E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XF594]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Sparrows Point Container Terminal Project in Baltimore County, Maryland

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorizations; request for comments on proposed authorizations and possible renewal.

SUMMARY: NMFS has received a request from Tradepoint TiL Terminal, LLC (TTT) for authorization to take marine mammals incidental to the Sparrows Point Container Terminal (SPCT) Project in Baltimore, MD. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue two consecutive incidental harassment authorizations (IHAs) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on possible one-time, 1-year renewals that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Comments should be addressed to the Permits and Conservation Division, Office of Protected Resources, NMFS and should be submitted via email to

ITP.Hotchkin@noaa.gov. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed below.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act* without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Cara Hotchkin, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. Section 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) directs the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking; other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to as "mitigation"); and requirements pertaining to the monitoring and reporting of the takings. The definitions of all applicable MMPA statutory terms used above are included in the relevant sections below (*see also* 16 U.S.C. 1362; 50 CFR 216.3, 216.103).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NAO 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHAs qualifies to be categorically excluded from further NEPA review.

Fixing America's Surface Transportation Act

This project is published on the Federal Permitting Dashboard as a Department of Transportation project. Requirements for tracking on the Federal Permitting Dashboard include a suite of provisions designed to expedite the environmental review for covered infrastructure projects, including enhanced interagency coordination as well as milestone tracking. The SPCT project page, including milestones and schedules related to the environmental review and permitting for the project can be found at: *https://www.permits.performance.gov/permitting-project/fast-41-covered-projects/sparrows-point-container-terminal.*

Summary of Request

On December 23, 2025, NMFS received a request from TTT for issuance of two consecutive IHAs to take marine mammals incidental to construction activities necessary for the SPCT project in Baltimore County, MD. Following NMFS' review of the application, TTT submitted a revised version on February 4, 2026. The application was deemed adequate and complete on March 26, 2026. TTT's request is for take of Tamanend's bottlenose dolphins (*Tursiops erebennus*), by Level B harassment only. Neither TTT nor NMFS expect serious injury or mortality to result from this activity and, therefore, IHAs are appropriate.

Description of Proposed Activity

Overview

Tradepoint TiL Terminals, LLC (a joint venture between Tradepoint Atlantic and Terminal Investment Limited) proposes to construct a new terminal on the east side of the Coke Point peninsula on the north side of the lower Patapsco River, in Baltimore County, Maryland, to address the needs for increasing container capacity at the Port of Baltimore. The completed facility will consist of an approximately 3,000-foot (ft) (914 meter (m)) wharf with cranes, a container yard, gate complex, Intermodal/Rail Yard, and various support structures. To provide container vessel access to the wharf, the project also includes dredging and placement of an anticipated 4.2 million cubic yards (3.2 million cubic meters) of dredged material for the required widening and deepening of the existing Sparrows Point access channel and turning basin. Construction activities will consist of dredging and pile driving (vibratory and impact) of steel pipe piles with diameters ranging from 30 inches (in) (76 centimeters (cm)) to 48 in (120 cm).

Dates and Duration

Construction is proposed between June 1, 2026, and May 31, 2028; thus, TTT has requested issuance of two sequential IHAs that would be effective from June 1, 2026, through May 31, 2027, and from June 1, 2027, through May 31, 2028, respectively. However, project delays may occur due to a number of factors, including availability of equipment and/or materials, weather-related delays, equipment maintenance and/or repair, and other contingencies.

A total of approximately 760 piles would be installed during Year 1 (454 30-in; 228 36-in; and 77 48-in), requiring approximately 253 in-water workdays. Approximately 760 piles would be installed during Year 2 (454 30-in; 228 36-in; and 77 48-in), requiring approximately 253 in-water workdays. All work would generally be limited to daylight construction; no pile installation would be initiated during nighttime hours, though driving may continue until a pile started in daylight is complete.

Specific Geographic Region

The proposed project will occur within portions of the Patapsco River and Chesapeake Bay near the Port of Baltimore (figure 1). The Patapsco River is approximately 1 mile (1.6 kilometers (km)) wide (between Hawkins Point and Sollers Point). The Sparrows Point Channel, which is adjacent to the marginal wharf, connects to the Brewerton Channel within the centerline of the river, which is a federally maintained channel with a width of 700 ft (213 m) and a depth of -50 ft (-15 m) mean lower low water.

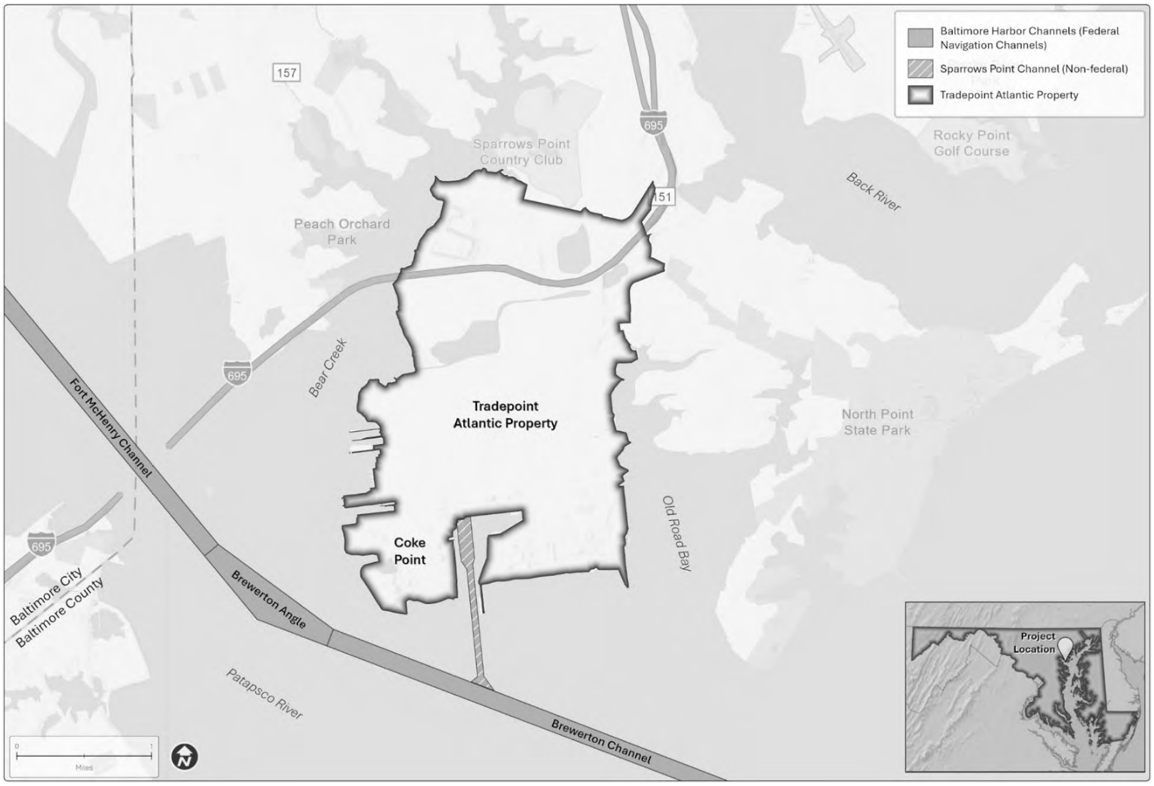

Figure 1 – Map of the SPCT Project Vicinity

Detailed Description of the Specified Activity

The project involves in-water pile driving and dredging within the Patapsco River where the northern range of Tamanend's bottlenose dolphins overlap the project area. The marine structure design includes an open-type (hollow steel pipe pile-supported) marginal wharf structure approximately 3,000 ft (914 m) long by 158 ft (48 m) wide, consisting of a pile-supported relieving platform integral to the wharf. The wharf structure is referenced as rows A through H for width, and columns (bents) 1 through 149 for length (see appendix A of TTT's IHA application for more details). Six modeling locations (S1 through S6) were designated along the wharf from north to south. Table 1 shows proposed pile quantities, sizes, and installation location on the wharf structure.

Table 1 - Pile Quantities, Sizes, and Rows for Years 1 and 2

Wharf Location (rows)	Year 1			Year 2		
	30-in	*36-in*	*48-in*	*30-in*	*36-in*	*48-in*
G/H	375	0	0	76	0	0
D/E/F	152	150	0	154	151	0
A/B/C	51	51	51	102	102	102

The wharf would be constructed in segments moving from north to south along the shoreline of the turning basin. The general sequence of construction for each constructed segment of the wharf is as follows:

- The existing slag material would be removed via excavation from land to establish the revetment slope beneath the marginal wharf.
- The first set of piles for the marginal wharf (Rows D, E, F, G, and H) would be installed after the slag removal has established the revetment slope beneath the marginal wharf.
- After the first phase of the pile-supported wharf is completed, the waterside dredging adjacent to the wharf would be completed to establish the remaining depth of the revetment slope.

- The second set of open wharf foundation piles (Rows A, B, and C) would be installed after the completion of underwater excavation and dredging that would be conducted to establish the revetment slope.
- Slope protection (stone and concrete) would be installed after the installation of the open wharf foundation piles.

Pile driving would start at the north end of the marginal wharf (Site S1, bent 1) and continue southward towards S6 (bent 149). Piles would be spaced approximately every 20 ft (6.1 m) along the wharf's length and every 25 ft (7.6 m) along its width. Each pile would be driven first by vibratory pile driving and then by impact pile driving. The pile driving would be conducted for approximately 12 hours per day, 7 days a week. On average, three piles would be driven each day.

Pile driving operations would consist of three separate "setups". Each setup consists of two crews and hammers (one vibratory and one impact). Operations would begin with the first crew using a vibratory hammer to initially install the pipe pile to resistance. Then a second pile driving crew would utilize a diesel impact hammer to drive the pile to refusal so that it reaches target design elevation. Up to six total hammers (three impact and three vibratory) may be functioning on site on a given day.

Concurrent driving is anticipated at up to three locations on any given day, with any combination of hammers. The most impactful concurrent scenarios include: C1 – three impact hammers; C2 – three vibratory hammers; and C3 – two impact hammers and one vibratory hammer.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 2 lists all species or stocks for which take is expected and proposed to be authorized for this activity and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is anticipated or proposed to be authorized here, PBR and annual mortality and serious injury (M/SI) from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Atlantic SARs. All values presented in table 2 are the most recent available at the time of publication (including from the draft 2024 SARs) and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*.

Table 2 -- Species, Stocks, and the Status of Marine Mammals with Estimated Take from the Specified Activities

Common name	Scientific name	MMPA Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance N_{best}, (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Odontoceti (toothed whales, dolphins, and porpoises)						
Family *Delphinidae*						
Bottlenose Dolphin[4]	*Tursiops erebennus*	Northern Migratory Coastal	-, D, Y	6,639 (0.41, 4,759, 2016)	48	12.2 - 21.5
		Southern Migratory Coastal	-, D, Y	3,751 (0.6, 2,353, 2016)	24	0 - 18.3

1- Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/*).
2 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
3- NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region*. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance.
4- Coastal bottlenose dolphins along the Eastern U.S. have been genetically identified as a separate species (Tamanend's bottlenose dolphin (*T. erebennus*)) (Costa *et al*. 2022); however, this is not yet reflected in the SARs. Here we present the most recent SAR for the two relevant stocks, both of which are now considered *T. erebennus*.

As indicated above, the only species (with two managed stocks) in table 2 which temporally and spatially co-occurs with the activity to the degree that take is reasonably likely to occur is the bottlenose dolphin. While fin whales (*Balaenoptera physalus*), minke whales (*Balaenoptera acutorostrata*), humpback whales (*Megaptera novaeangliae*), sei whales (*Balaenoptera borealis*), harbor porpoise (*Phocoena phocoena*), and harbor (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) have been documented in Lower Chesapeake Bay or the waters of coastal Maryland, the temporal and/or spatial occurrence of these species is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. All of these species are considered extralimital in the waters of the upper bay and the Patapsco River. Additionally, single individuals of Risso's dolphin (*Grampus griseus*) have been found stranded in the Baltimore area; however, these species are also considered extralimital.

Bottlenose dolphins are expected to occur on a regular basis in the waters of the upper Chesapeake Bay and Patapsco River. Atlantic coastal bottlenose dolphins have recently been recategorized as Tamanend's bottlenose dolphins (*Tursiops erebennus*) by Costa *et al*. (2022). Tamanend's bottlenose dolphins within the area of the SPCT project likely belong to either the Western North Atlantic Northern Migratory Coastal Stock (NMCS) or the Western North Atlantic Southern Migratory Coastal Stock (SMCS).

Tamanend's bottlenose dolphins are seasonally transient in the lower Patapsco River (Rodriguez et *al*., 2021). They have a higher likelihood of occurrence along the middle and lower Chesapeake Bay, outside the area of the project area. Tamanend's bottlenose dolphins primarily use the lower Chesapeake Bay in summer with most usage near the James and Elizabeth Rivers in Virginia. They are seen annually in Virginia from April through November with approximately 65 strandings occurring each year (Barco and Swingle, 2014; Engelhaupt *et al*., 2016). Dolphins are more commonly sighted in areas far south of Baltimore Harbor including the mouths of the Potomac and Rappahannock Rivers (Bay Journal, 2021).

Sighting data within the proximity of the project area near the mouth of the Patapsco River and within the entire Chesapeake Bay, are based on 'citizen science', where reports are logged via the Dolphin Watch app (*chesapeakedolphinwatch.org*) supported by University of Maryland, Center for Environmental Science. These data are available from 2017 through 2022. Logged sightings are less frequent farther north in the Patapsco River and Baltimore Harbor areas and typically occur in the summer. Recent reported observations near the immediate area of the project include a dolphin sighted using waters in the Inner Harbor (14.5 km (9 miles) north of the Key Bridge; ABC Baltimore 2023) and a dolphin sighted using waters at the mouth of the Patapsco River (approximately 8 km (5 miles) south of the Key Bridge; The Washington Post, 2018).

Rodriguez et al. (2021) synthesizes 3 consecutive years (2017, 2018, and 2019) of data from the DolphinWatch app. Overall, the highest dolphin sightings are correlated with water temperatures between 24 and 30 degrees Celsius (75.2 to 86 degrees Fahrenheit). Salinity and tidal state also influence the spatiotemporal patterns of bottlenose dolphins. Dolphins were sighted most in the summer. The highest number of documented dolphin sightings from these data was in July of each year, when water temperatures are high and provide nursery habitat for dolphin prey fish species (Gannon and Waples, 2004). During September and October, dolphins were primarily sighted in the lower and southern middle portions of the Chesapeake Bay while during the summer, dolphins occurred in the upper, middle, and lower portions of the bay. No dolphins were sighted in the upper bay during September and October of 2018. Considering data synthesized in this report and global sea temperature data for the Upper Chesapeake Bay, it is expected that bottlenose dolphins would most likely be present within the vicinity of the SPCT project between June 1 and September 30 of any given year. Reduced presence is possible in spring and fall when water temperatures are above 20 degrees Celsius, and no dolphins are expected to be present in the project location during winter months.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007; 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from composite audiograms, previous analyses in NMFS (2018), and/or data from Southall *et al*. (2007) and Southall *et al.* (2019). We note that the names of two hearing groups and the generalized hearing ranges of all marine mammal hearing groups have been recently updated (NMFS, 2024) as reflected below in table 3. Tamanend's bottlenose dolphins are considered high-frequency (HF) cetaceans.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2024)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36 kHz
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
Very High-frequency (VHF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	200 Hz to 165 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	40 Hz to 90 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 68 kHz

* Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on approximately 65 dB threshold from composite audiogram, previous analysis in NMFS (2018), and/or data from Southall *et al.* (2007) and Southall *et al.* (2019). Additionally, animals are able to detect very loud sounds above and below that "generalized" hearing range.

For more detail concerning these groups and associated frequency ranges, please see NMFS (2024) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The **Estimated Take of Marine Mammals** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take of Marine Mammals** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Acoustic effects on marine mammals during the specified activity are expected to potentially occur from vibratory and impact pile driving. The effects of underwater noise from TTT's proposed activities have the potential to result in Level B harassment of marine mammals in the action area.

The proposed activities would result in the placement of 831 steel pipe piles with diameters of 30-, 36-, and 48-in in year 1 and 686 piles in year 2 (see table 1 for details). There are a variety of types and degrees of effects on marine mammals, prey species, and habitat that could occur as a result of the SPCT project. Below we provide a brief description of the types of sound sources that would be generated by the project, the general impacts from these types of activities, and an analysis of the anticipated impacts on marine mammals from the project, with consideration of the proposed mitigation measures.

Description of Sound Sources for the Specified Activities

Activities associated with the project that have the potential to incidentally take marine mammals though exposure to sound would include vibratory and impact pile driving during the construction of the wharf.

Impact hammers typically operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is impulsive, characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the substrate. Vibratory hammers typically produce less sound (*i.e.*, lower levels) than impact hammers. Peak sound pressure levels (SPLs) may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.*, 2009; California Department of Transportation (CALTRANS), 2015, 2020). Sounds produced by vibratory hammers are non-impulsive; compared to sounds produced by impact hammers, the rise time is slower, reducing the probability and severity of injury, and the sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.*, 2005).

The likely or possible impacts of TTT's proposed activities on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Potential Effects of Underwater Sound on Marine Mammals

The introduction of anthropogenic noise into the aquatic environment from impact and vibratory pile driving is the primary means by which marine mammals may be harassed from TTT's specified activity. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life from none or minor to potentially severe responses depending on received levels, duration of exposure, behavioral context, and various other factors. Broadly, underwater sound from active acoustic sources, such as those in the SPCT project, can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking

(Richardson *et al.*, 1995; Gordon *et al.*, 2003; Nowacek *et al.*, 2007; Southall *et al.*, 2007; Götz *et al.*, 2009).

We describe the more severe effects of certain non-auditory physical or physiological effects only briefly as we do not expect that use of impact driving is reasonably likely to result in such effects (see below for further discussion). Potential effects from impulsive sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.*, 1973). Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g*., change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.*, 2006; Southall *et al*., 2007; Zimmer and Tyack, 2007; Tal *et al*., 2015). The specified activities considered here do not involve the use of devices such as explosives or mid-frequency tactical sonar that are associated with these types of effects.

In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.*, 2007, 2019). Exposure to anthropogenic noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.*, avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). It can also lead to non-observable physiological responses, such an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions, such as communication and predator and prey detection.

The degree of effect of an acoustic exposure on marine mammals is dependent on several factors, including, but not limited to, sound type (*e.g.*, impulsive vs. non-impulsive), signal characteristics, the species, age and sex class (*e.g.*, adult male vs. mom with calf), duration of exposure, the distance between the noise source and the animal, received levels, behavioral state at time of exposure, and previous history with exposure (Wartzok *et al.*, 2004; Southall *et al.*, 2007). In general, sudden, high-intensity sounds can cause hearing loss as can longer exposures to lower-intensity sounds. Moreover, any temporary or permanent loss of hearing, if it occurs at all, will occur almost exclusively for noise within an animal's hearing range. We describe below the specific manifestations of acoustic effects that may occur based on the activities proposed by TTT.

Richardson *et al*. (1995) described zones of increasing intensity of effect that might be expected to occur in relation to distance from a source and assuming that the signal is within an animal's hearing range. First (at the greatest distance) is the area within which the acoustic signal would be audible (potentially perceived) to the animal but not strong enough to elicit any overt behavioral or physiological response. The next zone (closer to the receiving animal) corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. The third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.*, when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

Below, we provide additional detail regarding potential impacts on marine mammals and their habitat from noise in general, starting with hearing impairment, as well as from the specific activities TTT plans to conduct, to the degree it is available.

Hearing Threshold Shifts. NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018, 2024). The amount of threshold shift is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018, 2024) there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.*, impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.*, spectral content), the hearing frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how animal uses sound within the frequency band of the signal; *e.g.*, Kastelein *et al.*, 2014), and the overlap between the animal and the source (*e.g.*, spatial, temporal, and spectral).

Auditory Injury (AUD INJ). NMFS (2024) defines AUD INJ as damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy (Houser 2021; Finneran 2024). AUD INJ may or may not result in a permanent threshold shift (PTS). PTS is subsequently defined as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024). PTS does not generally affect more than a limited frequency range, and an animal that has incurred PTS has some level of hearing loss at the relevant frequencies; typically animals with PTS or other AUD INJ are not functionally deaf (Au and Hastings, 2008; Finneran, 2016). Available data from humans and other terrestrial mammals indicate that a 40-dB threshold shift approximates AUD INJ onset (see Ward *et al.*, 1958, 1959; Ward, 1960; Kryter *et al.*, 1966; Miller, 1974; Ahroon *et al.*, 1996; Henderson *et al.*, 2008). AUD INJ levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (*Phoca vitulina*) (Kastak *et al.*, 2008), there are no empirical data measuring AUD INJ in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing AUD INJ are not typically pursued or authorized (NMFS, 2024).

Temporary Threshold Shift (TTS). TTS is a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024), and is not considered an AUD INJ. Based on data from marine mammal TTS measurements (see Southall *et al.*, 2007, 2019), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Finneran *et al.*, 2000, 2002; Schlundt *et al.*, 2000). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with the 24-hour cumulative sound exposure level (SEL_{24}) in an accelerating fashion: at low exposures with lower SEL_{24}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{24}, the growth curves become steeper and approach linear relationships with the sound exposure level (SEL).

Depending on the degree (elevation of threshold in dB), duration (*i.e.*, recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to more impactful (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animal is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more severe impacts. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.*, 2007), so we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Many studies have examined noise-induced hearing loss in marine mammals (see Finneran (2015) and Southall *et al.* (2019) for summaries). TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 2013). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS) (Finneran, 2015). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For cetaceans, published data on the onset of TTS are limited to captive bottlenose dolphin, beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*) (Southall *et al.*, 2019). For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), bearded seals (*Erignathus barbatus*) and California sea lions (*Zalophus californianus*) (Kastak *et al.*, 1999, 2007; Kastelein *et al.*, 2019b, 2019c, 2021, 2022a, 2022b; Reichmuth *et al.*, 2019; Sills *et al.*, 2020). TTS was not observed in spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to single airgun impulse sounds at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense or long-duration sound exposures. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of threshold shift at various post-exposure times.

The amount and onset of TTS depends on the exposure frequency. Sounds below the region of best sensitivity for a species or hearing group are less hazardous than those near the region of best sensitivity (Finneran and Schlundt, 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.*, a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.*, 2019a, 2019c). Note that in general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). In addition, TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same SEL (Mooney *et al.*, 2009; Finneran *et al.*, 2010; Kastelein *et al.*, 2014, 2015). This means that TTS predictions based on the total, SEL_{24} will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources. Nachtigall *et al.* (2018) describe measurements of hearing sensitivity of multiple odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale (*Pseudorca crassidens*)) when a relatively loud sound was preceded by a warning sound. These captive animals were shown to reduce hearing sensitivity when warned of an impending intense sound. Based on these experimental observations of captive animals, the authors suggest that wild animals may dampen their hearing during prolonged exposures or if conditioned to anticipate intense sounds. Another study showed that echolocating animals (including odontocetes) might have anatomical specializations that might allow for conditioned hearing reduction and filtering of low-frequency ambient noise, including increased stiffness and control of middle ear structures and placement of inner ear structures (Ketten *et al.*, 2021). Data available on noise-induced hearing loss for mysticetes are currently lacking (NMFS, 2024). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species.

Relationships between TTS and AUD INJ thresholds have not been studied in marine mammals, and there are no measured PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals.

AUD INJ typically occurs at exposure levels at least several dB above that inducing mild TTS (*e.g.*, a 40-dB threshold shift approximates AUD INJ onset (Kryter *et al.*, 1966; Miller, 1974), while a 6-dB threshold shift approximates TTS onset (Southall *et al.*, 2007, 2019). Based on data from terrestrial mammals, a precautionary assumption is that the AUD INJ thresholds for impulsive sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and AUD INJ cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.*, 2007, 2019). Given the higher level of sound or longer exposure duration necessary to cause AUD INJ as compared with TTS, it is considerably less likely that AUD INJ could occur.

Behavioral Effects. Exposure to noise also has the potential to behaviorally disturb marine mammals to a level that rises to the definition of harassment under the MMPA. Generally speaking, NMFS considers a behavioral disturbance that rises to the level of harassment under the MMPA a non-minor response – in other words, not every response qualifies as behavioral disturbance, and for responses that do, those of a higher level, or accrued across a longer duration, have the potential to affect foraging, reproduction, or survival. Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses may include changing durations of surfacing and dives, changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle response or aggressive behavior (such as tail/fin slapping or jaw clapping); and avoidance of areas where sound sources are located. In addition, pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.*, 1995; Wartzok *et al.*, 2004; Southall *et al.*, 2007, 2019; Weilgart, 2007; Archer *et al.*, 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.*, 2012), and can vary depending on characteristics associated with the sound source (*e.g.*, whether it is moving or stationary, number of sources, distance from the source). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see appendices B and C of Southall *et al.* (2007) and Gomez *et al.* (2016) for reviews of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.*, 2004). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a “progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,” rather than as, more generally, moderation in response to human disturbance (Bejder *et al.*, 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure.

As noted above, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.*, 1995; Wartzok *et al.*, 2004; National Research Council (NRC), 2005). Controlled experiments with captive marine mammals have shown pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.*, 1997; Finneran *et al.*, 2003). Observed responses of wild marine mammals to loud pulsed sound sources (*e.g.*, seismic airguns) have been varied but often consist of avoidance behavior or other behavioral changes (Richardson *et al.*, 1995; Morton and Symonds, 2002; Nowacek *et al.*, 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal (*e.g.*, Erbe *et al.*, 2019). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. If a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g*., Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Avoidance and displacement – Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g*., Frankel and Clark, 2000; Costa *et al.*, 2003; Ng and Leung, 2003; Nowacek *et al.*, 2004; Goldbogen *et al.*, 2013a, 2013b; Blair *et al.*, 2016). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g*., foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.*, bubble nets or sediment plumes), or changes in dive behavior. Acoustic and movement bio-logging tools also have been used in some cases to infer responses to anthropogenic noise. For example, Blair *et al*. (2015) reported significant effects on humpback whale (*Megaptera novaeangliae*) foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship nose. In addition, Wisniewska *et al.* (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.*, Croll *et al.*, 2001; Nowacek *et al.*, 2004; Madsen *et al.*, 2006; Yazvenko *et al.*, 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Respiration rates vary naturally with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.*, Kastelein *et al.*, 2001; 2005; 2006; Gailey *et al.*, 2007). For example, harbor porpoise respiration rates increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB (referenced to 1 micropascal (re 1 μPa); SEL of a single strike (SEL_{ss}): 127 dB re 1 μPa^2-s) (Kastelein *et al.*, 2013).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.*, 1995). For example, gray whales (*Eschrictius robustus*) are known to change direction – deflecting from customary migratory paths – in order to avoid noise from seismic surveys (Malme *et al.*, 1984). Harbor porpoises, Atlantic white-sided dolphins (*Lagenorhynchus actusus*), and minke whales have demonstrated avoidance in response to vessels during line transect surveys (Palka and Hammond, 2001). In addition, beluga whales in the St. Lawrence Estuary in Canada have been reported to increase levels of avoidance with increased boat presence by way of increased dive durations and swim speeds, decreased surfacing intervals, and by bunching together into groups (Blane and Jaakson, 1994). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.*, Bowles *et al.*, 1994; Goold, 1996; Stone *et al.*, 2000; Morton and Symonds, 2002; Gailey *et al.*, 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.*, Blackwell *et al.*, 2004; Bejder *et al.*, 2006; Teilmann *et al.*, 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.*, directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996; Bowers *et al.*, 2018). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (England *et al.*, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.*, when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fishes and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.*, Beauchamp and Livoreil, 1997; Fritz *et al.*, 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.*, decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.*, Harrington and Veitch, 1992; Daan *et al.*, 1996; Bradshaw *et al.*, 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a 5-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.*, 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.*, 2007). Note that there is a difference between multi-day substantive (*i.e.*, meaningful) behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Physiological stress responses. An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.*, Selye, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress, including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.*, Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.*, 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.*, Holberton *et al.*, 1996; Hood *et al.*, 1998; Jessop *et al.*, 2003; Krausman *et al.*, 2004; Lankford *et al.*, 2005; Ayres *et al.*, 2012; Yang *et al.*, 2022). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.*, 2002b) and, more rarely, studied in wild populations (*e.g.*, Romano *et al.*, 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. In addition, Lemos *et al.* (2022) observed a correlation between higher levels of fecal glucocorticoid metabolite concentrations (indicative of a stress response) and vessel traffic in gray whales. Yang *et al.* (2022) studied behavioral and physiological responses in captive bottlenose dolphins exposed to playbacks of "pile-driving-like" impulsive sounds, finding significant changes in cortisol and other physiological indicators but only minor behavioral changes. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2005), however distress is an unlikely result of this project based on observations of marine mammals during previous, similar construction projects.

Norman (2011) reviewed environmental and anthropogenic stressors for Cook Inlet beluga whales. Lyamin *et al.* (2011) determined that the heart rate of a beluga whale increases in response to noise, depending on the frequency and intensity. Acceleration of heart rate in the beluga whale is the first component of the “acoustic startle response.” Romano *et al.* (2004) demonstrated that captive beluga whales exposed to high-level impulsive sounds (*i.e.*, seismic airgun and/or single pure tones up to 201 dB Root Mean Square (RMS)) resembling sonar pings showed increased stress hormone levels of norepinephrine, epinephrine, and dopamine when TTS was reached. Thomas *et al.* (1990) exposed beluga whales to playbacks of an oil-drilling platform in operation (“Sedco 708,” 40 Hz-20 kHz; source level 153 dB). Ambient SPL at ambient conditions in the pool before playbacks was 106 dB and 134 to 137 dB RMS during playbacks at the monitoring hydrophone across the pool. All cell and platelet counts and 21 different blood chemicals, including epinephrine and norepinephrine, were within normal limits throughout baseline and playback periods, and stress response hormone levels did not increase immediately after playbacks. The difference between the Romano *et al.* (2004) and Thomas *et al.* (1990) studies could be the differences in the type of sound (seismic airgun and/or tone versus oil drilling), the intensity and duration of the sound, the individual's response, and the surrounding circumstances of the individual's environment. The sounds in the Thomas *et al.* (1990) study would be more similar to those anticipated by the TTT’s activities; therefore, no more than short-term, low-hormone stress responses, if any, are expected as a result of exposure to noise from the proposed activities.

Vocalizations and Auditory Masking. Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions, but only if the noise spectrum overlaps with the hearing sensitivity of the receiving marine mammal (Southall *et al.*, 2007; Clark *et al.*, 2009; Hatch *et al.*, 2012). Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.*, 2009). Acoustic masking is when other noises such as from human sources interfere with an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.*, those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.*, 1995; Erbe *et al.*, 2016). Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.*, signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.*, sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age, or hearing loss), and existing ambient noise and propagation conditions (Hotchkin and Parks, 2013).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales (*Orcinus orca*) have been observed to increase the length of their songs (Miller *et al.*, 2000; Fristrup *et al.*, 2003) or vocalizations (Foote *et al.*, 2004), respectively, while North Atlantic right whales (*Eubalaena glacialis*) have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.*, 2007). Fin whales (*Balaenoptera physalus*) have also been documented lowering the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote *et al.*, 2012). Other alterations to communication signals have also been observed. For example, gray whales, in response to playback experiments exposing them to vessel noise, have been observed increasing their vocalization rate and producing louder signals at times of increased outboard engine noise (Dahlheim and Castellote, 2016). Alternatively, in some cases, animals may cease sound production during production of aversive signals (Bowles *et al.*, 1994, Wisniewska *et al.*, 2018).

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is human-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect (though not necessarily one that would be associated with harassment).

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.*, Clark *et al.*, 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.*, Miller *et al.*, 2000; Foote *et al.*, 2004; Parks *et al.*, 2007; Di Iorio and Clark, 2010; Holt *et al.*, 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.*, 1995), through amplitude modulation of the signal, or through other compensatory behaviors, including modifications of the acoustic properties of the signal or the signaling behavior (Hotchkin and Parks, 2013). Masking can be tested directly in captive species (*e.g.*, Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.*, Branstetter *et al.*, 2013).

Masking occurs in the frequency band that the animals utilize and is more likely to occur in the presence of broadband, relatively continuous noise sources such as vibratory pile driving. Energy distribution of vibratory pile driving sound covers a broad frequency spectrum and is anticipated to be within the audible range of marine mammals present in the proposed action area. Since noises generated from the proposed construction activities are mostly concentrated at low frequencies (< 2 kHz), these activities likely have less effect on mid-frequency echolocation sounds produced by odontocetes (toothed whales). However, lower frequency noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. Low-frequency noise may also affect communication signals when they occur near the frequency band for noise and thus reduce the communication space of animals (*e.g.*, Clark *et al.*, 2009) and cause increased stress levels (*e.g.*, Holt *et al.*, 2009). Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, in addition to individual levels. Masking affects both senders and receivers of the signals, and at higher levels for longer durations, could have long-term chronic effects on marine mammal species and populations. However, the noise generated by the TTT's proposed activities will only occur intermittently, across an estimated 277 days in year one and 129 days in year two during the authorization period in a relatively small area focused around the proposed construction site. Thus, while the TTT's proposed activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that the fitness of individual marine mammals would be impacted.

Potential Effects on Marine Mammal Habitat

The TTT's proposed activities could have localized, temporary impacts on marine mammal habitat, including prey, by increasing in-water SPLs. Increased noise levels may affect acoustic habitat and adversely affect marine mammal prey in the vicinity of the project areas (see discussion below). Elevated levels of underwater noise would ensonify the project areas where both fishes and mammals occur and could affect foraging success. Additionally, marine mammals may avoid the area during the proposed construction activities; however, displacement due to noise is expected to be temporary and is not expected to result in long-term effects to the individuals or populations.

The total area likely impacted by the TTT's activities is relatively small compared to the available habitat in upper Chesapeake Bay and the Patapsco River. Avoidance by potential prey (*i.e.*, fish) of the immediate area due to increased noise is possible. The duration of fish and marine mammal avoidance of this area after pile installation and associated activities stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. Any behavioral avoidance by fish or marine mammals of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

The proposed project will occur within the same footprint as existing marine infrastructure. The nearshore and intertidal habitat where the proposed project will occur is an area of relatively high marine vessel traffic. Most marine mammals do not generally use the area within the footprint of the project area. Temporary, intermittent, and short-term habitat alteration may result from increased noise levels during the proposed construction activities. Effects on marine mammals will be limited to temporary displacement from pile installation and removal noise, and effects on prey species will be similarly limited in time and space.

Water quality – Temporary and localized reduction in water quality will occur as a result of in-water construction activities. Most of this effect would occur during the installation and removal of piles when bottom sediments are disturbed. The installation and removal of piles would disturb bottom sediments and may cause a temporary increase in suspended sediment in the project area. During pile extraction (if necessary), sediment attached to the pile moves vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish (marine mammal prey) suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993).

Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Since the currents are so strong in the area, following the completion of sediment-disturbing activities, suspended sediments in the water column should dissipate and quickly return to background levels in all construction scenarios. Turbidity within the water column has the potential to reduce the level of oxygen in the water and irritate the gills of prey fish species in the proposed project area. However, turbidity plumes associated with the project would be temporary and localized, and fish in the proposed project area would be able to move away from and avoid the areas where plumes may occur. Therefore, it is expected that the impacts on prey fish species from turbidity, and therefore on marine mammals, would be minimal and temporary. In general, the area likely impacted by the proposed construction activities is relatively small compared to the available marine mammal habitat in the upper Chesapeake Bay and Patapsco River.

Potential Effects on Prey. Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fishes, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Studies regarding the effects of noise on known marine mammal prey are described here.

Fishes utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.*, Zelick *et al.*, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.*, 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds that are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.*, feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fishes (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley, 2012; Pearson *et al.*, 1992; Skalski *et al.*, 1992; Santulli *et al.*, 1999; Paxton *et al.*, 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Peña *et al.*, 2013; Wardle *et al.*, 2001; Jorgenson and Gyselman, 2009; Cott *et al.*, 2012). More commonly, though, the impacts of noise on fishes are temporary.

SPLs of sufficient strength have been known to cause injury to fishes and fish mortality (summarized in Popper *et al.*, 2014). However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012b) showed that a TTS of 4 to 6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.*, 2012a; Casper *et al.*, 2013, 2017).

Fish populations in the proposed project area that serve as marine mammal prey could be temporarily affected by noise from pile installation and removal. The frequency range in which fishes generally perceive underwater sounds is 50 to 2,000 Hz, with peak sensitivities below 800 Hz (Popper and Hastings, 2009). Fish behavior or distribution may change, especially with strong and/or intermittent sounds that could harm fishes. High underwater SPLs have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper, 2005).

Zooplankton is a food source for several marine mammal species, as well as a food source for fish that are then preyed upon by marine mammals. Population effects on zooplankton could have indirect effects on marine mammals. Data are limited on the effects of underwater sound on zooplankton species, particularly sound from construction (Erbe *et al.*, 2019). Popper and Hastings (2009) reviewed information on the effects of human-generated sound and concluded that no substantive data are available on whether the sound levels from pile driving, seismic activity, or any human-made sound would have physiological effects on invertebrates. Any such effects would be limited to the area very near (1 to 5 m) the sound source and would result in no population effects because of the relatively small area affected at any one time and the reproductive strategy of most zooplankton species (short generation, high fecundity, and very high natural mortality). No adverse impact on zooplankton populations is expected to occur from the specified activity due, in part, to large reproductive capacities and naturally high levels of predation and mortality of these populations. Any mortalities or impacts that might occur would be negligible.

The greatest potential impact to marine mammal prey during construction would occur during impact pile driving. In-water construction activities would only be initiated during daylight hours, allowing fish to forage and transit the project area in the evening. Vibratory pile driving may elicit behavioral reactions from fishes such as temporary avoidance of the area but is unlikely to cause injuries to fishes or have persistent effects on local fish populations. Construction would have minimal permanent and temporary impacts on benthic invertebrate species, a marine mammal prey source. In addition, it should be noted that the area in question is low-quality habitat since it is already highly developed and experiences a high level of anthropogenic noise from normal operations and other vessel traffic.

Potential Effects on Foraging Habitat

The SPCT project is not expected to result in any habitat-related effects that could cause significant or long-term negative consequences for individual marine mammals or their populations, since installation and removal of in-water piles would be temporary and intermittent. The total seafloor area affected by pile installation and removal is a very small area compared to the vast foraging area available to marine mammals outside this project area. SPCT turning basin is an industrialized area that does not provide high-quality habitat for prey species. The area impacted by the project is relatively small compared to the available habitat just outside the project area, and there are no areas of particular importance that would be impacted by this project. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. As described in the preceding, the potential for the TTT's construction to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant. Therefore, impacts of the project are not likely to have adverse effects on marine mammal foraging habitat in the proposed project area.

In summary, given the relatively small areas being affected, as well as the temporary and mostly transitory nature of the proposed construction activities, any adverse effects from the TTT's activities on prey habitat or prey populations are expected to be minor and temporary. The most likely impact to fishes at the project site would be temporary avoidance of the area. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we preliminarily conclude that impacts of the specified activities are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes proposed for authorization through the IHA, which will inform NMFS' consideration of "small numbers," the negligible impact determinations, and impacts on subsistence uses.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of 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).

Authorized takes would be by Level B harassment only, as pile driving has the potential to result in disruption of behavioral patterns and/or TTS for individual marine mammals. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown zones and bubble curtains) discussed in detail below in the **Proposed Mitigation** section, Level A harassment is neither anticipated nor proposed to be authorized.

As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic criteria above which NMFS believes there is some reasonable potential for marine mammals to be behaviorally harassed or incur some degree of AUD INJ; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Criteria

NMFS recommends the use of acoustic criteria that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur AUD INJ of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.*, 2007; Southall *et al.*, 2021; Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared sound pressure received levels (RMS SPL) of 120 dB re 1 μPa) for continuous (*e.g.*, vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

TTT's proposed activity includes the use of continuous non-impulsive and impulsive sources, and therefore the RMS SPL thresholds of 120 dB and 160 dB re 1μPa are applicable.

Level A harassment – NMFS' Updated Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) (Updated Technical Guidance, 2024) identifies dual criteria to assess AUD INJ (Level A harassment) to five different underwater marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). TTT's proposed activity includes the use of impulsive (impact driving) and non-impulsive (vibratory driving) sources.

The 2024 Updated Technical Guidance criteria include both updated thresholds and updated weighting functions for each hearing group. The thresholds are provided in table 4, below. The references, analysis, and methodology used in the development of the criteria are described in NMFS' 2024 Updated Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools*.

Table 4 -- Thresholds Identifying the Onset of Auditory Injury

	AUD INJ Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 222 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 197 dB
High-Frequency (HF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,HF,24h}$: 193 dB	*Cell 4* $L_{E,HF,24h}$: 201 dB
Very High-Frequency (VHF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,VHF,24h}$: 159 dB	*Cell 6* $L_{E,VHF,24h}$: 181 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 223 dB $L_{E,PW,24h}$: 183 dB	*Cell 8* $L_{E,PW,24h}$: 195 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 230 dB $L_{E,OW,24h}$: 185 dB	*Cell 10* $L_{E,OW,24h}$: 199 dB

* Dual metric criteria for impulsive sounds: Use whichever criteria results in the larger isopleth for calculating AUD INJ onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level criteria associated with impulsive sounds, the PK SPL criteria are recommended for consideration for non-impulsive sources.

Note: Peak sound pressure level ($L_{p,0\text{-}pk}$) has a reference value of 1 µPa, and weighted cumulative sound exposure level ($L_{E,p}$) has a reference value of 1 µPa^{2}s. In this table, criteria are abbreviated to be more reflective of International Organization for Standardization standards (ISO, 2017). The subscript "flat" is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals underwater (*i.e.,* 7 Hz to 165 kHz). The subscript associated with cumulative sound exposure level criteria indicates the designated marine mammal auditory weighting function (LF, HF, and VHF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The weighted cumulative sound exposure level criteria could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these criteria will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The ensonified areas associated with the proposed pile driving activities were modeled by TTT and JASCO Applied Sciences (JASCO) during the application preparation process; details and the resulting predictions are shown in the modeling report included as appendix B of TTT's IHA application. Briefly, forcing functions for both impact and vibratory pile driving were calculated using the model GRLWEAP14. These functions served as inputs to JASCO's proprietary pile driving source model

(PDSM), which is used to estimate an equivalent acoustic source represented by a linear array of monopoles evenly distributed along the pile. The pile sound was simulated as an array of point sources radiating into the environment and the propagation of synthetic pressure waveforms were computed using JASCO's acoustic propagation model, FWRAM (Full Waveform Range-dependent Acoustic Model), which incorporates site-specific environmental data including bathymetry, sound speed in the water column, and seabed geoacoustics. Resulting model-produced source values are shown in table 5.

Table 5 – Modeled source values for all pile types for impact and vibratory pile driving

Method	Pile Diameter (inches)	SEL (dB re 1µPa^2-sec)
Impact	30	174.8
	36	182.1
	48	188.9
Vibratory	30	164
	36	170.6
	48	175.3

Two modeling locations were selected, one at either end of the wharf. The northernmost location (S1) and southernmost location (S6) were chosen to demonstrate the extremes of expected sound propagation (see figure 4 of TTT's IHA application). Scenarios were modeled during spring and fall seasons at both locations to account for seasonal changes in water temperature and salinity; average sound speed profiles during these seasons showed the strongest refracting profiles leading to the longest propagation ranges. Winter and summer sound propagation was not modeled.

A total of 14 pile driving scenarios were modeled – 8 single-activity scenarios consisting of either impact or vibratory driving at both S1 and S6 during spring and fall. Concurrent scenarios C1, C2, and C3 were all modeled at location S6 during spring and fall. The calculated isopleth distances and areas are shown in tables 6 and 7.

Table 6 – Modeled Isopleths and Areas Ensonified for Single-Activity Scenarios at Sites S1 and S6 in both Spring and Fall

Pile diameter (in.)	Method	Site 1				Site 6			
		Level A		Level B		Level A		Level B	
		Isopleth (km)	Area (km²)	Isopleth (km)	Area (km²)	Isopleth (km)	Area (km²)	Isopleth (km)	Area (km²)
Spring									
30	Impact	-	-	0.34	0.1134	-	-	0.34	0.181
36		-	-	0.79	0.2642	-	-	0.8	0.5809
48		0.03	0.0013	1.33	0.5281	0.03	0.0028	1.31	1.0207
30	Vibratory	-	-	2.12	0.9503	-	-	1.81	1.6742
36		-	-	2.55	1.4527	-	-	2039	2.8353
48		-	-	2.66	1.5837	-	-	2.66	3.3329
Fall									
30	Impact	-	-	0.35	0.1134	-	-	0.35	0.1963
36		-	-	0.81	0.2642	-	-	0.81	0.5809
48		0.03	0.0028	1.36	0.5281	0.03	0.0028	1.35	1.0568
30	Vibratory	-	-	2.11	0.9161	-	-	1.81	1.6742
36		-	-	2.55	1.4527	-	-	2.39	2.8953
48		-	-	2.66	1.5837	-	-	2.66	3.3979

Table 7 – Modeled Isopleths and Areas Ensonified for Concurrent Scenarios at Site S6 in both Spring and Fall

Scenario	Level A		Level B	
	Isopleth (km)	Area (km²)	Isopleth (km)	Area (km²)
Spring				
C1	0.04	0.0028	3.89	1.131
C2	-	0	2.83	3.3979
C3	0.04	0.0028	3.89	9.7314
Fall				
C1	0.04	0.0028	3.89	1.131
C2	-	0	2.83	3.3979
C3	0.04	0.0028	3.89	10.1788

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information which will inform the take calculations. Rodriguez *et. al.* (2021) synthesizes three consecutive years (2017, 2018, and 2019) of data from the DolphinWatch app collected between the months of April and October.

Overall, the highest dolphin sightings were correlated with water temperatures between 24 and 30 degrees Celsius (75.2 to 86 degrees Fahrenheit). Dolphins were sighted most in the summer, peaking in July of each year. Salinity and tidal state also influenced the spatiotemporal occurrence of bottlenose dolphins.

Density estimates for the upper Chesapeake Bay region were compiled for each year (table 8) and the geometric mean of all 3 years was used to estimate peak-season (summer) dolphin densities for the purpose of this analysis.

Table 8 - Dolphin density based on Rodriguez et al. 2021

Year	Yearly (March – November) Average Density (per km^2)	Geometric mean density (per km^2)
2017	0.015	0.019
2018	0.026	
2019	0.017	

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

Estimated take by Level B harassment was calculated based on the ensonified areas multiplied by the seasonal density estimates and the number of in-water work days each year. For single hammer scenarios (table 9), site- and season-specific daily exposures were calculated for both sites in both seasons by multiplying the relevant ensonified area by the density, and then averaged seasonally at S1 and S6. Average daily exposures for all pile types were calculated by taking the average of the S1 and S6 seasonal averages. This was then multiplied by the estimated number of work days and summed across pile types to determine total estimated take by Level B harassment.

Table 9 – Proposed Take Calculations for Single Hammer Scenarios for Years 1 and 2*

Pile diameter (in.)	Seasonal Average of Daily Exposures		Average Daily Exposures	# Days	Estimated Exposures per pile type	Annual Estimated exposures	
	S1	S6				Year 1	Year 2
Impact							
30	0.0022	0.0036	0.0029	151.5	0.43	1	1
36	0.0050	0.0110	0.0080	76	0.61		
48	0.0100	0.0197	0.0149	25.5	0.38		
Vibratory							
30	0.018	0.032	0.025	151.5	3.75	8	8
36	0.028	0.054	0.041	76	3.12		
48	0.030	0.064	0.047	25.5	1.20		

*Proposed activities for years 1 and 2 are identical; estimated exposure calculations are therefore identical and results for each year are shown separately.

For concurrent hammering scenarios (table 10), estimated take was calculated using the fall propagation modeling at S6. Concurrent driving scenarios already included all three pile types, so no summing of exposures over the three pile types was necessary. Scenario C3 had the highest potential take in both years and estimated take proposed for authorization is therefore based on this scenario.

Table 10 – Proposed Take Calculations for Concurrent Hammering Scenarios for Years 1 and 2

Scenario	Fall exposures (dolphins per day)	Fall days	Annual Estimated exposures	
			Year 1	Year 2
C1	0.0215	253	5	5
C2	0.0646	253	16	16
C3	0.1934	253	49	49

*Proposed activities for years 1 and 2 are identical; estimated exposure calculations are therefore identical and results for each year are shown separately

An estimate of take by Level A harassment was performed in the same manner for days with impact pile driving. The maximum estimated Level A harassment area was 0.0028 km^2 for impact hammering of 48-in piles under scenario C3. AUD INJ onset thresholds were not reached during modeling of vibratory driving of any size pile. Using the same number of days as shown in table 9, the estimated take by Level A harassment during scenario C3 was 0.01 animals per year. Thus, TTT did not request any take by

Level A harassment, and none is proposed for authorization. Tables 11 and 12 show the amount of take proposed for authorization under the Year 1 and Year 2 IHAs, respectively.

Table 11 – Estimated Proposed Take by Level A and Level B Harassment and Percent of Stocks Taken for Year 1

Species	Stock	Level A	Level B	Total	Stock abundance	Percent of Stock
Bottlenose dolphin	Western North Atlantic Northern Migratory Coastal Stock	0	49	49	6,639	0.74
	Western North Atlantic Southern Migratory Coastal Stock				3,751	1.3

Table 12 – Estimated Proposed Take by Level A and Level B Harassment and Percent of Stocks Taken for Year 2

Species	Stock	Level A	Level B	Total	Stock abundance	Percent of Stock
Bottlenose dolphin	Western North Atlantic Northern Migratory Coastal Stock	0	49	49	6,639	0.74
	Western North Atlantic Southern Migratory Coastal Stock				3,751	1.3

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

The mitigation requirements described in the following were proposed by TTT in its adequate and complete application or are the result of subsequent coordination between NMFS and TTT. TTT has agreed that all of the mitigation measures are practicable. NMFS has fully reviewed the specified activities and the mitigation measures to determine if the mitigation measures would result in the least practicable adverse impact on marine mammals and their habitat, as required by the MMPA, and has determined the proposed measures are appropriate. NMFS describes these below as proposed mitigation requirements, and has included them in the proposed IHAs.

In addition to the measures described later in this section, the TTT would follow these general mitigation measures:

- Takes proposed for authorization, by Level B harassment only, would be limited to the species and numbers listed in tables 11 and 12. Construction activities must be halted upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or is within the harassment zone.

- The taking by serious injury or death of any of the species listed in tables 11 and 12 or any taking of any other species of marine mammal would be prohibited and would result in the modification, suspension, or revocation of the IHAs, if issued. Any taking exceeding the authorized amounts listed in in tables 11 and 12 would be prohibited and would result in the modification, suspension, or revocation of the IHA, if issued.
- Ensure that construction supervisors and crews, the marine mammal monitoring team, and relevant TTT staff are trained prior to the start of all construction activities, so that responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work;
- The TTT, construction supervisors and crews, Protected Species Observers (PSOs), Designated Visual Observers (DVOs), and relevant TTT staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction.
- Employ PSOs (or DVOs when appropriate) and establish monitoring locations as described in section 5 of the IHA and the TTT Marine Mammal Monitoring and Mitigation Plan. The TTT must monitor the project area to the maximum extent possible based on the required number of PSOs or DVOs, required monitoring locations, and environmental conditions.

Additionally, the following mitigation measures apply to the TTT’s in-water construction activities:

Establishment of Shutdown Zones - The TTT would establish shutdown zones with radial distances as identified in table 13 for all construction activities. If a marine mammal is observed entering or within the shutdown zones indicated in table 13, pile driving activity must be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zones or 15 minutes have passed without re-detection of the animal.

Table 13 – Proposed Shutdown Zones During Project Activities

Activity	**Shutdown Zone (m)**	**Clearance zone (m)**
Impact Installation	40	1,190
Vibratory installation	10	2,860

Pre- and Post-Activity Monitoring – When PSOs or DVOs are present, monitoring would take place from 30 minutes prior to initiation of pile driving activity (*i.e.*, pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity. In addition, monitoring for 30 minutes would take place whenever a break in the specified activity (*i.e.*, impact pile driving, vibratory pile driving) of 30 minutes or longer occurs. Pre-start clearance monitoring would be conducted during periods of visibility sufficient for the PSO or DVO to determine that the shutdown zones indicated in table 12 are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals.

Pile driving activities would be initiated only during daylight hours when PSOs or DVOs (when present) can visually monitor for the presence of marine mammals. In the event that pile driving continues after dusk (to complete the installation of a pile in progress), night vision equipment (handheld night vision devices or handheld thermal imagers) would be used.

Soft Start - TTT would use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. A soft start would be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. Soft start procedures are used to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. Soft starts would not be required for infrequently occurring pile restrikes (short duration events with low blow counts) due to technical conflicts with hammer energy.

Hydroacoustic Monitoring – TTT would conduct sound field verification to ground truth the zones over which effects to marine mammals are expected. An acoustic monitoring plan would be submitted to NMFS no later than 30 days prior to the beginning of pile driving for approval. Monitoring would be conducted for 1 week starting with the initial pile of each diameter/group, for 1 week (5 days) at least once during concurrent piling, and for one week during the predicted most impactful concurrent piling.

Data would be collected using autonomous acoustic recorders at three fixed ranges from each monitored pile along a fixed azimuth. Underwater noise data will be collected at near-field, intermediate, and far-field locations to monitor noise associated with the active pile.

Based on our evaluation of the applicant's proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance. NMFS conducted an independent evaluation of the proposed measures, and has preliminarily determined for each of the proposed IHAs that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);

- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g*., marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

The monitoring and reporting requirements described in the following were proposed by TTT in its adequate and complete application and/or are the result of subsequent coordination between NMFS and TTT. TTT has agreed to the requirements. NMFS describes these below as requirements and has included them in the proposed IHA.

Visual Monitoring — Monitoring must be conducted by qualified, NMFS-approved PSOs between May 15 and September 30. A minimum of one NMFS-approved PSO will be on duty during pile driving activities between 1 June and 15 September to monitor the Shutdown Zone and Clearance Zone. Between May 15 and May 30, and between September 15 and September 30, a minimum of one PSO must be on duty during 2 of every 7 calendar days during pile driving. Between October 1 and May 14, monitoring must be conducted for 1 of every 7 calendar days during pile driving. During this time, monitoring may be conducted by either NMFS-approved PSOs or by DVOs.

PSOs and DVOs would have similar qualifications, with some differences. PSOs would be independent of the activity contractor (for example, employed by a subcontractor), while DVOs may be a member of the activity contractor team. Both PSOs and DVOs must have no other assigned tasks during monitoring periods. At least one PSO would have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued Incidental Take Authorization (ITA) or Letter of Concurrence (LOC). Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization. PSOs would have experience or training in the field identification of marine mammals, including the identification of behaviors. DVOs do not need prior experience; they would be provided training sufficient to identify marine mammals in the field, but not to identify specific behaviors.

PSOs and DVOs would also have the following additional qualifications:

- The ability to conduct field observations and collect data according to assigned protocols;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to: (1) the number and species of marine mammals observed; (2) dates and times when in-water construction activities were conducted; (3) dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and (4) marine mammal behavior; and
- The ability to communicate orally, by radio or in person, with Project personnel to provide real-time information on marine mammals observed in the area as necessary.

TTT must establish monitoring locations as described in the Marine Mammal Monitoring and Mitigation Plan (see appendix C of TTT's application). When monitoring is required, PSOs and DVOs would record all observations of marine mammals, regardless of distance from the pile being driven, as well as the additional data indicated below and in section 6 of the IHAs, if issued.

Reporting – TTT would be required to submit an annual draft summary report on all construction activities and marine mammal monitoring results to NMFS within 90 days following the end of each construction year or 60 calendar days prior to the requested issuance of any subsequent IHA for similar activity at the same location, whichever comes first. The draft summary report would include an overall description of construction work completed, a narrative regarding marine mammal sightings, and associated raw PSO and DVO data sheets (in electronic spreadsheet format). Specifically, the report must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction 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) or number of strikes for each pile (impact driving);
- PSO and DVO locations during marine mammal monitoring; and
- Environmental conditions during monitoring periods (at beginning and end of PSO and DVO shift 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.
- Upon observation of a marine mammal the following information must be reported:
- Name of PSO or DVO who sighted the animal(s) and PSO or DVO location and activity at the time of the sighting;
- Time of the sighting;

- Identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO or DVO confidence in identification, and the composition of the group if there is a mix of species;
- Distance and bearing of each observed marine mammal relative to the pile being driven or removed for each sighting;
- Estimated number of animals (min/max/best estimate);
- Estimated number of animals by cohort (*e.g.,* adults, juveniles, neonates, group composition, *etc.*);
- Animal's closest point of approach and estimated time spent within the estimated harassment zone(s);
- 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);
- Number of marine mammals detected within the estimated harassment zones, by species; and
- Detailed information about implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specified actions that ensued, and resulting changes in behavior of the animal(s), if any.

Acoustic monitoring report(s) must be submitted on the same schedule as visual monitoring reports (*i.e.*, within 90 days following the completion of construction). The acoustic monitoring report must contain the informational elements described in the Acoustic Monitoring Plan and, at minimum, must include:

- Hydrophone equipment and methods: (1) recording device, sampling rate, calibration details, distance (m) from the pile where recordings were made; and (2) the depth of water and recording device(s);
- Location, identifier, orientation (*e.g.*, vertical, battered), material, and geometry (shape, diameter, thickness, length) of pile being driven, substrate type, method of driving during recordings (*e.g.,* hammer model and energy), and total pile driving duration;
- Whether a sound attenuation device is used and, if so, a detailed description of the device used, its distance from the pile and hydrophone, and the duration of its use per pile;
- For impact pile driving: (1) number of strikes per day and per pile and strike rate; (2) depth of substrate to penetrate; (3) decidecade (one-third octave) band spectra in tabular and figure formats computed on a per-pulse basis, including the arithmetic mean or median for all computed spectra; (4) pulse duration and median, mean, maximum, minimum, and number of samples (where relevant) of the following sound level metrics : (5) RMS SPL; (6) SEL_{24}, Peak (PK) SPL, and SEL_{ss}; and
- For vibratory driving/removal: (1) duration of driving per pile; (2) vibratory hammer operating frequency; (3) decidecade (one-third octave) band spectra in tabular and figure formats for 1-second windows, including the arithmetic mean or median for all computed spectra; and (2) median, mean, maximum, minimum, and number of samples (where relevant) of the following sound level metrics: 1-sec RMS SPL, SEL_{24} (and timeframe over which the sound is averaged).

If no comments are received from NMFS within 30 days after the submission of the draft summary report, the draft report would constitute the final report. If TTT received comments from NMFS, a final summary report addressing NMFS' comments would be submitted within 30 days after receipt of comments.

Reporting Injured or Dead Marine Mammals — In the event that personnel involved in TTT's activities discover an injured or dead marine mammal, TTT would report the incident to the NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*, *ITP.hotchkin@noaa.gov*) and to the GARFO Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, TTT would immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the IHA. TTT would not resume their activities until notified by NMFS. The report would include the following information:

- Description of the incident;
- Environmental conditions (*e.g.,* Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Photographs or video footage of the animal(s) (if equipment is available).
- 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; and
- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

NMFS has identified key factors which may be employed to assess the level of analysis necessary to conclude whether potential impacts associated with a specified activity should be considered negligible. These include, but are not limited to, the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect to the species or stock, and the status of the species or stock. The potential effects of the specified activities on Tamanend's bottlenose dolphins are discussed below.

Pile driving associated with the SPCT project, as outlined previously, has the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment only from underwater sounds generated by pile driving. Potential takes could occur if dolphins are present in zones ensonified above the threshold for Level B harassment identified above while activities are underway.

TTT's proposed activities and associated impacts would occur within a limited, confined area of the stocks' range. The work would occur in the vicinity of the Sparrows Point Container Terminal site, and sound from the specified activities would be blocked by the shorelines of the turning basin, Patapsco River, and Chesapeake Bay. The intensity and duration of take by Level B harassment would be minimized through use of mitigation measures described herein. Further, the presence of dolphins in the area is limited and typically seasonal as animals move through the area chasing prey associated with changing water temperatures, thereby reducing the potential for prolonged exposure or behavioral disturbance. In addition, NMFS does not anticipate that serious injury or mortality will occur as a result of the TTT's proposed activity given the nature of the activity, even in the absence of required mitigation.

Exposures to elevated sound levels produced during pile driving may cause the behavioral disturbance of some individuals. Behavioral responses of marine mammals to pile driving at the SPCT project site are expected to be mild, short term, and temporary. Effects on individuals that are taken by Level B harassment, as enumerated in the **Estimated Take** section, on the basis of reports in the literature as well as monitoring from other similar activities elsewhere, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging if such activity were occurring (*e.g.*, Ridgway *et al.*, 1997; Nowacek *et al*., 2007; Thorson and Reyff, 2006; Kendall and Cornick, 2015; Goldbogen *et al.*, 2013b; Blair *et al.*, 2016; Wisniewska *et al.*, 2018; Piwetz *et al*., 2021). Marine mammals within the Level B harassment zones may not show any visual cues that they are disturbed by activities, or they could become alert, avoid the area, leave the area, or display other mild responses that are not visually observable such as exhibiting increased stress levels (*e.g.*, Rolland *et al.*, 2012; Lusseau, 2005; Bejder *et al.*, 2006; Rako *et al.*, 2013; Pirotta *et al.*, 2015; Pérez-Jorge *et al.*, 2016). They may also exhibit increased vocalization rates, louder vocalizations, alterations in the spectral features of vocalizations, or a cessation of communication signals (Hotchkin and Parks 2013).

Bottlenose dolphins in the region will only be present temporarily based on seasonal patterns. Thus, individuals present will be exposed to only transient periods of noise-generating activity as they move past the project site. Most likely, individual animals will either be temporarily deterred from swimming past the construction activities and will pass by when no pile driving is occurring, or will swim through the area more quickly. Takes may also occur during important foraging seasons, when anadromous fishes are migrating past the project area and marine mammals follow. However, the SPCT project area represents a small portion of available foraging habitat and impacts on dolphin feeding are expected to be minimal. No marine mammal species or individuals are known or expected to be resident in the project area, and impacts are unlikely to be more than temporary and low-intensity.

The activities analyzed here are similar to numerous other coastal construction activities which have taken place with no known long-term adverse consequences from behavioral harassment. Any potential reactions and behavioral changes are expected to subside quickly when the exposures cease, and therefore, no long-term adverse consequences are expected (*e.g.*, Graham *et al.*, 2017). While there are no long-term peer-reviewed studies of marine mammal habitat use in the Patapsco River, studies from other areas indicate that most marine mammals would be expected to have responses on the order of hours to days. The intensity of Level B harassment events will be minimized through use of mitigation measures described herein, which were not quantitatively factored into the take estimates. The TTT will use PSOs stationed strategically to increase detectability of marine mammals during in-water construction activities, enabling a high rate of success in implementation of shutdowns to minimize any likelihood of injury. Further, given the absence of any important habitat areas within the estimated harassment zones, we assume that potential takes by Level B harassment will have an inconsequential short-term effect on individuals and will not result in population-level impacts.

As stated in the **Mitigation** section, the TTT will implement shutdown zones (table 13). No take by Level A harassment is proposed for authorization and thus is not expected to adversely impact individual fitness, let alone annual rates of recruitment or survival for the affected species or stocks.

Repeated, sequential exposure to pile driving noise over a long duration could result in more severe impacts to individuals that could affect a population (via sustained or repeated disruption of important behaviors such as feeding, resting, traveling, and socializing; Southall *et al.*, 2007). Alternatively, marine mammals exposed to repetitious construction sounds may become habituated, desensitized, or tolerant after initial exposure to these sounds (reviewed by Richardson *et al.*, 1995; Southall *et al.*, 2007). However, given the relatively low abundance and generally transitory nature of marine mammals in the Chesapeake Bay and Patapsco River near the project location compared to the stock sizes (tables 11 and 12), population-level impacts are not anticipated. The absence of any important habitat areas in the action area further decreases the likelihood of population-level impacts.

The SPCT project is also not expected to have significant adverse effects on any marine mammal habitats. The long-term impact on marine mammals associated with the SPCT project would be a small permanent decrease in low-quality potential habitat because of the shifted footprint of the wharf. Installation of in-water piles would be temporary and intermittent, and the increased footprint of the facilities would destroy only a small amount of low-quality habitat, which currently experiences high levels of anthropogenic activity. Impacts to the immediate substrate are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time but which would not be expected to have any effects on individual marine mammals. Further, there are no known biologically important areas (BIAs) near SPCT project area that will be impacted by the TTT's proposed activities.

Impacts to marine mammal prey species are also expected to be minor and temporary and to have, at most, short-term effects on foraging of individual marine mammals and likely no effect on the populations of marine mammals as a whole. Overall, the area impacted by the SPCT project is very small compared to the available surrounding habitat and does not include habitat of particular importance. The most likely impact to prey would be temporary behavioral avoidance of the immediate area. During construction activities, it is expected that some fish and marine mammals would temporarily leave the area of disturbance, thus impacting marine mammals' foraging opportunities in a limited portion of their foraging range. But, because of the relatively small area of the habitat that may be affected and lack of any habitat of particular importance, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary and as described above, the following factors primarily support our preliminary negligible impact determinations for the affected stocks of Tamanend's bottlenose dolphins:

- No takes by mortality or serious injury are anticipated or authorized;
- Any acoustic impacts to marine mammal habitat from pile driving are expected to be temporary and minimal;

- Take will not occur in places and/or times where take would be more likely to accrue to impacts on reproduction or survival, such as within habitats critical to recruitment or survival (*e.g.*, rookery);
- The SPCT project area represents a very small portion of the available foraging area for all potentially impacted marine mammal species and does not contain any habitat of particular importance;
- Take will only occur within the Chesapeake Bay and Patapsco River, which is a limited, confined area of any given stock's home range;
- Monitoring reports from similar work have documented little to no observable effect on individuals of the same species impacted by the specified activities;
- The required mitigation measures (*i.e.*, soft starts, pre-clearance monitoring, shutdown zones, bubble curtains) are expected to be effective in reducing the effects of the specified activity by minimizing the numbers of marine mammals exposed to injurious levels of sound; and
- The intensity of anticipated takes by Level B harassment is low for all stocks consisting of, at worst, temporary modifications in behavior, and would not be of a duration or intensity expected to result in impacts on reproduction or survival.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds for each of the proposed IHAs that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only take of small numbers of marine mammals may be authorized under section 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers (see 86 FR 5322, January 19, 2021). Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all stocks, the number of takes proposed for authorization is less than one-third of the best available population abundance estimate (*i.e.*, no more than 0.67 percent of any stock; see tables 11 and 12). The maximum annual number of animals that may be authorized to be taken from these stocks would be considered small relative to the relevant stock's abundances even if each estimated take occurred to a new individual.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds for each of the proposed IHAs that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. 1531 *et seq*.) requires that each Federal agency ensures that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of incidental take authorizations, NMFS consults internally whenever we propose to authorize take for ESA-listed species.

No incidental take of ESA-listed species is proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue two consecutive IHAs to TTT for conducting the SPCT project near Baltimore, MD, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHAs can be found at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities.*

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHAs for the proposed SPCT project. We also request comment on the potential renewal of these proposed IHAs as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for these IHAs or any subsequent renewal IHAs.

On a case-by-case basis, NMFS may issue a one-time, 1-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the **Description of Proposed Activity** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activity** section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond 1 year from expiration of the initial IHA).
- The request for renewal must include the following:

1. An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take).

2. A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: April 20, 2026.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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