work area 3, as described in Section 1.6. GIS analysis then used these values to calculate the resulting zones of influence (ZOIs) (i.e., the area ensonified by noise levels at or greater than the threshold in km^2).

The modeled Level A ZOIs are shown on Figure 6-1 for each scenario outlined in Section 1.0 (Table 6-1). The maps depict the maximum modeled Level A ZOIs between each representative sheet pile location for low-frequency cetacean, mid-frequency cetacean, high-frequency cetacean, and phocid pinniped (in water) thresholds based on the NOAA Fisheries Service criteria (see Section 1.6.5) (NMFS 2018).

The Level B ZOIs for activities in the work areas are shown on Figure 6-1. The maximum modeled Level B distance was for the scenario modeled where the 120 dB threshold was exceeded at a distance of 13,594 meters (44,600 feet) due to pile driving. As stated in Section 1.6.1, the Port of New York and New Jersey is the fourth busiest port in the United States. Therefore, Transco anticipates that the underwater noise generated from vibratory pile driving would reach ambient levels at a distance much shorter than 13,594 meters (44,600 feet) due to the amount of vessel traffic throughout the Project area. In addition, model results indicate that the Level B threshold of 160 dB during impact pile driving would only be exceeded up to 430 meters (1,411 feet) from the pile-driving activity. However, Transco has calculated the areas outlined in Table 6-1 and conservatively requested Level B take based on the largest modeled Level B ensonified area (i.e., 13,594 meters [44,600 feet]; Table 1-7).

Table 6-1. Total Area of Each Zone of Influence for Sheet Pile Driving Scenarios

Scenario	Level	Area[a] (km^2)	Maximum Radial Distance[a] (meters)
One Impact Hammer operating for 2 hours and one vibratory hammer operating for 15 minutes	Level A Low-Frequency Cetaceans	7.45825	935.8
	Level A Mid-Frequency Cetaceans	5.81180	33.3
	Level A High-Frequency Cetaceans	0.15174	1,114.7
	Level A Phocid Seals	2.44709	500.8
	Level B	426.12626	13,594

Key: km^2 = square kilometers
Note:
[a] Level A and B areas calculated from largest distance to level B thresholds presented in Attachment B.

6.3 Species Density

Estimated takes for marine mammals were calculated based on the best available information for the region, which includes density estimates developed by Duke University through its Habitat-Based Cetacean Density Models (Roberts et al. 2016; Roberts 2022). The models include approximately 30 years of survey data and model distributions based on species habitat preferences. For each cetacean species, maximum abundance density data for the months of June to October near work area 3, Sandy Hook Channel, were recorded (Table 6-2 through Table 6-4). The resulting density grid was used to calculate take estimates of marine mammals for sheet pile installation activities. For seals, densities were obtained from the 2022 Duke University Habitat-Based Cetacean Density Model (Roberts 2022); however, seal species are not distinguished from each other in the model.

Table 6-2 and Table 6-3 outline the densities used to calculate Level A and Level B takes.

Table 6-2. Monthly Densities Used in Level A Take Calculations at Work Area 3, Sandy Hook Channel

Species	Density (animals/km²) [a]			
	June	July	August	September
Cetaceans - Whales				
Fin Whale	5.72885E-06	2.71295E-06	2.04969E-06	**7.66659E-06**
Humpback Whale	**3.79656E-05**	1.29532E-05	1.21848E-05	2.26511E-05
Minke Whale	**0.000103**	9.31811E-06	4.10852E-06	8.68497E-06
North Atlantic Right Whale	**1.11956E-05**	6.45806E-06	2.81428E-06	8.69666E-06
Cetaceans – Dolphins and Porpoises				
Atlantic White-Sided Dolphin	**2.68250E-06**	6.40423E-08	6.98912E-09	4.23678E-08
Bottlenose Dolphin	**0.06740**	0.05648	0.03741	0.02929
Harbor Porpoise	**9.77027E-05**	1.87942E-05	8.97938E-06	5.4346E-06
Long-Finned Pilot Whale[b] Short-Finned Pilot Whale[b]	**7.03934E-08**	**7.03934E-08**	**7.03934E-08**	**7.03934E-08**
Common Dolphin	**4.50288E-05**	1.11117E-06	4.30118E-07	3.29508E-06
Atlantic Spotted Dolphin	8.46512E-07	8.79244E-07	**1.04512E-06**	7.35719E-07
Pinnipeds – Seals				
Harp Seals[c] Gray Seals[c] Harbor Seals[c]	**0.17305**	0.01766	0.00670	0.01874

Sources: Roberts 2022.

Notes:

[a] **Bolded** numbers indicate highest density estimated and were used to calculate take. Model versions used for each density: fin whale v12, humpback whale v11, minke whale v10, North Atlantic Right Whale v12, Atlantic white-sided dolphin v4, bottlenose dolphin v6, harbor porpoise v6, pilot whales v7, common dolphin v5, seal v5; Maximum abundance monthly densities available in Roberts (2022) are presented in this table and were used to calculate take for each species or species group. See Section 6.4 for a description on how the densities were calculated.

[b] Pilot whales are modeled together and produce one year-round density. This number was divided by 12 to get monthly maximum densities.

[c] All seal species are modeled together and produce one density.

Table 6-3. Monthly Densities Used in Level B Take Calculations at Work Area 3, Sandy Hook Channel

Species	Density (animals/km^2) [a]			
	June	July	August	September
Cetaceans - Whales				
Fin Whale	1.57572E-04	**1.7035E-04**	7.36133E-05	1.63907E-04
Humpback Whale	**1.68549E-04**	6.82166E-05	5.60349E-05	8.23552E-05
Minke Whale	**7.39178E-04**	9.59837E-05	4.42924E-05	5.69995E-05
North Atlantic Right Whale	**2.32557E-05**	1.16223E-05	6.5278E-06	1.71004E-05
Cetaceans - Dolphins and Porpoises				
Atlantic White-Sided Dolphin	**1.76532E-04**	6.18486E-06	6.18486E-06	9.95009E-06
Bottlenose Dolphin	0.17182	**0.24718**	0.21512	0.11906
Harbor Porpoise	**4.62487E-04**	1.24929E-04	5.80719E-05	1.37748E-05
Long-Finned Pilot Whale[b]	**2.80232E-05**	**2.80232E-05**	**2.80232E-05**	**2.80232E-05**
Short-Finned Pilot Whale[b]				
Common Dolphin	**0.00209**	1.57284E-04	4.72171E-05	7.06261E-05
Atlantic Spotted Dolphin	3.45616E-06	2.77794E-04	**4.73081E-04**	2.03301E-04
Pinnipeds – Seals				
Harp Seals[c]	**0.35430**	0.03596	0.01895	0.04627
Gray Seals[c]				
Harbor Seals[c]				

Source: Roberts 2022.
Notes:
[a] **Bolded** numbers indicate highest density estimated and were used to calculate take. Model versions used for each density: fin whale v12, humpback whale v11, minke whale v10, NARW v12, Atlantic white-sided dolphin v4, bottlenose dolphin v6, harbor porpoise v6, pilot whales v7, common dolphin v5, seal v5; maximum abundance monthly densities available in Roberts (2022) are presented in this table and were used to calculate take for each species or species group. See Section 6.4 for a description on how the densities were calculated.
[b] Pilot whales are modeled together and produce one year-round density. This number was divided by 12 to get monthly maximum densities.
[c] All seal species are modeled together and produce one density.

6.4 Calculating Take Estimates

The take calculations presented in this IHA relied on the best available population density estimates (Section 6.3). Potential takes were calculated for Level A and Level B for each of the 14 species likely to be found in the vicinity of the work area 3 during sheet pile installation activities scheduled to occur during summer 2024. To date, the maintenance schedule has not been finalized; therefore, Transco has used the most conservative take estimates calculated for this authorization request. The calculated number of takes by harassment presented here are overly conservative numbers based on a variety of factors, including the following:

- The density estimates assume even distribution of animals throughout grid-cells.
- The density values used in the take calculations account for entire grid-cell density values, even if the species-specific ZOI overlapped a small portion of the grid-cell.

- Pinniped densities assume all individuals in the population are in the water at any given time.
- Animal movement out of the ZOI was not included in the analysis.
- Maximum abundance densities were used as outlined in Section 6.3.

Therefore, Transco expects that the actual number of individual animals being exposed to harassment levels of sound would be far less than the number of take authorizations requested. Additionally, the underwater noise produced by the sheet pile installation may not be fully audible to these species due to the local background noise, which is likely to be dominated by loud, low-frequency commercial vessel noise (see Sections 1.6.2 and 6.2).

6.4.1 Method for Calculating Take Estimates

GIS was used to calculate potential cetacean and seal takes from sheet pile installation activities. The scenario presented in Table 6-1 was used to estimate ZOIs and subsequent takes. Level A and Level B ZOIs (Table 6-1) were clipped by the viewshed for work area 3 (Figure 6-1). Species density (animals per km^2; Table 6-2 and Table 6-3) was then multiplied by the ZOIs (km^2; Table 6-1), resulting in calculated take estimates. The following formulas were implemented by the script for each species at each representative sheet pile location:

- Initial Level A take estimate = ZOI * d
- Initial Level B take estimate = ZOI * d

where:

ZOI = the ensonified area in km^2 at or above the species-specific PTS acoustic threshold and behavioral thresholds, clipped by the viewshed

d = density estimate in animals/ km^2 for each species within the ZOI

The initial take estimates are multiplied by the duration (days) of the corresponding sheet pile installation activity (based on sheet pile specifications; see Section 1.4). The following formulas demonstrate this method:

- Level A take estimate = initial take estimate * X days of activity
- Level B take estimate = initial take estimate * X days of activity

where:

X days of activity = number of days for which the corresponding sheet pile installation activity occurs. For this Project, the number of days is 90.

6.4.2 Number of Requested Takes

Table 6-4 displays both the estimated number of incidental takes during sheet pile installation and the takes requested by Transco for each species. These numbers were rounded to the nearest whole individual to yield the requested number of Level B takes that are identified in the table. Small numbers of Level A take (in relation to stock size) are being requested for four species: bottlenose dolphin, gray seal, harbor seal, and harp seal. Level B takes are being requested for 13 species: fin whale, humpback whale, minke whale, Atlantic white-sided dolphin, bottlenose dolphin, harbor porpoise, long-finned pilot whale, short-finned pilot whale, common dolphin, Atlantic spotted dolphin, gray seal, harbor seal, and harp seal (see Table 6-4 and Table 7-1).

Table 6-4. Species Densities, Calculated Take and Requested Take for Level A and Level B Harassment

Species	Calculated Level A Takes	Requested Level A Takes	Calculated Level B Takes	Requested Level B Takes
Cetaceans - Whales				
Fin Whale	0	0	6.53	7
Humpback Whale	0	0	6.46	7
Minke Whale	0	0	28.35	28
North Atlantic Right Whale	0	0	0.89	1
Cetaceans - Dolphins and Porpoises				
Atlantic White-Sided Dolphin	0	0	4.60	5
Bottlenose Dolphin	0.92	1	9,479.78	9,480
Harbor Porpoise	0	0	17.74	18
Long-finned Pilot Whale	0	0	1.07	1
Short-finned Pilot Whale	0	0	1.07	1
Common Dolphin	0	0	80.15	80
Atlantic Spotted Dolphin	0	0	18.03	18
Pinnipeds – Seals				
Gray Seals Harbor Seals Harp Seals	38.11	38	13,587.89	13,588

Sources: Density used in take estimates are described in Section 6.4 and were taken from Roberts 2022.

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7.0 ANTICIPATED IMPACT ON SPECIES OR STOCKS

The anticipated impact of the activity upon the species or stock of marine mammals.

The sound generated by sheet pile installation during the Project would exceed the NOAA Fisheries Service in-water acoustic thresholds for both Level A and Level B harassment (see Section 1.6, Table 1-5 and Table 1-7). Therefore, these sound levels would be considered potentially injurious and behaviorally disturbing to marine mammals.

Transco is requesting authorization for Level A and Level B harassment takes for small numbers of 13 marine mammal species. To calculate the percentage of each species' stock potentially affected by the Project, population abundance was taken from Hayes et al. (2022). The number of takes in relation to the overall stock size of each of the five species are presented in Table 7-1.

Marine mammals use sound for various components of daily survival, such as foraging, navigation, and predator avoidance. Marine mammals are also thought to use sound to learn about their surrounding environment and to gather information from biological sources (such as inter- and intra-specific species) or naturally occurring phenomena such as wind, waves, rain, and seismic activity (i.e., earthquakes) (Richardson et al. 1995). Behavioral reactions to sound can include a flight response, changes in breathing and diving patterns, avoidance of important habitat or migration areas, and a disruption of social relationships and interactions (Richardson et al. 1995; McCauley et al. 2000; Nowacek et al. 2007). Marine mammals may also respond to excessive noise levels with changes in call rates and call frequencies, and such noise levels can result in masking, which is a decreased ability of an animal to detect relevant sounds due to an increase in background noise that effectively blocks those sounds (Richardson et al. 1995; Nowacek et al. 2007; Southall et al. 2007). Physiological responses can include TTS, PTS, and increases in stress hormones (Richardson et al. 1995; Southall et al. 2007; Wright et al. 2007). TTS is a temporary and fully recoverable reduction in hearing sensitivity due to exposure to greater-than-normal sound intensity. PTS is the permanent and non-recoverable reduction in hearing sensitivity due to damage caused by either a prolonged exposure to a sound or temporary exposure to a very intense sound. When or how a marine animal responds to a sound depends on several variables such as the characteristics of the sound itself, characteristics of the animal (age, sex, habitat), and previous exposure(s) (Wartzok et al. 2004).

Table 7-1. Requested Number of Level A and Level B Takes and Percentage of Marine Mammal Stock Potentially Affected

Species	Stock	Stock Abundance	Level A Takes Requested[a]	Percentage of Stock Potentially Affected by Level A Take	Level B Takes Requested[a]	Percentage of Stock Potentially Affected by Level B Take
Cetaceans – Whales						
Fin Whale	Western North Atlantic	6,802	0	0.00%	7	0.10%
Humpback Whale	Gulf of Maine	1,396	0	0.00%	7	0.5%
Minke Whale	Canadian East Coast	21,968	0	0.00%	28	0.13%
Cetaceans - Dolphins and Porpoises						
Atlantic White-Sided Dolphin	Western North Atlantic	98,233	0	0.00%	5	0.01%
Bottlenose Dolphin	Western North Atlantic - Coastal and Offshore Combined	69,490[c]	1	0.00%	9,480	13.64%
Harbor Porpoise	Gulf of Maine/ Bay of Fundy Stock	95,542	0	0.00%	18	0.02%
Long-finned Pilot Whale	Western North Atlantic	39,215	0	0.00%	1	0.00%
Short-finned Pilot Whale	Western North Atlantic	28,924	0	0.00%	1	0.00%
Common Dolphin	Western North Atlantic	172,947	0	0.00%	80	0.05%
Atlantic Spotted Dolphin	Western North Atlantic	39,921	0	0.00%	18	0.05%
Pinniped – Seals						
Gray Seal[b]	Western North Atlantic	27,131[d] (424,300)[e]		0.14% (0.01%)		50.08% (3.20%)[f]
Harbor Seal	Western North Atlantic	61,336	38	0.06%	13,588	22.15%[f]
Harp Seals	Western North Atlantic	7,600,000		0.00%		0.18%[f]

Sources: Stock abundance taken from latest NOAA stock assessment reports available for each species (Hayes et al. 2020; Hayes et al. 2021; Hayes et al. 2022)

Notes:

a Requested takes round up to the nearest whole number if the value was 0.5 or less and rounded up to the nearest whole number if it was equal to or greater than 0.5.

b Gray seal western North Atlantic population number is a sum of U.S. and Canada counts.

c Population abundance for bottlenose dolphins is based on the total combined population of coastal (6,639) and offshore bottlenose (62,851) stocks.

d Population in U.S. waters

e Population in Canadian waters

f Presents the maximum worst case if all takes were to come from one species, which is unlikely.

Noise generated during sheet pile installation activities may be audible to marine mammals in the vicinity of the work area 3. Most assessments of impacts associated with marine mammals and sheet pile driving have focused on impact pile driving. The pulsed noise of impact pile installation produces greater sound source levels than vibratory installation, thereby increasing the potential for adverse impacts. Project activities include vibratory and impact pile driving. Behavioral reactions such as avoidance of the sound source, avoidance of feeding habitat, and changes in breathing patterns have been reported as reactions to increased sound levels (Malme et al. 1984; Richardson et al. 1995; Nowacek et al. 2007; Tyack 2009). Transco expects potential short-term avoidance of the 120 or 160 dB µPa L_{rms} (and greater) ensonified areas associated with pile-driving activities (see Table 6-1). However, the level of disturbance from Level B noise associated with pile-driving activities would be dependent on the local background noise. Local baseline underwater noise near work area 3 is dominated by low-frequency commercial vessel noise (see Section 1.6.1) and may already exceed the behavioral disturbance thresholds for marine mammals.

For NOAA Fisheries Service to authorize the incidental take of marine mammals, it must determine that there is a negligible impact on the marine mammal species or stock. As stated in 50 CFR § 216.103, NOAA Fisheries Service defines negligible impact as “an impact resulting from a specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stocks [of marine mammals] through effects on annual rate of recruitment or survival.”

Transco expects acoustic disturbance of marine mammal species would be temporary due to the duration of the activity (assumed 2.25 hours per day for 90 days) and the transient nature of marine mammal in the area. Based on the percentage of each population that could be taken by Level A and Level B acoustic harassment (see Table 7-1), Transco does not expect that the Project would have an impact on recruitment or survival of any of the marine mammal stocks discussed in this application. Therefore, Project-related sheet pile installation activities are expected to have a negligible impact on the marine mammal species and stocks that could occur in the vicinity of work area 3 during the in-water maintenance period.

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8.0 ANTICIPATED IMPACTS ON SUBSISTENCE USES

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

This section is not applicable. The Project would take place in the Atlantic Ocean offshore of the states of New York and New Jersey—specifically, in the New York Bight region. There are no traditional subsistence hunting areas in the Project region.

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9.0 ANTICIPATED IMPACTS ON HABITAT

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

9.1 Introduction

In-water maintenance activities would have temporary impacts on marine mammal habitat by producing temporary disturbances, primarily through in-water sound pressure levels from vibratory and impact pile driving. Cetaceans and pinnipeds are expected to be transient in the work areas. No distinct marine mammal critical habitat or foraging habitat has been identified in the vicinity of the work areas. Therefore, disturbance from underwater noise associated with the Project would not exclude marine mammals from important habitat areas.

Other impacts to marine mammal habitat resulting from in-water maintenance activities are changes in prey distribution and changes to water quality (e.g., increases in turbidity). Mitigation measures implemented by Transco to minimize potential for these and other Project-related environmental effects are outlined in Section 11.0.

9.2 Changes in Prey Distribution

Fish are a primary prey of the cetaceans and pinnipeds discussed in this application and outlined in Table 10-1. Like marine mammals, fish can be affected by noise, both physiologically and behaviorally.

The Fisheries Hydroacoustic Working Group was formed in 2004 and consists of biologists from NMFS, the U.S. Fish and Wildlife Service, Federal Highway Administration, U.S. Army Corps of Engineers, and the California, Washington, and Oregon Departments of Transportation, supported by national experts on underwater sound producing activities that affect fish and wildlife species of concern. In June 2008, the agencies signed a memorandum of agreement documenting criterion for assessing physiological effects of impact pile driving on fish (FHWG 2008). The criteria were developed for the acoustic levels at which physiological effects to fish could be expected. The Fisheries Hydroacoustic Working Group outlines thresholds for fish greater and less than 2 grams in weight for the onset of physiological effects (Stadler and Woodbury 2009), and not necessarily levels at which fish are mortally damaged. These criteria were developed to apply to all fish species.

Impulsive criteria for impact pile driving include dual metrics that are used to assess the effects to fish exposed to high levels of accumulated energy (SEL) for repeated impulsive sounds and a single strike at high L_{pk}. The criteria include a maximum accumulated SEL for lower-level signals and a maximum L_{pk} for a single pile-driving strike (FHWG 2008). For vibratory pile driving, the NOAA Fisheries Greater Atlantic Regional Fisheries Office only recognizes behavioral thresholds for fishes (NOAA Fisheries Service 2022s). Behavioral disturbance thresholds for fish of 150 dB re 1 µPa L_{rms} apply to all noise sources (Andersson et al. 2007; Wysocki et al. 2007; Mueller-Blenkle et al. 2010; Purser and Radford 2011).

Project-related noise is anticipated to exceed the threshold criteria for physiological and behavioral impacts on fish. Transco modeled the distance to fish thresholds using the Optional Multi-Species Pile Driving Calculator (NOAA Fisheries Service 2022s). Modeling indicates that for a single pile strike to result in physiological injury, fish would need to be within 4.3 meters (14 feet) of a sheet pile during impact pile driving activities (based on the 206 dB peak threshold). Considering cumulative thresholds, modeling indicates that physiological effects to fish may be possible up to 431 meters (1,414 feet) from impact pile driving activities. For injury to occur, however, fish would need to remain within these distances for the maximum anticipated duration of the activity (i.e., for 2.25 hours within a 24-hour period). With the implementation of ramp-ups (impact hammer) and soft-starts (vibro-hammer), the potential for serious injury is minimized (see Section 11.1). Ramp-ups/soft-starts would facilitate a gradual increase of hammer blow energy and/or continuity to allow marine life to leave the area prior to the start of operations at full energy that could result in injury. Ramp-ups/soft-starts could be effective in deterring fish from the areas close to impact pile driving activities prior to exposure that might result in a serious injury.

Modeling indicates that behavioral disturbance for fish may be possible up to 2,000 meters (6,562 feet) from impact pile driving activities and 136 meters (446 feet) from vibratory pile driving activities. Fish could be exposed to noises above behavioral threshold and may avoid the area. Should an exposure occur, it would be temporary, with effects dissipating once the activity had ceased (maximum anticipated duration of pile driving within a 24-hour period is estimated at 2 hours and 15 minutes) or the individual had left the area.

The work areas are not distinct from the surrounding New York Bight region, so it is expected that cetaceans and pinnipeds would still be able to feed on fish prey species in the areas surrounding the Project area, and any effects on any fish prey species would not impact the cetaceans or pinnipeds discussed in this application.

9.3 Turbidity and Water Quality Impacts

Sheet pile driving by vibro-hammer or impact hammer, rock placement, and the use of barge spuds or anchors can disturb sediments and may cause localized increases in turbidity and total suspended sediment (TSS). The extent of these water quality impacts depends on sediment grain type/size and ambient currents. A Project-specific survey conducted in the fall of 2021 showed that the surficial sediment in the proposed work areas is primarily sandy substrate, with limited areas of silt/clay (WSP 2022). Due to the sandy content of the surficial layer, Project-related TSS from rock placement is expected to settle out of the water column relatively quickly and close to the area of disturbance, similar to the effects of deploying artificial reef materials (NYSDEC 2020). Pile-driving activities are expected to produce TSS concentrations of approximately 5.0 to 10.0 milligrams per liter above background levels up to approximately 91 meters (300 feet) of the sheet pile being driven (FHWA 2012). Considering sediment type, duration of sediment-disturbing activities, and the strong tidal currents in the offshore work areas, ambient turbidity levels are expected to return quickly following completion of work at each proposed work areas. The placement of spud and/or anchors to hold working barges in place may also cause localized increases in turbidity and TSS. Due to spud shape and footprint, negligible amounts of turbidity are expected from spud placement or removal. Though the eight 12,000-pound delta flipper anchors potentially used in barge placement have a larger footprint than spuds (800 square feet per anchor barge placement versus 52 square feet per spud barge placement), anchor barges will be able to shift and reach a larger area without replacement of anchors. Turbidity generated from anchor placement and removal is expected to generate turbidity levels similar to those referenced for artificial reef placement, and sediment would settle out of the water column quickly (NYSDEC 2020).

Operational waste such as bilge and ballast waters, trash and debris, and sanitary and domestic waste will be generated by vessels and barges associated with the Project. Project vessels will comply with all U.S. Coast Guard (USCG) requirements for handling marine debris and liquid wastes (e.g., MARPOL, Annex V, Pub. L. 100−220 [101 Stat. 1458]). All vessels associated with the Project will comply with USCG requirements for the prevention and control of oil and fuel spills (MARPOL, Annex I, Pub. L. 96-478 [94 Stat. 2297]). In the unlikely event of a fuel or oil spill, Transco will implement a Spill Plan for Oil and Hazardous Materials.

9.4 Conclusions Regarding Impacts to Habitat

No direct loss of habitat available to marine mammals is expected to occur due the proposed Project maintenance activities. Marine mammals using habitat near the work areas are primarily transiting through as the Project does not overlap with any known important habitats or foraging locations. The closest haul-out sites are 2.86 kilometers (1.78 statute miles) and 16.1 kilometers (10 statute miles) and will not be disturbed by in-air transmission of noise.

Any adverse impacts on prey species populations are expected to be temporary and localized. Given the large numbers of fish and other prey species in the larger New York Bight region, the short-term effects on fish species, the ability of both prey species and marine mammals to avoid the areas of disturbance, and the availability of similar suitable habitat surrounding the Project area, the Project is not expected to have significant effects on the habitat or prey of marine mammals in the work areas.

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10.0 ANTICIPATED IMPACTS OF LOSS OR MODIFICATION OF HABITAT

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

During the Project, various activities would cause benthic disturbance. These activities include rock placement, sheet pile installation, and vessel positioning (i.e., anchor or spud placement).

Rock will be placed over an estimated 26.52 acres (1,155,200 square feet) across the seven work areas, including 17.28 acres (752,700 square feet) in New Jersey waters (work areas 1 through 5) and 9.24 acres (402,500 square feet) in New York waters (work areas 6 and 7; Figure 1-1). This would result in the conversion of approximately 26.52 acres (1,155,200 square feet) from soft to hard bottom.

The existing benthic community would be directly impacted through burial and habitat conversion. Transco assumes 100% mortality for any sessile benthic organisms within the direct area of seabed disturbance. Such organisms likely to be impacted by the proposed sediment sampling include shellfish species known to inhabit the Raritan-New York Bay estuary complex. The seabed immediately surrounding the placed rock may also be subject to altered sediment deposition rates and patterns due to disruption of ambient currents (NYSDEC 2020). Because of the abundance of benthic invertebrate habitat, however, anticipated impact from the proposed work on benthic invertebrates populations would be low due to the presence of other populations in the surrounding waters. For example, the U.S. Fish and Wildlife Service-designated Raritan Bay-Sandy Hook Bay Complex encompasses 69,188 acres (USFWS 1997). In comparison, the anticipated total impact associated with the proposed rock placement and sheet piling will affect approximately 26.5 acres of seabed widely spread throughout the offshore complex. Soft sediment substrate in the footprint of the placed rock will be converted to hardbottom for the operational life of the Project. The epibenthic communities that populate the placed rock would be substantially different from the existing soft-bottom benthic and epibenthic communities, and may include some non-native species (e.g., those carried north with the Gulf Stream). However, higher-relief hardbottom substrate in the region (e.g., artificial reef) is documented to support greater species density and diversity than low-relief soft-bottom substrate (NYSDEC 2020; Figley 2003). Thus, the conversion to hardbottom habitat is expected to offset impacts to the overall benthic community from the loss of soft-bottom benthic habitat.

These activities would not result in significant permanent loss or modification of habitat for marine mammals or their prey (Table 10-1). The greatest impact on marine mammals associated with the Project would be the temporary loss of habitat due to elevated underwater noise levels and the potential temporary impact on prey species due to turbidity (see Section 9.4).

Table 10-1. Prey of Marine Mammal Species in the Project Area

Common Name	Scientific Name	Primary Prey Items	Foraging Presence in Project Area [a,b,c,d]	Reference
Cetaceans - Whales				
Fin Whale (Western North Atlantic Stock)	*Balaenoptera physalus*	Krill, and schooling dish, herring and sand lance.	Uncommon	Borobia et al. 1995 and NOAA Fisheries Service 2022e
Humpback Whale (Gulf of Maine Stock)	*Megaptera novaeangliae*	In Newfoundland: capelin, small crustaceans, krill and plankton.	Possible: most sightings in the New York Bight are juvenile humpbacks.	Filatova et al. 2013; Gotham Whale 2022; SCW 2022b
Minke Whale (Canadian East Coast Stock)	*Balaenoptera acutorostrata acutorostrata*	Plankton krill, cod and herring.	Uncommon: Occasional sighting in the New York Bight.	NOAA Fisheries Services 2022h; SCW 2022b
North Atlantic Right Whale (Western North Atlantic Stock)	*Eubalaena glacialis*	Plankton	Uncommon	Baumgartner et al. 2011
Long-Finned Pilot Whale (Western North Atlantic Stock)	*Globicephala melas*	Squids (long-finned and short-finned squid) and fish (Atlantic mackerel)	Uncommon: occasional sighting in the New York Bight.	Gannon et al. 1997; SCW 2022b
Short-Finned Pilot Whale (Western North Atlantic Stock)	*Globicephala macrorhynchus*	Squids	Uncommon	NOAA Fisheries Service 2022p
Cetaceans - Dolphins and Porpoises				
Atlantic White-Sided Dolphin (Western North Atlantic Stock)	*Lagenorhynchus acutus*	Pelagic schooling fish inhabiting shelf waters. Predominantly Gadiformes	Possible	Hernandez et al. 2016
Common Bottlenose Dolphin (Western North Atlantic Coastal and Offshore Stock)	*Tursiops truncatus truncatus*	Generalist feeders. Coastal and offshore groups have different prey items. North Carolina: Fishes from Sciaenidae, weakfish, and croaker.	Possible: sightings of bottlenose dolphin vary throughout New York Bight but appear to have higher presence in deeper waters. Foraging is possible.	Gannon and Waples 2004; Collom et al. 2017
Harbor Porpoise (Gulf of Maine/Bay of Fundy Stock)	*Phocoena phocoena*	Historically has been clupeid fish but has shifted to sandeels and gadoid fish.	Possible	Santos and Pierce 2003
Common Dolphin (Western North Atlantic Stock)	*Delphinus delphis delphis*	Schooling fish within top 200 feet.	Possible	NOAA Fisheries Service 2022q

Common Name	Scientific Name	Primary Prey Items	Foraging Presence in Project Area [a,b,c,d]	Reference
Atlantic Spotted Dolphin (Western North Atlantic Stock)	*Stenalis frontalis*	Fish, octopus	Possible	Hayes et al. 2020
Pinnipeds - Seals				
Gray Seal (Western North Atlantic Stock)	*Halichoerus grypus atlantica*	Gulf of Maine: tuna and Spiny dogfish. New England and Mid-Atlantic Bight: sand lance, gadids and flatfish, with seasonal variances. Cape Breton Island: Atlantic cod and white hake.	Common; most common in Jersey shores in the winter	Byron and Morgan 2016; Ampela 2009; Hammill et al. 2014; SCW 2022a
Harbor Seal (Western North Atlantic Stock)	*Phoca vitulina concolor*	Gulf of Main: tuna and spiny dogfish Squid and schooling fish Shores of Jersey: shellfish, squid, octopus and fish	Common; most common in Jersey shores in the winter	Reeves et al. 2022a; SCW 2022a
Harp Seal (Western North Atlantic Stock)	*Pagophilus groenlandicus*	Arctic cod, capelin, Atlantic cod	Possible	Stenson et al. 1997

Sources: See Reference column in the table.

Note:

[a] Uncommon: Assigned if the species is a rare visitor to the Project area and/or may or may not have primary prey to support foraging

[b] Possible: Assigned if the species if not a frequent visitor to the Project area and/or has some primary prey foraging

[c] Common: A frequent visitor or permanent resident that is known to forage near the Project area.

[d] Project area is limited to the “pre-clearance zone” as defined in Section 11.0 and extends approximately 1,000 meters (3.281 feet).

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11.0 MITIGATION MEASURES

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

The Project is anticipated to result in take by Level A injury and Level B acoustic harassment if maintenance crews are unable to shut down operations during a marine mammal sighting. Modeling and available data suggest the Project may result in Level A take of small numbers of bottlenose dolphin, gray seal, harbor seal, and harp seal and Level B take of fin whale, humpback whale, minke whale, Atlantic white-sided dolphin, bottlenose dolphin, harbor porpoise, common dolphin, Atlantic spotted dolphin, gray seal, harbor seal, and harp seal (see Table 6-4 and Table 7-1). Transco proposes to employ several mitigation measures in an effort to minimize the number of marine mammals exposed to Level A and Level B harassment from in-water sheet pile-driving activities.

11.1 Proposed Measures for Pile Installation

Transco plans to use a vibratory device to install sheet piles. Vibro-hammers are non-impulsive, continuous low-frequency noise sources because they continuously vibrate the sheet pile into the substrate until the desired depth is reached. If refusal is reached during sheet pile installation with the vibratory hammer, a hydraulic impact hammer will be used to attain an acceptable depth. Transco anticipates conducting pile installation activities in the months of June, July, and August. North Atlantic right whale densities are lowest during the summer and early fall months in the Project work areas (Section 3.3.4). Therefore, conducting pile installation activities during this time would reduce the likelihood of acoustic harassment of right whales.

Visual monitoring of the pre-clearance and shutdown zone(s) will be performed by qualified NOAA Fisheries-approved Protected Species Observers (PSOs). Because the worse-case Level B ZOI extends up to 13,594 meters (8.45 statute miles) (Table 6-1), it would not be practicable for Transco to monitor the entire zone for all species. Instead, the monitoring zones outlined in Table 11-1 are proposed for the Project.

Table 11-1. Pre-clearance and Shutdown Zones

	Pre-clearance Zone (meters)	**Shutdown Zone** (meters)
North Atlantic Right Whales	Any Distance	Any Distance
Fin, Humpback, and Minke Whales	950	60
All Other Marine Mammals	100	60

Monitoring of the pre-clearance zone would begin 30 minutes prior to the start of sheet pile installation for the day and continue throughout the time required to complete pile installation or removal. If a marine mammal is observed within the pre-clearance zone, start-up would be delayed until the observed marine mammal leaves the zone or is not re-sighted within the zone for 30 minutes. A 30-minute post-work survey of the clearance zone would be conducted after any cessation of pile installation (i.e., operation of vibratory or impact hammer equipment). Sheet pile installation may continue at any point during the 30-minute post-work survey window without the need for an additional 30-minute pre-clearance survey period. If maintenance activities resume after a break in monitoring, observers would begin another 30-minute pre-clearance survey before sheet pile installation can begin. In the unlikely event that a marine mammal comes within close proximately to the pile-driving sound source during any phase of the Project, Transco would implement the shutdown zones outlined in Table 11-1. For North Atlantic right whales, shutdown would occur when a right whale is observed by PSOs at any distance, and a shutdown zone of 100 meters (328 feet) would be implemented for all other ESA-listed species. The 950-meter (3,117-foot) zone is proposed as a protective measure to avoid takes by Level A harassment, and potentially some takes by Level B harassment. The 60-meter (197-foot) zone was calculated based on the largest distance to the Level A harassment threshold for high-frequency cetaceans based on the peak sound pressure metric (8 meters [26 feet]) (Table 6-1) plus a 50-meter (164-foot) buffer zone, plus an additional buffer. However, if the sighting occurs before the pile has been driven to a sufficient depth to allow for pile stability, and conditions are such that the support structure would need to be removed (e.g., weather conditions are deteriorating), then for safety reasons the current pile would need to be driven to a sufficient depth to allow for stability and a shutdown would not be feasible until after that depth was reached. Additionally, if environmental conditions (e.g., heavy fog) prevent the observers from detecting animals within the clearance zone, activities would be delayed until sighting conditions improve. If the monitoring zone is obscured due to weather, PSOs on watch may continue to monitor the shutdown zone using alternative visual aids (i.e., thermal camera systems, mounted infrared camera). All in-water maintenance activities would be conducted during daylight hours, no earlier than 30 minutes after sunrise and no later than 30 minutes before sunset. If lighting conditions prevent the observer from effectively monitoring the 950-meter (0.6-statute-mile) pre-clearance zone, work would not be allowed to start.

Other mitigation measures proposed for the Project are as follows:

- Ramp-up/soft-start procedures will provide additional protection to marine mammals by alerting them and giving them a chance to leave the area prior to the hammer operating continuously and/or at full capacity. During ramp-ups (impact pile driving), contractors will be required to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. Vibratory hammers will use a soft-start method consisting of short start/stops prior to full operation. Contractors will start the vibro-hammer for 30 seconds followed by a 30-second waiting period, conducted a total of three times. Ramps-ups/soft-starts will be implemented at the start of each day's pile driving and at any time following cessation of pile driving for a period of 30 minutes or longer.
- In-water work shall occur during the period when the predicted density of the North Atlantic right whales are lowest in the Action Area (i.e., summer and early fall months).

- Two active NOAA Fisheries Service-approved observers (i.e., PSOs) would be stationed within the pre-clearance zone on the maintenance barge during sheet pile installation. PSO requirements will include the following:
  - Independent PSOs (i.e., not work personnel) who have no other assigned tasks during monitoring periods will be used.
  - At least one PSO will have prior experience performing the duties of a PSO during maintenance activity.
  - Other PSOs may substitute education (degree in biological science or related field) or training for prior experience performing the duties of a PSO during maintenance activity pursuant to a NMFS-issued incidental take authorization.
  - A lead observer or monitoring coordinator must be designated to coordinate monitoring and log project and monitoring activity data. The lead observer must have prior experience performing the duties of a PSO during maintenance activities.
- Transco will have two active PSOs stationed at the best possible vantage points in the Project area to monitor during all pile-driving activities, and one during vibratory pile driving activities. If a PSO sights a marine mammal in the shutdown zone, the PSO must alert the “command” PSO to notify the equipment operator to shut down. If the “command” PSO does not respond, any PSO has the authority to notify the need for a shutdown. If the “command” PSO calls for a shutdown, the “command” PSO will let the contractor know when activities can re-commence. Additional PSOs may be employed during periods of low or obstructed visibility to ensure the entirety of the pre-clearance and shutdown zones are monitored.
- The PSOs would monitor the pre-clearance zone, with the observers monitoring 360 degrees around the barge.
- If marine mammals are observed, the sighting would be fully documented. If a marine mammal is observed within the shutdown zone, all in-water operations would cease until visual confirmation that the animal has left the zone, or the animal is not sighted for 30 minutes. If pile driving activities ceases for more than 30 minutes, a new 30-minute pre-clearance monitoring period will commence.
- Information recorded during each observation is presented in Section 11.4, below.

11.2 Transiting Vessels

A variety of vessels would be in the area throughout the duration of the Project. This activity is not considered a concern for harassment of marine mammals in the vicinity of the Action Area because of the high level of vessel activity associated with both commercial traffic (to and from the Port of New York and New Jersey) and recreational traffic that already occurs in the region. However, due to the critically endangered status of the North Atlantic right whale, vessel activity and speed regulations are already in place along the East Coast. As mentioned in Section 3.3.4.3 (North Atlantic Right Whale Distribution), a portion of the Action Area is located within an SMA associated with the Port of New York and New Jersey between November and April. However, the Project is not anticipated to be operating during this time; therefore, these seasonal restrictions do not apply.

At all times and locations, vessel operators and crews would use the following protocols:

- Maintain a vigilant watch for right whales and slow down or stop the vessel to avoid striking the animal(s).
- Conform to the regulations prohibiting the approach of right whales closer than 457.2 meters (1,500 feet) (50 CFR 224.103(c)).
- Adhere to rules for Dynamic Management Areas if they are designated by NOAA Fisheries Service in the Action Area during the Project.

11.3 Maintenance Activities

All in-water maintenance activities would comply with federal regulations to control the discharge of operational waste such as bilge and ballast waters, trash and debris, and sanitary and domestic waste that could be generated from all vessels associated with the Project. All vessels associated with the Project are expected to comply with USCG requirements for the prevention and control of oil and fuel spills (MARPOL, Annex V, Pub. L. 100−220 [101 Stat. 1458]).

- For in-water maintenance activities (other than pile driving—e.g., rock placement), if a marine mammal comes within 10 meters (33 feet), Transco will cease operations until the marine mammal has left the 10-meter (33-foot) zone.
- A Spill Plan for Oil and Hazardous Materials will be developed for the Project.
- No petroleum products, fresh cement, lime or concrete, chemicals, or other toxic or deleterious materials shall be allowed to enter surface waters.
- Equipment that enters the surface water shall be maintained to prevent any visible sheen from petroleum products appearing on the water.
- There shall be no discharge of oil, fuels, or chemicals to surface water or onto land where there is a potential for reentry into surface waters.
- No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground- or surface waters.
- The contractor shall regularly check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc., for leaks and shall maintain and store materials properly to prevent spills.
- Projects and associated activities shall be designed so potential impacts on species and habitat are avoided and minimized to the extent practicable.

11.4 Reporting Requirements

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of pile-driving activities. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report shall be considered final. The marine mammal monitoring report will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the report will include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Maintenance activities occurring during each daily observation period, including: (a) How many and what type of piles were driven or removed and the method (i.e., impact or vibratory); and (b) the total duration of time for each pile (vibratory driving) number of strikes for each pile (impact driving);
- Description of any marine mammal behavior patterns during observation, including direction of travel and estimated time spent within Level A and Level B harassment zones while pile driving is occurring;
- Number of individuals of each species (differentiated by month as appropriate) detected within the monitoring zone, and estimates of number of marine mammals taken, by species (total takes will be estimated by extrapolating Level A and B harassment takes to the proportion of the zones that are not observable by the PSOs);
- Detailed information about any implementation of any mitigation trigger (e.g., shutdowns and delays), a description of specified actions that ensued and resulting behavior of the animal, if any; and
- PSO locations during marine mammal monitoring.

Environmental conditions during monitoring periods (at the beginning and end of PSO shifts 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.

PSOs will record all incidents of marine mammal occurrence on data sheets, regardless of distance from activity, and will document any behavioral reactions in concert with distance from piles being driven or removed. Specifically, PSOs will record the following:

- Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting;
- Time of sighting;
- Identification of the animal(s) (e.g., genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;
- Distance and location of each observed marine mammal relative to the pile being driven for each sighting;
- Estimated number of animals (minimum/maximum/best estimate);
- Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.); and
- Description of any marine mammal behavioral observations (e.g., observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (e.g., no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching).

If personnel involved in the maintenance activities discover an injured or dead marine mammal, Transco will report the incident to the Office of Protected Resources (PR.ITP.MonitoringReports@noaa.gov) and to the Greater Atlantic Region New England/Mid-Atlantic Stranding Coordinator (866-755-6622) as soon as feasible. If the death or injury was clearly caused by the specified activity, Transco will immediately cease the specified activities until the NMFS Office of Protected Resources is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate. Transco will not resume their activities until notified by NMFS. The report will include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

12.0 ARCTIC PLAN OF COOPERATION

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. A plan must include the following:

(i) A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

(ii) A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

(iii) A description of what measures the applicant has taken an/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

(iv) What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting activity, to resolve conflicts and to notify the communities of any changes in the operation.

This section is not applicable. The Project would take place in the coastal waters of Raritan Bay, Lower New York Bay, and Atlantic Ocean in the states of New York and New Jersey, within the larger New York Bight region, and no activities would take place in or near a traditional Arctic subsistence hunting area. No subsistence uses of marine mammals would be impacted by this action.

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13.0 MONITORING AND REPORTING PLANS

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

13.1 Monitoring Plan

Transco has developed the following Marine Mammal Monitoring Plan to outline the mitigation measures to prevent Level A harassment of marine mammals from sheet pile installation activities associated with the Project:

- NOAA Fisheries Service-approved observers (i.e., PSOs) would be stationed on the maintenance barge.
- The PSOs would monitor the NOAA-approved pre-clearance zone and would clear the zone prior to the start of any pile installation activities as described in Section 11.1.
- Observers would monitor 360 degrees around the sound source.
- During all sheet pile installation activities, observers would use binoculars and/or naked eye to continuously search for marine mammals.
- If marine mammals are observed within the pre-clearance zones, the sighting would be recorded, including the following information, when possible:
  - Bearing to animal relative to observer position (using compass)
  - Overall numbers of individuals observed
  - Frequency of observations
  - Estimated location within the pre-clearance zone (i.e., distance from the source)
  - Type of maintenance activity (i.e., impact, vibratory [pre-, active-, post-operation])
  - Behavioral state, possible reactions of the animals(s) to the sheet pile driving (if any), and any behaviors the animals(s) may display while in the pre-clearance zone
  - Observers would make note of the sea state using the Beaufort scale, weather conditions during observations (percent cloud cover, visibility, percent glare), and tidal state

13.2 Reporting Plan

Transco would provide NOAA Fisheries Service with a draft monitoring report within 90 days of the conclusion of monitoring. This report would include the following:

- A summary of the activity and monitoring plan (e.g., dates, times, locations)
- A summary of mitigation implementation
- Monitoring results and a summary that addresses the goals of the monitoring plan, including (but not limited to):
    - Environmental conditions when observations were made:
        - Water conditions (i.e., Beaufort sea state, tidal state)
        - Weather conditions (i.e., percent cloud cover, visibility, percent glare)
- Observation-specific data:
    - Date and time observations were initiated and terminated
- Date, time, number, species, and any other relevant data regarding marine mammals observed (for pre-activity, during activity, and post-activity observations)
- Description of the observed marine mammal behaviors (both the presence and absence of activities)
- Assessment of implementation and effectiveness of prescribed mitigation and monitoring measures
- If any type of take not permitted by the IHA is believed to have occurred, activities would immediately cease and the incident would be reported to NOAA Fisheries Service.
- If an injured or dead marine mammal is discovered, cause of death or injury is unclear, and death is relatively recent (i.e., the animal is in a less than moderate state of decomposition), the observation would be immediately reported to the Regional Stranding Coordinator.
- If an injured or dead marine mammal is discovered in which cause of death is clear and unrelated to the Project or death is not recent (i.e., animal is in a moderate to advanced state of decomposition), the observation would be reported to the Regional Stranding Coordinator within 24 hours.

If comments are received from the NOAA Fisheries Service on the draft report, a final report will be submitted to the NOAA Fisheries Service within 30 days after all comments are received. If no comments are received from the NOAA Fisheries Service, the report submitted will be considered the final report.

14.0 COORDINATING RESEARCH TO REDUCE AND EVALUATE INCIDENTAL TAKE

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

To encourage learning and coordinate research opportunities related to the incidental taking of marine mammals, any data gathered during in-water maintenance activities would be made available to NOAA Fisheries Service, researchers, and other interested parties. Also, if any ESA-listed North Atlantic right whales are observed at any time while observers are present, or during in-water maintenance activities, sightings would be reported to the NOAA Fisheries Service NEFSC North Atlantic right whale sighting advisory system to aid in alerting other boaters (especially commercial shipping vessels) in the area of the animals' presence. This would also help to increase knowledge of the locations that these animals frequent along the East Coast during their winter migration.

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ATTACHMENT A WORK VESSEL/BARGE POSITIONING AND ROCK PLACEMENT MONITORING SURVEY EQUIPMENT

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WORK VESSEL/BARGE POSITIONING AND ROCK PLACEMENT MONITORING SURVEY EQUIPMENT

Item	Description	Peak Noise Level in Decibels	Beam Angle / Width	Frequency
Sources Below 180 kHz				
MIDI BEACON	APPLIED ACOUSTICS 1000 SERIES	200 dB	(+/-) 45 DEGREES	17 - 31 kHZ / 26-33.5 kHZ
USBL/LBL TRANSPONDER	SONARDYNE TYPE 8300-311	187 - 202 dB	OMNI-DIRECTIONAL	19 - 34 kHZ
USBL/LBL TRANSPONDER	SONARDYNE ROVNAV 6	187 - 202 dB	OMNI-DIRECTIONAL	20 - 34 kHZ
SCANNING SONAR	KONGSBERG 1171 SONAR	minus 20 to 100 db	360 DEGREES	Transmit 0-2500 us / Receive 200 KHZ Max
SOUND VELOCITY PROFILER	Teledyne Digibar Pro	n/a	n/a	11kHz
Kongsberg Hipap	USBL System	TD Dependent, 180 - 203 db	OMNI-DIRECTIONAL	20-30 kHz (MF)
Sources Above 180 kHz				
MULTI-FREQUENCY IMAGING SONAR	IMAGENEX 881A	unavailable at this time	310 KHZ 4x40 / 675 KHZ 1.8x20 / 1MHZ .9x10	310 kHZ / 675 kHZ / 1 MHZ
SCANNING SONAR	KONGSBERG 1071 SONAR	minus 20 to 100 db	360 DEGREES	675 kHZ
NORBIT DREDGE MONITORING	NORBIT ISTX360 RTK	n/a	5 - 210 DEGREES	400 kHZ
NORBIT DREDGE MONITORING	NORBIT WINGHEAD I80S	n/a	5 - 210 DEGREES	400 kHZ
SCANNING SONAR	TRITECH SUPER SEAKING DST	210dB re 1µPa a 1m	20 - 40 DEGREES	325 kHZ - 650 kHZ
Scanning sonar	Tritech Micron DST	n/a	35° vertical, 3° horizontal	CHIRP centered on 700kHz
Kongsberg M3	Multibeam - imaging Sonar	n/a	Varies	500 kHz
SEABAT MULTIBEAM	SEABAT T50-R	n/a	0.5 to 1	190 kHZ - 420 kHZ

WORK VESSEL/BARGE POSITIONING AND ROCK PLACEMENT MONITORING SURVEY EQUIPMENT

Item	Description	Peak Noise Level in Decibels	Beam Angle / Width	Frequency
Other				
SOUND VELOCITY PROFILER and CTD (Single Beam echo-sounder, Multi-Beam echo-sounder, USBL, Imaging sonar)	Valeport SWIFT SVP	n/a	n/a	n/a

Notes: n/a - not available; KHZ - kilohertz; dB = decibels; µPa = micropascals; m = meter; Max = maximum

ATTACHMENT B NMFS SPREADSHEET RESULTS FOR DISTANCE TO LEVEL A AND B THRESHOLDS

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E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

(green)	**Action Proponent Provided Information**
(pink)	**NMFS Provided Information (Technical Guidance)**
(blue)	**Resultant Isopleth**

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	2022 New York Bay Lateral Pipeline Maintenance Program
PROJECT/SOURCE INFORMATION	Underwater - One vibratory hammer operating for 15 minutes then one impact hammer operating for 2 hours.

Please include any assumptions

PROJECT CONTACT	

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)[¥]	2	Default

[¥] Broadband: 95% frequency contour percentile (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 73), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: METHOD E.1-1 is PREFERRED method when SEL-based source levels are available (because pulse duration is not required). Only use method E.1-2 if SEL-based source levels are not available.

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT) **PREFERRED METHOD (pulse duration not needed)**

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**208.0**	**Unweighted SEL_{cum} including one vibro-hammer @ measured distance**	**208.1**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,\ single\ strike}$) specified at "x" meters (Cell B32)	170
Number of strikes per pile	6240
Number of piles per day	1
Transmission loss coefficient	15
Distance of single strike SEL_{ss} ($L_{E,p,\ single\ strike}$) measurement (meters)	20

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)		196.0
Distance of $L_{p,0\text{-}pk}$ measurement (meters)+		20
$L_{p,0\text{-}pk}$ Source level		215.5

RMS - added for behaviour

	Impulsive	Non-Impulsive
$L_{p,0\text{-}rms}$ specified at "x" meters (Cell G29)	180.0	162.5
Distance of $L_{p,0\text{-}rms}$ measurement (meters)+	20	20

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	Behaviour (RMS) - Impulsive	Behaviour (RMS) - Non-Impulsive
SEL_{cum} Threshold	183	185	155	185	203	160	120
PTS Isopleth to threshold (meters)	**935.8**	**33.3**	**1,114.7**	**500.8**	**36.5**	**430.9**	**13,593.6**
PK Threshold	219	230	202	218	232		
PTS PK Isopleth to threshold (meters)	**NA**	**NA**	**8.0**	**NA**	**NA**		
PTS Isopleth to threshold (feet)	**3,070.3**	**109.2**	**3,657.2**	**1,643.1**	**119.6**	**1,413.7**	**44,598.3**
PTS PK Isopleth to threshold (feet)	**NA**	**NA**	**0.005**	**NA**	**NA**		

"NA": PK source level is ≤ to the threshold for that marine mammal hearing group.

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.2: 2020

KEY

(green)	**Action Proponent Provided Information**
(pink)	**NMFS Provided Information (Technical Guidance)**
(blue)	**Resultant Isopleth**

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	2022 New York Bay Lateral Pipeline Maintenance Program
PROJECT/SOURCE INFORMATION	In air - One vibratory hammer operating.

Please include any assumptions

PROJECT CONTACT	

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)[¥]	0	N/A for in-air

[¥] Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	98	dB re 20 uPa
Number of piles within 24-h period		In-air threshold is based on rms, not SEL. This information is not required.
Duration to drive a single pile (minutes)		
Duration of Sound Production within 24-h period (seconds)	0	
10 Log (duration of sound production)	0.00	
Transmission loss coefficient	20	
Distance of sound pressure level (L_{rms}) measurement (meters)	15	

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	**Harbor Seals**	**All other pinnipeds**			
RMS Threshold	100	90			
Isopleth to threshold (meters)	**11.9**	**37.7**			
Isopleth to threshold (feet)	**39.1**	**123.6**			
Isopleth to threshold (miles)	**0.01**	**0.02**			

WEIGHTING FUNCTION CALCULATIONS - N/A for In-Air

Weighting Function Parameters	**Low-Frequency Cetaceans**	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid Pinnipeds**	**Otariid Pinnipeds**
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.2: 2020

KEY

(green)	**Action Proponent Provided Information**
(pink)	**NMFS Provided Information (Technical Guidance)**
(blue)	**Resultant Isopleth**

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	2022 New York Bay Lateral Pipeline Maintenance Program
PROJECT/SOURCE INFORMATION	In air - One impact hammer operating

Please include any assumptions

PROJECT CONTACT	

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	0	N/A for in-air

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	126.5	dB re 20 uPa
Number of piles within 24-h period		In-air threshold is based on rms, not SEL. This information is not required.
Duration to drive a single pile (minutes)		
Duration of Sound Production within 24-h period (seconds)	0	
10 Log (duration of sound production)	0.00	
Transmission loss coefficient	20	
Distance of sound pressure level (L_{rms}) measurement (meters)	1	

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Harbor Seals	All other pinnipeds			
RMS Threshold	100	90			
Isopleth to threshold (meters)	**21.2**	**67.0**			
Isopleth to threshold (feet)	**69.5**	**219.8**			
Isopleth to threshold (miles)	**0.01**	**0.04**			

WEIGHTING FUNCTION CALCULATIONS - N/A for In-Air

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

NOTE: If user decided to override these Adjustment values, they need to make sure to download another copy to ensure the built-in calculations function properly.

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

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