



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XF061]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Robert Storrs Harbor Floats A&B Replacement Project in Unalaska, Alaska

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

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received a request from the City of Unalaska (COU) for authorization to take marine mammals incidental to the replacement of the harbor floats in Unalaska, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, 1-year renewal that could be issued under certain circumstances and if all requirements are met, as described in the **Request for Public Comments** section 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 Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.Gatzke@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, *etc.*) 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: Jennifer Gatzke, 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)(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 and 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 IHA qualifies to be categorically excluded from further NEPA review.

Summary of Request

On June 25, 2025, NMFS received a request from the COU for an IHA to take marine mammals incidental to construction work involving pile driving during a harbor replacement project on Unalaska Island, Alaska. Following NMFS’ review of the application, COU submitted a revised version, which was deemed adequate and complete, on March 2, 2026. COU’s request is for take of five species of marine

mammals by Level B harassment and, for a subset of three of these species, Level A harassment. Neither COU nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

COU plans to conduct construction, including pile driving, associated with the Robert Storrs Harbor Floats A&B Replacement Project in Unalaska, Alaska. The project includes the use of vibratory, impact and down-the-hole (DTH) pile driving hammers, which may result in the incidental take by Levels A and B harassment of marine mammals.

Unalaska, an island in the Aleutian Island chain, is west of the Alaska Peninsula (figure 1). The Robert Storrs Harbor is a small harbor, west-southwest (WSW) of Dutch Harbor, and the only recreational vessel harbor used by residents of Unalaska.

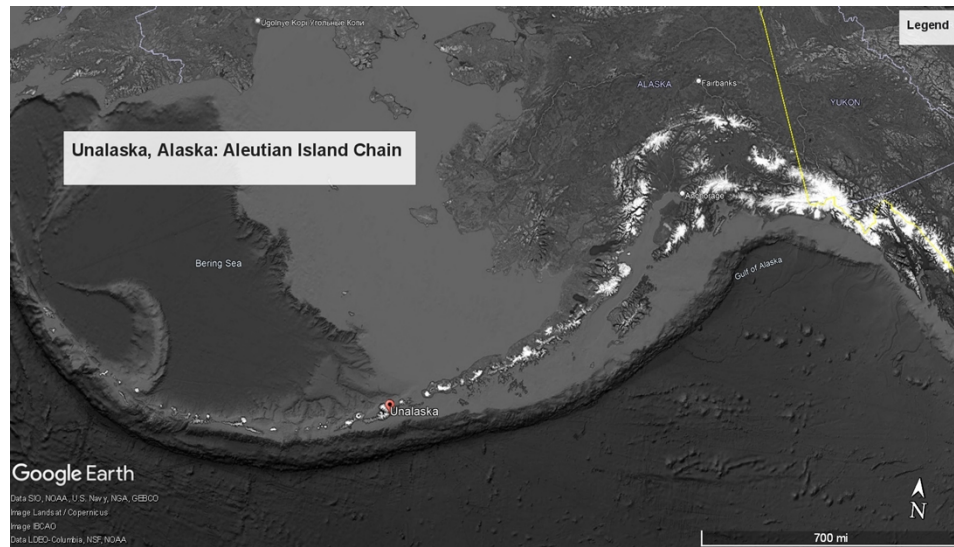


Figure 1. Map of Alaska and Aleutian Island chain showing location of Unalaska

This project is designed to better serve the community, by removing the current ailing infrastructure, and modernizing the docks to make them more accessible. To support this expanded upland parking area, rock fill will be placed below the high tide line to create an embankment for this improvement. Construction will require removal of piles and floats, as well as installation of new materials, which is expected to take a maximum of 100 days of in-water work. Vibratory, impact, and DTH hammer pile driving will be used to remove the existing steel pipe piles and floats. This IHA would be effective for 1 year within a maximum 2-year window of effectiveness from the date of issuance.

No serious injury or mortality is anticipated to result from this activity. A small number of incidental take by Level A harassment (auditory injury) is proposed for authorization, as is incidental take by Level B Harassment. The COU will implement mitigation measures and a monitoring program that will reduce the likelihood of injurious interaction. Multiple trained protected species observers (PSOs) in strategic locations will monitor the project area and clearance zones. The number and/or intensity of incidents of takes will be minimized through the incorporation of the mitigation measures that were proposed by COU or are the result of coordination between NMFS and COU. The COU has agreed that all of the mitigation measures are practicable. As required by the MMPA, we concurred that these measures are sufficient to achieve the least practicable adverse impact on the affected marine mammal species or stocks and their habitat and have included them in the IHA as proposed mitigation requirements.

Dates and Duration

The proposed IHA would be valid for the statutory maximum of 1 year from the date of effectiveness and will become effective upon written notification from the applicant to NMFS, but not beginning later than 1 year from the date of issuance or extending beyond 2 years from the date of issuance. Due to weather considerations, most

in-water work is planned to occur between March and September, with the COU planning to start work in July 2026. However, project delays may occur due to a number of factors, such as project funding, availability of equipment and/or materials, weather and tide-related delays, equipment maintenance and/or repair, and other considerations. Pile driving will consist of vibratory, impact and DTH drilling of steel piles no larger than 24 inches (61 centimeters). Plans include: (1) the removal of existing piles, installation and removal of temporary piles, and installation of permanent piles; (2) no simultaneous pile driving; (3) a maximum number of 100 pile driving days; and (4) 10- to 12-hour daytime construction shifts.

Specific Geographic Region

Approximately 2,560 km (1,591 miles) WSW of Anchorage, AK, Robert Storrs Harbor sits beside Iliuliuk Harbor, WSW of Dutch Harbor, and is the only recreational harbor used by Unalaska residents, including a small number of subsistence hunters (figure 2).

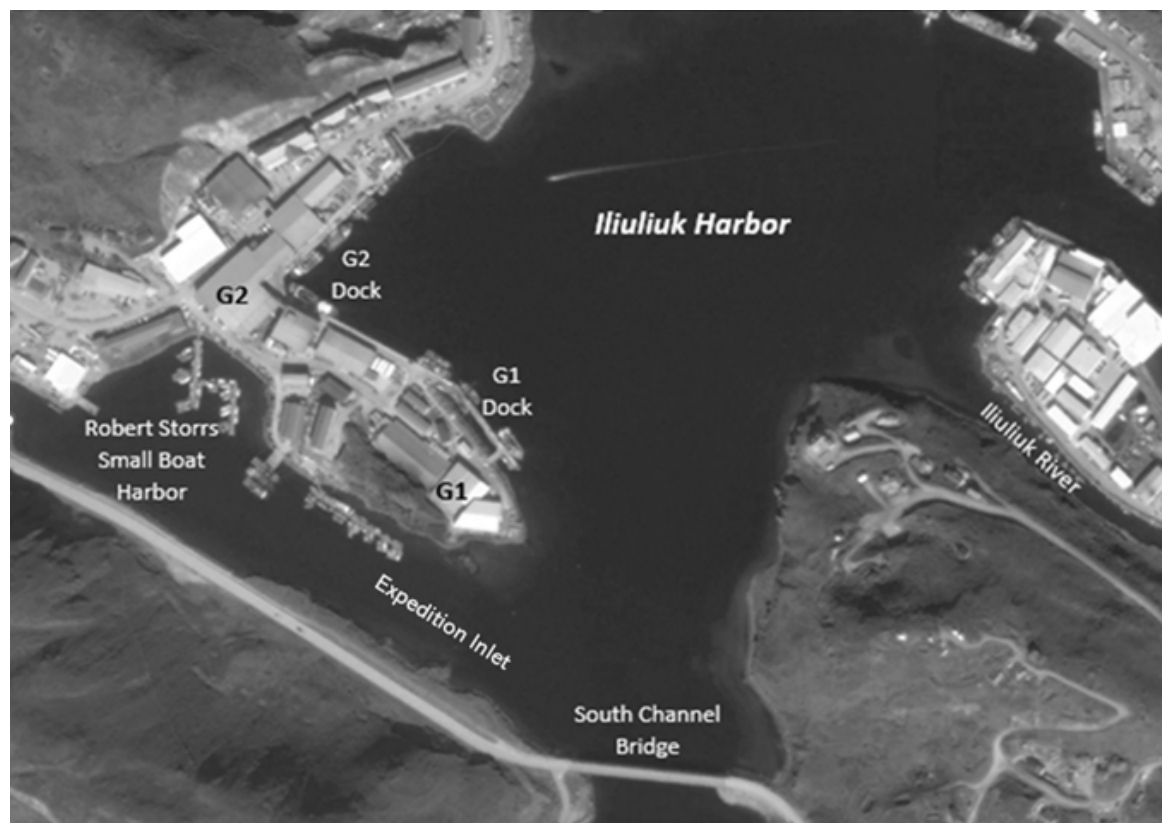


Figure 2. Map of Iliuliuk Harbor, Expedition Inlet, and Robert Storrs Small Boat Harbor

Detailed Description of the Specified Activity

Pile removal and installation will involve vibratory, impact and DTH drilling. The project will use a single crane barge with no simultaneous pile driving. The project aims to replace most of the infrastructure, removing and installing new piles, floats, gang/walkways, bulkheads, below the high tide line rock armoring to support a new upland parking area. Pile removal and driving are expected to cause behavioral disturbance, temporary threshold shifts (TTS), or auditory injury (AUD INJ), which includes but is not limited to permanent threshold shifts (PTS).

There are components of this project that we do not expect to impact marine mammals, their habitat, or their subsistence use. These components include the work to expand the parking area, abutments, and gravel fill. We do not expect any of these activities to result in disturbance beyond the ambient noise and activity of a working harbor, including both airborne and underwater sound, and these activities will not be considered further.

The COU plans for 95 days of pile driving, with a maximum of 100 days. All in-water work is scheduled for 10-12 daytime hours per day: 6 days to remove existing piles, 6 days to install temporary template piles, and 88 days to install permanent piles. In-water work, including pile driving, needs to occur between March 15 and September 30 to avoid hazardous weather conditions. Overall construction season includes an allowance for weather delays and is subject to change.

Table 1 -- Pile Driving Activity Planned

Size steel pipe pile (inches)	Construction method	Project total # piles	Max piles per day	Min/strikes per pile	Days of effort	Average piles per day
16	Vibratory removal	33	15	15	6	7
24	(Temporary) Vibratory installation	5	4	20	3	2
24	(Temporary) Vibratory removal		4	15	3	2

24	Vibratory installation	44	4	20	22	2
	Impact installation		4	1000	22	2
	DTH installation		2	180	44	1

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

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 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.

Killer Whale	<i>Orcinus orca</i>	ENP Alaska Resident	-, -, N	1,920 (N/A, 1,920, 2019)	19	1.3
Killer Whale	<i>Orcinus orca</i>	ENP Gulf of Alaska, Aleutian Islands and Bering Sea Transient	-, -, N	587 (N/A, 587, 2012)	5.9	0.8
Family Phocoenidae (porpoises)						
Harbor Porpoise	<i>Phocoena phocoena</i>	Bering Sea	-, -, N	4,130 (UNK, N/A, 2008)	UND	0.4
Order Artiodactyla—Order Carnivora—Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller Sea Lion	<i>Eumetopias jubatus</i>	Western	E, D, Y	49,837 (N/A, 73,211, 2022)	299	267
Family Phocidae (earless seals)						
Harbor seal	<i>Phoca vitulina</i>	Aleutian Islands	-, -, N	5,588 (N/A, 5,366, 2018)	97	90
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 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. In some cases, CV is not applicable [explain if this is the case].						

⁴ These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, vessel strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

As indicated above, all five species (with eight managed stocks) in table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. While other marine mammal species, including sperm whales (*Physeter macrocephalus*), fin whales (*Balaenoptera physalus*), North Pacific right whales (*Eubalaena japonica*), minke whales (*Balaenoptera acutorostrata*), and Dall's porpoise (*Phocoenoides dalli*) have been documented in the waters surrounding Unalaska, we do not expect these species to overlap in space and time with the project site and they will not be discussed further. In addition, the northern sea otter (*Enhydra lutris kenyoni*) is found in Unalaska. However, sea otters are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Humpback whales - Waters surrounding Unalaska Island are designated as a humpback whale feeding biologically important area (BIA) (Harrison *et al.* 2023). Three stocks are found in the Aleutian Islands, with the Hawaiian stock most heavily represented, followed by the Western North Pacific and Mexico-North Pacific stocks. This humpback whale feeding BIA is active from May through January when humpback whales congregate in the bay to feed on spawning herring. Overall, humpback whales are likely to be present during construction. The COU notified PND Engineers, Inc., and NMFS that they received a January 2026 sighting of a humpback whale in Expedition Inlet, indicating the likelihood that humpback whales may be in the adjacent project area during construction (personal communication, 2/18/26). The final monitoring report for the UniSea G1 Dock Replacement Project (figure 2) noted three rare sightings of humpback whales inside Iliuliuk Harbor in June and July of 2016. The first whale

surfaced during construction at the center of Iliuliuk Harbor on June 16 when construction was halted for an hour. The remaining two humpback whales were sighted before entering the observation zone and Iliuliuk Harbor (PND Engineers, Inc., 2017). During the 2017 Unalaska Marine Center (UMC) Dock Replacement project in nearby Dutch Harbor, approximately 9 humpback whales were observed within estimated Level B harassment zones.

Killer whales - While killer whales are sighted in waters around Unalaska, and there are food sources that might attract whales in the harbors, monitoring reports from the UniSea and UMC projects reveal no killer whale sightings in nearby harbors. Whales in this area could be from either the Eastern North Pacific (ENP) Alaska Resident stock, or the ENP Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock. Resident killer whales are particularly common around Unalaska and Umnak Islands (Zerbini *et al.*, 2007), and they have been documented preying on gray whales migrating through the nearby Unimak Pass (Barrett-Lennard *et al.*, 2011).

Harbor porpoises - During the UniSea G1 Dock Replacement Project in Iliuliuk Harbor between March and October 2016, protected species observers reported no sightings of harbor porpoises (PND Engineers, Inc., 2017). While there are few reported sightings of harbor porpoises in the general area of the harbor, there is potential for them to be sighted during the project. Table 2 notes the most recent ship survey for the Bering Sea stock of harbor porpoise was conducted in 2008. Using that resulting partial population estimate of 5,713 and its associated Coefficient of Variation (CV) of 0.4, N_{MIN} for the Bering Sea stock of harbor porpoise is 4,130. As this is an underestimate for the entire stock because it is based on a survey that covered only a small portion of the stock's range, and because the survey data are more than 8 years old, N_{MIN} is considered unknown in the most recent SARs report. However, we use the 4,130 figure as the best

available information to calculate the percentage of take in table 3 in support of the small numbers determination.

Steller sea lions - Winter Steller eider surveys conducted by the USACE regularly found Steller sea lions in Iliuliuk Harbor and in Expedition Inlet, with a maximum of ten Steller sea lions within Iliuliuk Harbor per survey (PND, 2026). Sea lions were frequently seen on the southern side of Iliuliuk Bay, likely moving toward the entrance channel of Iliuliuk Harbor, where they were commonly found (Chris Hoffman, unpublished data). There are fish processing plants and an anadromous river in the bay that draw pinnipeds and other marine life. While critical habitat exists around Unalaska Island, the nearest Steller sea lion haul-out site is 17 nautical miles (nmi) away, and the nearest rookery is 20 nmi away. Due to the shape of the enclosed harbor, and the resulting limit to the extent of acoustic noise, project activities are not expected to affect critical habitat.

Harbor seals - The UniSea G1 Dock Replacement Project conducted protected species observations between March and October of 2016 for 211 days in the Iliuliuk Harbor Area. The final monitoring report totaled sightings of 200 individuals and indicated that harbor seals remained relatively constant in their presence throughout the season, but moved away from areas with the highest concentration of sea lions (PND Engineers, Inc., 2017). There are no haul-out sites nearby that would be a concern for dislocating seals during construction activities.

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 or hear over the same frequency range (*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.*). Subsequently, NMFS (2018, 2024) described generalized hearing ranges for these marine mammal hearing groups (table 3). 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, 2019). Of the species potentially present in the action area, humpback whales considered low-frequency (LF) cetaceans, killer whales are considered high-frequency (HF) cetaceans, harbor porpoises are considered very high-frequency (VHF) cetaceans, Steller sea lions are otariid pinnipeds, and harbor seals are phocid pinnipeds.

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

Hearing Group	Generalized Hearing Range*
LF cetaceans (baleen whales)	7 Hz to 36 kHz
HF cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
VHF cetaceans (true porpoises, <i>Kogia</i> , river dolphins, Cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	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>i.e.</i> , all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS (2018), and/or data from Southall <i>et al.</i> (2007) and Southall <i>et al.</i> (2019). Additionally, animals are able to detect very loud sounds above and below that “generalized” hearing range.	

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

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and 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 the specified activities. 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 activities are expected to potentially occur from vibratory pile installation and removal, impact pile driving, DTH systems, and rock hammering. The effects of underwater noise from COU's proposed activities have the potential to result in Level B harassment of marine mammals in the action area and, for some species as a result of certain activities, Level A harassment.

There are a variety of types and degrees of effects on marine mammals and their habitat (including prey) that could occur as a result of the specified activities. Below we provide a brief description of the types of sound generated by specified activities, the general impacts on marine mammals and their habitat from these types of activities, and a related project-specific analysis with consideration of the proposed mitigation measures.

Description of Sound Sources for Specified Activities

Activities associated with the project that have the potential to incidentally take marine mammals through exposure to sound include pile driving activity using vibratory, impact, and DTH drilling.

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 sound pressure levels

(SPLs), 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, and extract piles by using vibration to break the sediment friction and allow a crane to pull the piles out. Vibratory hammers typically produce less sound (*i.e.*, lower SPLs) than impact hammers. Peak 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, 2015, 2020). Sounds produced by vibratory hammers are non-impulsive; compared to sounds produced by impact hammers, they have a slower rise time, 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).

DTH systems use a combination of drilling and percussive mechanisms to advance a hole into the rock, with or without simultaneously advancing a pile/casing into that hole. Drill cuttings and debris at the rock face are removed by an air-lift exhaust through the inside of the pile (Guan and Miner, 2020). Unlike other pile installation methods, at least one sound source during DTH is found at the intersection of the drill tip and the substrate and is often more characteristically a point source rather than a linear source, as in impact and vibratory pile driving. A DTH system is essentially a drill bit that drills through the bedrock using a rotating function like a normal drill integrated with a hammering mechanism to increase speed of progress through the substrate (*i.e.*, it is similar to a “hammer drill” hand tool). DTH systems typically involve a single hammer (mono-hammer), but multi- or “cluster” hammer drills may also be used.

DTH systems include both DTH drilling and DTH driving techniques. During DTH pile drilling, the DTH hammer does not make direct contact with the pile; rather, the hammer acts as a percussive drill to advance a hole through the substrate within a casing (casing is driven through overburden using impact or vibratory methods). After

the hole is drilled to the desired depth, the casing is removed, and the production pile is placed inside the hole. Often, an impact hammer is then used to confirm the pile has reached load-bearing capacity (*i.e.*, proof). If needed, a tension anchor can be drilled following these same methods within the production pile to add lateral support to the pile.

During DTH pile driving, the DTH hammer directly strikes a specially designed shoe located at the bottom of the pile, which has wings that have a slightly larger diameter than the pile (*i.e.*, the hammer directly strikes the production pile itself; no pile casing is used). The drill head locks into the bottom of the pile, and then the drill head and pile advance simultaneously into the substrate to the desired depth. Often, the production pile is then proofed with an impact hammer. If needed, a tension anchor can be drilled using DTH drilling methods within the production pile to add lateral support to the pile.

The sounds produced by the DTH methods simultaneously contain both a continuous non-impulsive component from the drilling action and an impulsive component from the hammering effect. Therefore, for purposes of evaluating Level A and Level B harassment under the MMPA, NMFS treats DTH systems as both impulsive (Level A harassment thresholds) and continuous, non-impulsive (Level B harassment thresholds) sound source types simultaneously.

Typical activities for which DTH systems are used include rock socketing and tension or rock anchoring. Rock socketing involves using DTH techniques to create a hole in the bedrock inside which a pile is placed to give it lateral and longitudinal strength as described in DTH drilling, above. Rock sockets are made in bedrock when the overlaying sediments are too shallow to adequately secure the bottom portion of a pile using other methods.

The purpose of a tension anchor is to secure a pile to the bedrock to withstand uplift forces. Tension anchors are installed within production piles that are installed into

the substrate below the elevation of the pile tip after the pile has been driven through the sediment layer to refusal. Typically, a small- diameter casing (*e.g.*, 6- to 8-inch (15.24- to 20.32-centimeter) steel pipe casing) is inserted into a larger- diameter production pile. A rock drill is then inserted into the casing, and a small (*e.g.*, 6- to 10-inch; 15.24- to 25.4-centimeter) diameter hole is drilled into bedrock with rotary and percussion drilling methods (using DTH drilling methods). The drilling activity is contained within the steel pile casing and the steel pipe pile. The typical depth of the drilled tension anchor hole varies, but a 6- to 9-meter (m) depth is common. A steel rod is then grouted into the drilled hole and affixed to the top of the pile.

Hydraulic rock hammers would be used for removal and demolition purposes. These tools are impact devices designed to break rock or concrete. A rock hammer operates by using a chisel-like hammer to rapidly strike an exposed surface to break it up into smaller pieces that would be removed by a clamshell dredge or bucket excavator, as appropriate. Few data exist regarding the underwater sounds produced by rock hammers. Data reported by Escude (2012), however, suggest that the sounds produced by hoe rams are comparable to impact hammers. Therefore, for the purposes of this analysis, it is assumed that hydraulic rock hammers act as an impulsive source characterized by rapid rise times and high peak levels.

The likely or possible impacts of the COU'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, given there are no known pinniped haul-out sites in the vicinity of the Robert Storrs Harbor, 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 vibratory and impact hammers is the primary means by which marine mammals may be harassed from the COU'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 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 rock fill 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 project 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.

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 COU.

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 details regarding potential impacts on marine mammals and their habitat from noise in general, starting with hearing impairment, as well as from the specific activities COU plans to conduct, to the degree it is available.

Hearing Threshold Shifts (TSs). NMFS defines a noise-induced 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 TS 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).

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 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).

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 (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 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 (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocaena 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 seals (*Phoca largha*) and ringed seals (*Pusa hispida*) 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 depend 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 LF 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 SEL₂₄ 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 LF 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 SEL thresholds are 15 to 20 dB higher than TTS cumulative SEL 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 foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship noise. 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 re 1 μ Pa; SEL of a single strike: 127 dB re 1 μ Pa²-s) (Kastelein *et al.*, 2013).

Avoidance is the displacement of an individual from an area or migration path because 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 (*Eschrichtius robustus*) are known to change direction—deflecting from customary migratory paths—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 Jackson, 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 1 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.

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 acoustic 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 TTS hearing loss), and existing ambient noise and propagation conditions (Hotchkiss 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, LF signals may have less effect on HF

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 (Hotchkiss 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 hammers. Energy distribution of vibratory hammer sounds cover 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. LF 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 COU's proposed activities will only occur intermittently, across an estimated 100 days during the authorization period in a relatively small area focused around the proposed construction site. Thus, while the COU'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.

Airborne Acoustic Effects. Pinnipeds that occur near the project site could be exposed to airborne sounds associated with construction activities that have the potential to cause behavioral harassment, depending on their distance from these activities. Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above airborne acoustic harassment criteria. Although pinnipeds are known to haul out regularly on man-made objects, we believe that incidents of take resulting solely from airborne sound are unlikely due to the proximity between the proposed project area and the known haul-out sites (*e.g.*, Steller sea lions are known to haul out on a buoy in Iliuliuk Bay, and pinniped rookeries and haul-out sites exist around Unalaska Island). Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

We recognize that pinnipeds in the water could be exposed to airborne sounds that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sounds would cause behavioral responses similar to those discussed

above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to flush from haul-out sites, temporarily abandon the area, and or move further from the source. However, these animals would previously have been ‘taken’ because of exposure to underwater sounds above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of additional incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Potential Effects on Marine Mammal Habitat

The COU’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, any 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 COU’s activities is relatively small compared to the available habitat in Iliuliuk Harbor. 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 construction activity 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 would occur within the same footprint as existing marine infrastructure. The nearshore and intertidal habitat where the proposed project would 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 mammal habitat would be limited to temporary pile installation and removal noise, and effects on prey species would be similarly limited in time and space.

Water quality. Temporary and localized reduction in water quality would 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, 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).

Impacts to water quality from DTH are expected to be similar to those described for pile driving. Impacts to water quality would be localized and temporary and would have negligible impacts on marine mammal habitat. Drilling would have negligible impacts on water quality from sediment resuspension because the system would operate within a casing set into the bedrock. The drill would collect excavated material inside of

the apparatus where it would be lifted to the surface and placed onto a barge for subsequent disposal.

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 Iliuliuk Harbor.

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 depend 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 LF 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 is likely 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 cause death, and it 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, rock hammering, and DTH excavation. However, the duration of impact pile driving would be limited to the final stage of installation (“proofing”) after the pile has been driven as close as practicable to the design depth with a vibratory driver. In-water construction activities would only occur during daylight hours, allowing fish to forage and transit the project area in the evening. Vibratory pile driving and rock hammering would possibly 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 also 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 Robert Storrs Harbor Floats A&B Replacement 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. 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 COU’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 COU'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 primarily be by Level B harassment, as use of the acoustic (*i.e.*, pile driving hammers) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for AUD INJ (Level A harassment) to result, primarily for VHF species and phocids because predicted AUD INJ zones are relatively large and these species are often difficult to detect. In addition, AUD INJ is anticipated for otariids due to their common occurrence in the immediate vicinity of the project area. AUD INJ is unlikely to occur for LF or HF species due to the anticipated low likelihood of occurrence and relative ease of detection. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable.

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). In this particular case, we did not use density or ensonified area to calculate take, but relied heavily upon the number of days marine mammal groups would be exposed to different underwater sound regimes within the highly constrained harbor environment, and previous monitoring results (pinnipeds) and average group size

(cetaceans). 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). Criteria have also been developed to identify the pressure levels above which animals may incur different types of tissue damage (non-acoustic Level A harassment or mortality) from exposure to pressure waves from explosive detonation. We note that the criteria for AUD INJ, as well as the names of two hearing groups, have been recently updated (NMFS, 2024) as reflected below in the Level A harassment section.

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 (RMS) SPL of 120 dB (referenced to 1 micropascal (re 1 μ Pa)) for continuous (*e.g.*,

vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μ Pa for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, 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.

COU’s proposed project includes the use of continuous (vibratory and DTH) and intermittent (impact and DTH) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μ Pa 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). COU’s proposed activity includes the use of impulsive (impact hammer and DTH) and non-impulsive (vibratory hammer and DTH) sources.

The 2024 Updated Technical Guidance criteria include both updated thresholds and updated weighting functions for each hearing group. The thresholds are provided in the table 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
LF Cetaceans	<i>Cell 1</i> $L_{pk,flat} : 222 \text{ dB}$ $L_{E9LF,24h} : 183 \text{ dB}$	<i>Cell 2</i> $L_{E9LF,24h} : 197 \text{ dB}$
HF Cetaceans	<i>Cell 3</i> $L_{pk,flat} : 230 \text{ dB}$ $L_{E9HF,24h} : 193 \text{ dB}$	<i>Cell 4</i> $L_{E9HF,24h} : 201 \text{ dB}$
VHF Cetaceans	<i>Cell 5</i> $L_{pk,flat} : 202 \text{ dB}$ $L_{E9VHF,24h} : 159 \text{ dB}$	<i>Cell 6</i> $L_{E9VHF,24h} : 181 \text{ dB}$
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat} : 223 \text{ dB}$ $L_{E9PW,24h} : 183 \text{ dB}$	<i>Cell 8</i> $L_{E9PW,24h} : 195 \text{ dB}$
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat} : 230 \text{ dB}$ $L_{E9OW,24h} : 185 \text{ dB}$	<i>Cell 10</i> $L_{E9OW,24h} : 199 \text{ dB}$
* 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 SPL criteria associated with impulsive sounds, the peak SPL criteria are recommended for consideration for non-impulsive sources. Note: Peak SPL ($L_{p,0-pk}$) has a reference value of 1 μPa, and weighted cumulative SEL ($L_{E,n}$) has a reference value of 1 $\mu\text{Pa}^2\text{s}$. 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>i.e.</i>, 7 Hz to 165 kHz). The subscript associated with cumulative SEL 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 SEL criteria could be exceeded in a multitude of ways (<i>i.e.</i>, 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 Zone

Here, we describe operational and environmental parameters of the activity that are used in estimating the zone ensonified above the acoustic thresholds, including source levels and transmission loss coefficient. The ensonified space is truncated by land features that restrict the lineal distance of sound travel from the source to about 1000 m (figure 3).

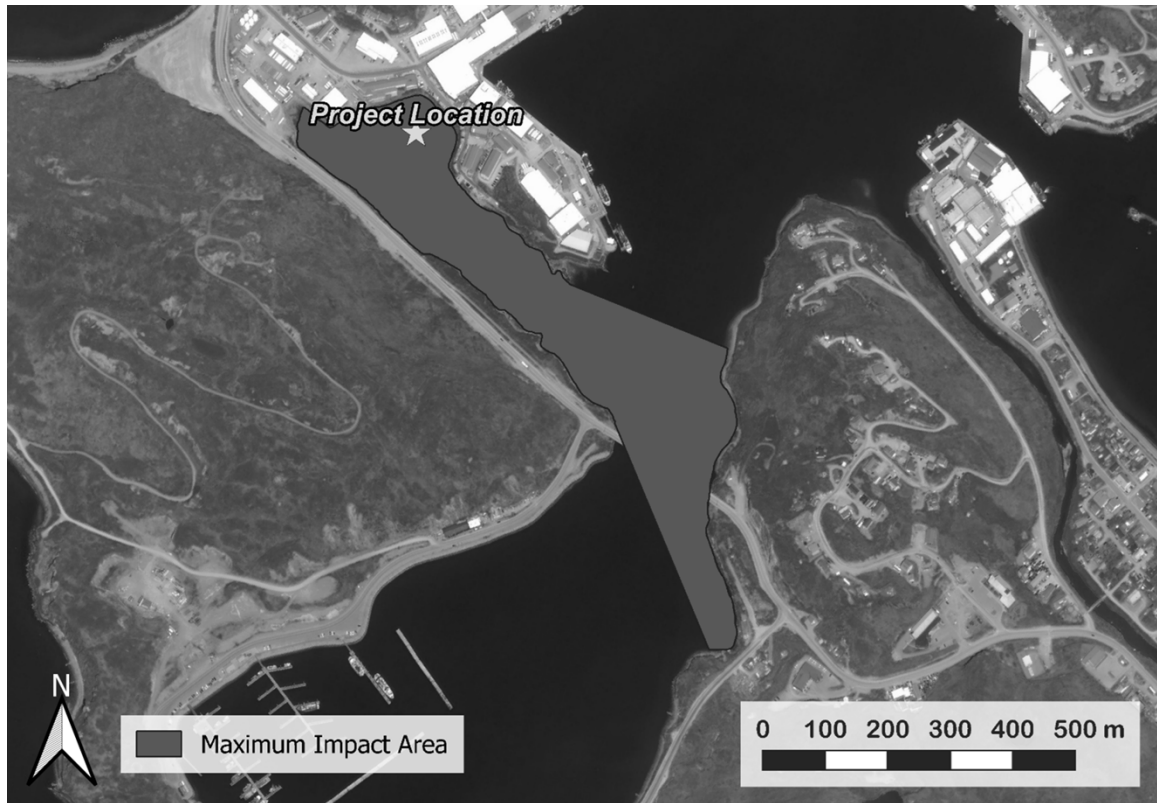


Figure 3. Map of Robert Storrs Small Boat Harbor showing the project location and the shaded ensonified region created during pile driving activity (1000m lineal extent due to land feature obstructions).

The ensounded zone associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the 2024 Updated Technical Guidance that can be used to relatively predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers a practical, alternative way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur AUD INJ. Inputs used in the optional User Spreadsheet tool (table 5), and the resulting estimated isopleths (table 6), are reported below.

Table 5 -- User Spreadsheet Inputs for the Robert Storrs Harbor Floats Project

Source (Steel pipe piles; inches)	Source type	Predicted Source Level (SPL RMS)	SEL	Peak Source Level (SPL RMS)	Distance (m)	WFA (kHz)	Max piles per day	Minutes (strikes) per pile
16	V, R	163	153	181	10	2.5	15	15
24	V, I	163	153	181	10	2.5	4	20
	V, R	163	153	181	10	2.5	4	15
24	V, I&R	163	153	181	10	2.5	4	20
	Impact	190	177	203	10	2	4	1000
	DTH	167	159	184	10	2	2	180
V=Vibratory; R= Removal; I=Installation; DTH=Down-the-hole								

Table 6 -- Calculated Isopleths; Underwater Sources Using the NMFS 2024 Acoustic Tools and Technical Guidance

				PTS Thresholds (m) Level A					Level B Behavioral Disturbance Isopleth (m)
Source (Steel pipe)	Source type	Max Piles	Strikes per pile	LF Cetaceans	HF Cetaceans	VHF Cetaceans	(PW) Phocid Pinnipeds	(OW) Otariid Pinnipeds	

piles; inches)		per day							
16	V, R	15	15	30.3	11.6	24.7	39.0	13.1	7,356.4
24	V, I	4	20	15.2	5.8	12.4	19.5	6.6	7,356.4
	V, R	4	15	12.5	4.8	10.2	16.1	5.4	7,356.4
24	V, I&R	4	20	15.2	5.8	12.4	19.5	6.6	7,356.4
	Impact	4	1000	998.2	127.4	1544.6	886.7	330.5	1,000.0
	DTH	2	180	899.8	114.8	1392.4	799.3	297.9	13,594
V=Vibratory; R= Removal; I=Installation; DTH=Down-the-hole									

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools>.

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.

For humpback whales and killer whales, no Level A harassment is anticipated or proposed for authorization due to the likelihood that these species would not linger in the ensonified zone, and there is a duration element to Level A harassment. If encountered, these species are thought to be brief visitors to the area and traveling through to other portions of the island. PSOs would also likely be able to more easily detect these large species, noting presence and behaviors for the monitoring report. Therefore, all pile driving days would be assumed to result in no worse than Level B harassment for these species.

As noted previously, the constrained harbor environment means that the largest attainable harassment zone distance is approximately 1,000 m. Therefore, due to the relatively large estimated Level A harassment zones associated with impact driving and DTH installation for harbor seal and harbor porpoise, all days of impact driving and DTH installation are assumed to result in Level A harassment for these species, while all days of vibratory driving would result in Level B harassment only. However, for Steller sea lions, the Level A harassment zone for both impact driving and DTH installation is approximately one-third of this maximum harassment zone distance. Therefore, for

Steller sea lions, we assume that one-third of takes on days when impact driving and DTH installation occur would result in Level A harassment. The remaining takes on these days, and all takes of Steller sea lions on vibratory driving days, are assumed to result in Level B harassment.

While no harbor porpoises were sighted during the UniSea project in 2016, COU proposed a monthly estimate of 10 harbor porpoise to account for potential occurrence of this species. For humpback whales and killer whales, COU proposed to assume that two and three individuals may occur within the project area per month, respectively. Note that, for humpback whale, given the low total estimated take, all humpback whale takes are assumed to be of Hawaii stock. Similarly, for the low total estimated take of killer whales, all are assumed to be of ENP Alaska resident stock. For Steller sea lion and harbor seal, we assume average occurrence of 9.4 and 0.95 individuals per day, respectively, on the basis of past monitoring data. The UniSea G1 Dock Replacement monitoring report from 2016 noted sightings of 1,987 individual Steller sea lions and 200 harbor seals over 211 days of monitoring.

The project is expected to require approximately 100 days of pile driving and DTH activity, with approximately two-thirds of this time potentially involving impact driving or DTH installation. We therefore multiply the monthly occurrence estimates by 3.3 months and, for harbor porpoise, assume that two-thirds of the resulting estimated takes would be by Level A harassment. For the species for which we use daily occurrence estimates, we multiple those estimates by 100 days, and assume proportional take by Level A and Level B harassment as described above.

Table 7 -- Common names for species of Marine Mammals with Proposed Take from the Specified Activities

Common name	Estimated Take	Maximum # days exposure to impact hammer	Maximum # days exposure to vibratory hammer	Level A	Level B	Total IT	Min abundance	Proposed take as % of stock

		& DTH						
Humpback whale	2/mo	66	34	0*	7	7	11278	.1
Killer whale	3/mo			0*	10	10	1920	.5
Harbor porpoise	10/mo**			22	11	33	4130	.8
Steller sea lion	9.4/day***			205	735	940	49837	1.8
Harbor seal	.95/day***			63	32	95	5366	1.8
* Level B only; easy sight-ability for shutdown in exclusion zones if needed ** Different monthly rate than used by applicants, but using group size data used in their application *** Applicant presented site-specific monitoring data for pinnipeds, so are using daily sighting data as opposed to monthly estimates								

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. NMFS regulations require applicants for incidental take authorizations (ITAs) 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, as well as subsistence uses. 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 COU in its adequate and complete application or are the result of subsequent coordination between NMFS and COU. COU has agreed that all 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 IHA.

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

- 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.
- Ensure that construction supervisors and crews, the marine mammal monitoring team, and relevant COU 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 COU, construction supervisors and crews, PSOs, and relevant COU 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 and establish monitoring locations as described in the COU's Marine Mammal Monitoring and Mitigation Plan (see appendix 3 of the COU's application). The COU must monitor the project area to the maximum extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions.

Additionally, the following mitigation measures apply to the COU's in-water construction activities.

Establishment of Shutdown Zones. The COU would establish shutdown zones with radial distances as identified in table 8 for all construction activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). If a marine mammal is observed entering or within the shutdown zones indicated in table 8, 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. If a marine mammal comes within or approaches the shutdown zone indicated in table 8, such operations must cease. Shutdown zones would vary based on the activity type and marine mammal hearing group.

During the impact and DTH pile driving of 24-inch steel pipe piles, the shutdown zone for Steller sea lions would be established at 60 m rather than the larger Level A harassment isopleths (340 and 300 m, respectively) due to practicability; local conditions

indicate that Steller sea lions are frequently present near the project site, likely due to nearby docks that accommodate fishing vessels. The Level A harassment zones for harbor porpoises and harbor seals are nearly or equal to the size of the Level B harassment zones. As with the Steller sea lion, harbor seals may be drawn to the project site, and the shutdown zone is established at 130 m. The harbor porpoise shutdown zone is established at 300 m, rather than the Level A harassment zone of 1000 m (equal to the Level B zone).

Table 8 -- Proposed Shutdown Zones During Project Activities

Activity	Pile Type / Size (cm)	Shutdown Zone (m)				
		LF cetaceans	HF cetaceans	VHF cetaceans	PW	OW
Vibratory Removal	steel 41 (16 inch)	40	20	30	40	20
Vibratory Removal	steel 61 (24 inch)	20	10	20	20	10
Vibratory Installation	steel 61 (24 inch)	20	10	20	20	10
Impact Installation	steel 61 (24 inch)	1000	130	300	130	60
Down-the-hole	steel 61 (24 inch)	900	120	300	130	60

Pre- and Post-Activity Monitoring. Monitoring would take place 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 lead PSO to determine that the shutdown zones indicated in table 4 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.

Soft Start. The COU 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 a warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity.

NMFS conducted an independent evaluation of the proposed measures and 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.

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 COU in its adequate and complete application and/or are the result of subsequent coordination between NMFS and COU. COU has agreed to the requirements. NMFS describes these below as requirements and has included them in the proposed IHA.

The COU would abide by all monitoring and reporting measures contained within the IHA, if issued, and their Marine Mammal Monitoring and Mitigation Plan (see

appendix 3 of The COUs application). A summary of those measures and additional requirements proposed by NMFS is provided below.

Visual Monitoring. A minimum of two NMFS-approved protected species observers (PSOs) must be stationed at the project site for the entirety of active construction operations. PSOs would be independent of the activity contractor (for example, employed by a subcontractor) and 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 ITA or Letter of Concurrence (LOC). Other PSOs may substitute other relevant experience (including relevant Alaska Native traditional knowledge), 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 ITA. Where a team of three or more PSOs is required, a lead observer or monitoring coordinator would be designated. The lead observer must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued ITA or LOC.

PSOs should also have the following additional qualifications:

- The ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in field identification of marine mammals, including the identification of behaviors;
- 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.

The COU must establish monitoring locations as described in the Marine Mammal Monitoring and Mitigation Plan (see appendix 3 of the COU's application). For all pile driving activities, a minimum of one PSO must be assigned to each active pile driving location to monitor the shutdown zones. PSOs would record all observations of marine mammals, regardless of distance from the pile being driven, as well as the additional data indicated below.

Reporting. The COU 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 construction 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 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 locations during marine mammal monitoring; and
- Environmental conditions during monitoring periods (at beginning and end of PSO 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 who sighted the animal(s) and PSO 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 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.

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 the COU 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 the COU's activities discover an injured or dead marine mammal, the COU would report the incident to the NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*, *ITP.gatzke@noaa.gov*) and to the Alaska Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, the COU 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. The COU 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.

NMFS conducted an independent evaluation of the proposed measures, and 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, and on the availability of such species or stock for subsistence uses.

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).

To avoid repetition, the discussion of our analysis applies to all the species listed in table 2, given that the anticipated effects of this activity on these different marine mammal stocks are expected to be similar. There is little information about the nature or severity of the impacts, or the size, status, or structure of any of these species or stocks that would lead to a different analysis for this activity.

Specified activities associated with the Robert Storrs Harbor Project, as outlined previously, have the potential to disturb or displace as well as cause AUD INJ to marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment and Level A harassment, from underwater sounds generated by pile driving. Potential takes could occur if marine mammals are present in zones ensounded above the thresholds for Level B harassment or Level A harassment, identified above, while activities are underway.

No serious injury or mortality would be expected, even in the absence of required mitigation measures, given the nature of the activities. The potential for harassment would be minimized through the implementation of planned mitigation measures (see **Proposed Mitigation** section).

Take by Level A harassment is proposed for five species (harbor porpoise, Steller sea lion, and harbor seal) as the size of the estimated Level A harassment zone relative to the shutdown zone means that it is possible that these species could enter the Level A harassment zone and remain within the zone for a duration long enough to incur AUD INJ before being detected.

Any take by Level A harassment is expected to arise from, at most, a small degree of AUD INJ (*i.e.*, minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by impact pile driving such as the LF

region below 2 kHz), not severe hearing impairment or impairment within the ranges of greatest hearing sensitivity. Animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of AUD INJ. COU would also shut down pile-driving activities if marine mammals enter the shutdown zones (table 4) further minimizing the likelihood and degree of AUD INJ that would be incurred. Given the small degree anticipated, any AUD INJ potential incurred would not be expected to affect the reproductive success or survival of any individual, much less result in adverse impacts on the species or stock.

Additionally, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. However, since the hearing sensitivity of individuals that incur TTS is expected to recover completely within minutes to hours, it is unlikely that the brief hearing impairment would affect the individual's long-term ability to forage and communicate with conspecifics, and would therefore not likely impact reproduction or survival of any individual marine mammal, let alone adversely affect rates of recruitment or survival of the species or stock.

As described above, NMFS expects that marine mammals would likely move away from an aversive stimulus, especially at levels that would be expected to result in AUD INJ, given sufficient notice through use of soft start.

Effects on individuals that are taken by Level B harassment in the form of behavioral disruption, on the basis of reports in the literature as well as monitoring from other similar activities, would likely be limited to reactions such as avoidance, increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff, 2006). Most likely, individuals would simply move away from the sound source and temporarily avoid the area where pile driving is occurring. If sound produced by pile removal and installation activities is sufficiently

disturbing, animals are likely to simply avoid the area while the activities are occurring. We expect that any avoidance of the project area by marine mammals would be temporary in nature and that any marine mammals that avoid the project area during pile removal and installation activities would not be permanently displaced. Short-term avoidance of the project area and energetic impacts of interrupted foraging or other important behaviors is unlikely to affect the reproduction or survival of individual marine mammals, and the effects of behavioral disturbance on individuals is not likely to accrue in a manner that would affect the rates of recruitment or survival of any affected stock.

The Robert Storrs Harbor Project is also not expected to have significant adverse effects on affected marine mammals' habitats. The pile removal and installation activities would not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range. We do not expect pile-driving activities to have significant consequences to marine invertebrate populations. Given the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat, including fish and invertebrates, are not expected to cause significant or long-term negative consequences. With the exception of some below high tide line fill to support the upland parking area embankment, the new improvements to the Robert Storrs Harbor would be contained within the footprint of the existing harbor so no permanent impacts to habitat are expected to occur.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect any of the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or authorized;

- Level A harassment of three species proposed for authorization are expected to be of a small degree;
- Effects on species that serve as prey for marine mammals from the activities are expected to be short-term and, therefore, any associated impacts on marine mammal feeding are not expected to result in significant or long-term consequences for individuals, or to accrue to adverse impacts on their populations;
- The lack of anticipated significant or long-term negative effects to marine mammal habitat; and
- The efficacy of the mitigation measures in reducing the effects of the specified activities on all species and stocks.

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 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

(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.

The instances of take that NMFS proposes to authorize are below one-third of the estimated stock abundance for all stocks (table 3). The number of animals that we expect to authorize to be taken from these stocks would be considered small relative to the relevant stocks' abundances even if each estimated taking occurred to a new individual, which is an unlikely scenario.

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 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

In order to issue an IHA, NMFS must find that the specified activity will not have an “unmitigable adverse impact” on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined “unmitigable adverse impact” in 50 CFR 216.103 as an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by (i) causing the marine mammals to abandon or avoid hunting areas, (ii) directly displacing subsistence users, or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

Harbor seals and Steller sea lions are the only two species under review that have recently been hunted for subsistence purposes in Unalaska, with harbor seals being most recent in 2020 with 35 seals harvested (Keating *et al.*, 2022). While it appears that the percentage of the Unalaskan subsistence hunters has recently been declining from 1994 to

2020 (less than 4 percent according to PND (2026)), and acknowledging a gap in data collection from 2008 to 2020, there is also trade in subsistence goods.

This harbor enhancement project does not overlap in space and time with local Alaskan subsistence hunting, and when completed, will provide improved water quality and accessibility for hunters to more fully use this harbor. The proposed improvements to the harbor are essential to support subsistence users in Unalaska. Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the proposed mitigation and monitoring measures, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from COU's proposed activities.

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 ITAs, NMFS consults internally whenever we propose to authorize take for ESA-listed species, in this case with the NMFS Alaska Regional Office (AKRO).

NMFS is proposing to authorize take of Steller Sea lions, which are listed under the ESA. The NMFS Office of Protected Resources has requested initiation of section 7 consultation with AKRO for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the COU for conducting construction including pile driving at Robert Storrs Harbor in

Unalaska, Alaska, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA 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 IHA for the proposed Robert Storrs Harbor Float A&B Replacement Project. We also request comment on the potential renewal of this proposed IHA 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 this IHA or a subsequent renewal IHA.

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:
 - 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).

- 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: March 23, 2026.

Kimberly Damon-Randall,

Director, Office of Protected Resources,

National Marine Fisheries Service.

[FR Doc. 2026-05812 Filed: 3/24/2026 8:45 am; Publication Date: 3/25/2026]