INCIDENTAL HARASSMENT AUTHORIZATION APPLICATION FOR THE OCEANSIDE HARBOR FISHING PIER AND NON-MOTORIZED VESSEL LAUNCH IMPROVEMENT PROJECT

JANUARY 1, 2024 THROUGH DECEMBER 31, 2024

Submitted to:
Office of Protected Resources,
National Marine Fisheries Service,
National Oceanic and Atmospheric Administration

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List of Acronyms and Abbreviations

ADA	The Americans with Disabilities Act
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
CI	Confidence Interval
CLT	California Least Tern
CV	Coefficient of Variation
dB	decibel
ESA	Endangered Species Act
ft	foot/feet
IHA	Incidental Harassment Authorization
km	kilometer(s)
m	meter(s)
M&A	Merkel & Associates, Inc.
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
NAVFAC	Naval Facilities Engineering Systems Command (SW = Southwest)
nmi	nautical miles
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
POC	point of contact
POSD	Port of San Diego
PTS	permanent threshold shift
re 1 µPa	referenced to 1 micropascal
RMS	root mean square
SEL	sound exposure level
SPL	sound pressure level
TL	transmission loss
TTS	temporary threshold shift
U.S.	United States
USACE	U.S. Army Corps of Engineers
ZOI	Zone of Influence

EXECUTIVE SUMMARY

In accordance with the Marine Mammal Protection Act (MMPA) of 1972, as amended, Merkel and Associates, Inc. (M&A) is applying for an Incidental Harassment Authorization (IHA) for pile removal and pile driving activities associated with the Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvements Project (Project) located within Oceanside Harbor, in the City of Oceanside, California. For this IHA application, M&A determined that underwater noise from pile removal and installation has the potential to result in incidental harassment under the MMPA. This IHA application is intended to cover an approximately 12-month window during which 6 days of pile removal and installation activity would occur. A subsequent Continuation IHA application will be submitted for any remaining in-water activities that are necessary to complete the project that extend beyond the planned one-year IHA period.

Six species of marine mammals have a reasonable likelihood of occurrence during the project's timeline and could thereby be exposed to sound pressure levels (SPLs) and sound exposure levels (SELs) associated with non-impulsive and continuous noise associated with pile removal and installation:

- California sea lion (*Zalophus californianus*);
- Harbor seal (*Phoca vitulina*);
- Northern elephant seal (*Mirounga angustirostris*);
- Bottlenose dolphin (*Tursiops truncatus*);
- Common dolphin including long- and short-beaked (*Delphinus capensis* and *D. delphis*); and
- Pacific white-sided dolphin (*Lagenorhynchus obliquidens*).

The fishing pier in Oceanside Harbor is near the center of the inner Oceanside Harbor basin (Figure 1). Oceanside Harbor provides a public boat launch, marina services, fuel dock, bait, shopping, dining, and beach front access to the public. The harbor is just south of and connected to the Del Mar Boat Basin, part of Marine Corps Base Camp Pendleton with which it shares a common outer harbor stilling basin. The Project involves pile removal and pile driving activities, creation of a new non-motorized vessel launch and American Disabilities Act (ADA) compliant dock access, and completion of a new, expanded fishing pier. Section 1.2 describes in detail the proposed activities to be conducted during this IHA period. The proposed activities with the potential to affect marine mammals within the waterways of Oceanside Harbor that could result in harassment under the MMPA are pile removal by vibratory extraction, and pile installation via impact and vibratory pile driving.

In this IHA application, M&A has used National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Technical Guidance (NMFS 2018) and User Spreadsheet (NMFS 2020a), as well as observed noise levels during pile removal and installation projects throughout California, to identify the Level A (injury) and Level B (behavioral) monitoring zones [formerly zones of influence (ZOIs)} that would result from pile removal and installation, as outlined in Section 6 and presented in Table ES-1.

Table ES-1. Noise Source Data Used to Calculate Level A and B Monitoring Zones by Demolition or Installation Method and Pile Size and Type

Method	Pile Size and Type	Noise Source Data
Pile Removal Activities		
Vibratory Extraction	16-inch Octagonal Concrete[1]	Draft Interim Proxy Source Levels from Pier 6 Replacement Project, San Diego Bay (NAVFAC SW 2022))
Pile Installation Activities		
Impact Pile Driving	18-inch Round Steel[2]	Analysis of pooled reported data provided by NMFS (Caltrans 2020)
Vibratory Hammer	18-inch Round Steel	Prichard Lake Pumping Station Project in Sacramento, CA (Caltrans 2020)
Vibratory Hammer	10-inch round Steel[3]	Mad River Slough Pipeline Project in the Compendium of Pile Driving Sound Data (Illingworth & Rodkin 2007)

[1]In the absence of information on vibratory extraction of 16-inch octagonal concrete piles, interim proxy levels were provided by NMFS including unpublished data from NAVFAC SW 2022).
[2]In the absence of information on impact pile driving of 18-inch round steel piles, several pile sizes were analysis by NMFS (Caltrans 2020)[3]In the absence of information on Vibratory Installation of 10-inch round steel piles, source data from 12-inch round steel piles (Illingworth & Rodkin 2007) was used as a proxy source level.

Source levels for pile removal and installation are typically measured at 10 m (33 ft) from a pile in order to standardize sound measurement data. For pile removal and installation activities, underwater sound transmission loss is estimated using the practical spreading loss model for transmission loss assuming acoustic source data derived from the reported values in the projects listed in Table ES-1.

Potential exposures that would constitute takes under the MMPA are calculated and described in Section 6, and based on this analysis, no mortality or injuries are anticipated. When Level A shutdown zones are small, a 10 m (33 ft) "Physical Interaction Shutdown Zone" (PISZ) is generally used to reduce the risk of physical interaction between marine mammals and in-water construction activities. However, for the present project, this PISZ has been expanded to 15 m (50 ft) for all marine species observed in the Project area. This larger shutdown zone envelopes most Level A exposure distances for marine mammals. One Level A shutdown zone for has been established beyond the PISZ that would apply for phocid pinnipeds (true seals) during 18-inch steel pipe pile impact driving activities. This shutdown zonehas been set at 180 meters (591 feet) to avoid Level A exposure to phocid pinnipeds, calculated to be a distance of 176.7 meters (579.7 feet) from the sound source. Adhering to constraints on active pile driving activities when mammals enter applicable shutdown zones would avoid Level A harassment (minor injury due to the onset of a permanent threshold shift [PTS]). Previously established acoustic data and a simple practical spreading loss model were used to determine the Level A shutdown zones and B monitoring zones applicable to the proposed work.

The Project will include continued observational monitoring of marine mammal occurrences within established shutdown zones and monitoring zones during periods of pile pulling or driving operations.

Pursuant to the MMPA Section 101(a)(5)(D), M&A submits this application to the NMFS for an IHA for the incidental, but not intentional, Level B taking of 756 marine mammals during approximately 6 days of pile removal and installation activities as part of the Project occurring during the one-year period beginning November 1, 2023 and ending October 31, 2024. The take would include up to 600 California sea lion, 18 harbor seals, 72 bottlenose dolphin, 54 common dolphin, 6 Pacific white-sided dolphin, and 6 northern elephant seals. Common dolphin, Pacific white-sided dolphin, and northern elephant seal are not expected to be in the harbor but may occur on rare occasions.

The anticipated take of marine mammals would be in the form of non-lethal, temporary harassment behavioral disturbance and is expected to have a negligible impact on the species. If in-water activities do not occur within the anticipated project window, a request for renewal will be submitted and received by NMFS no later than 60 days prior to the expiration of this IHA. The renewal request will include an explanation that the activities to be conducted under the requested renewal are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor 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 because only a subset of the initially analyzed activities remain to be completed under the renewal). The renewal request will also include a preliminary monitoring report showing the results of 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.

Regulations governing the issuance of incidental take under certain circumstances are codified at 50 Code of Federal Regulations (CFR) Part 216, Subpart I (Sections 216.101 – 216.108). Section 216.104 sets out 14 specific items that must be addressed in requests for take pursuant to Section 101 (a) (5) (D) of the MMPA. These 14 items are addressed in Sections 1 through 14 of this IHA application.

1.0 DESCRIPTION OF SPECIFIED ACTIVITY

1.1 INTRODUCTION

Merkel and Associates, Inc. (M&A) submits this Incidental Harassment Authorization (IHA) application to the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) for the incidental taking of marine mammal species during pile removal and pile driving activities associated with the Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvements Project (Project) at Oceanside Harbor, within the city of Oceanside, California (Figure 1-1). In-water work associated with the Project will consist of pile removal and pile driving activities, creation of a new non-motorized vessel launch and American Disabilities Act (ADA) compliant dock access, and completion of a new, expanded fishing pier. Upland improvements associated with the project will consist of the creation of ADA compliant parking. Of those activities, only pile removal and pile driving may result in takes of marine mammals for the one-year period between November 1, 2023 and ending October 31, 2024. To account for the breeding/nesting season of the Endangered Species Act (ESA)-listed California least terns (CLT; *Sternula antillarum browni*), in-water pile removal and pile driving activities are expected to occur on a total of 6 days between November 1, 2023 and March 31, 2024, or after September 1, 2024. During this timeframe, there will be an estimated maximum of 1 day of pile removal activities and 5 days of pile driving activities.

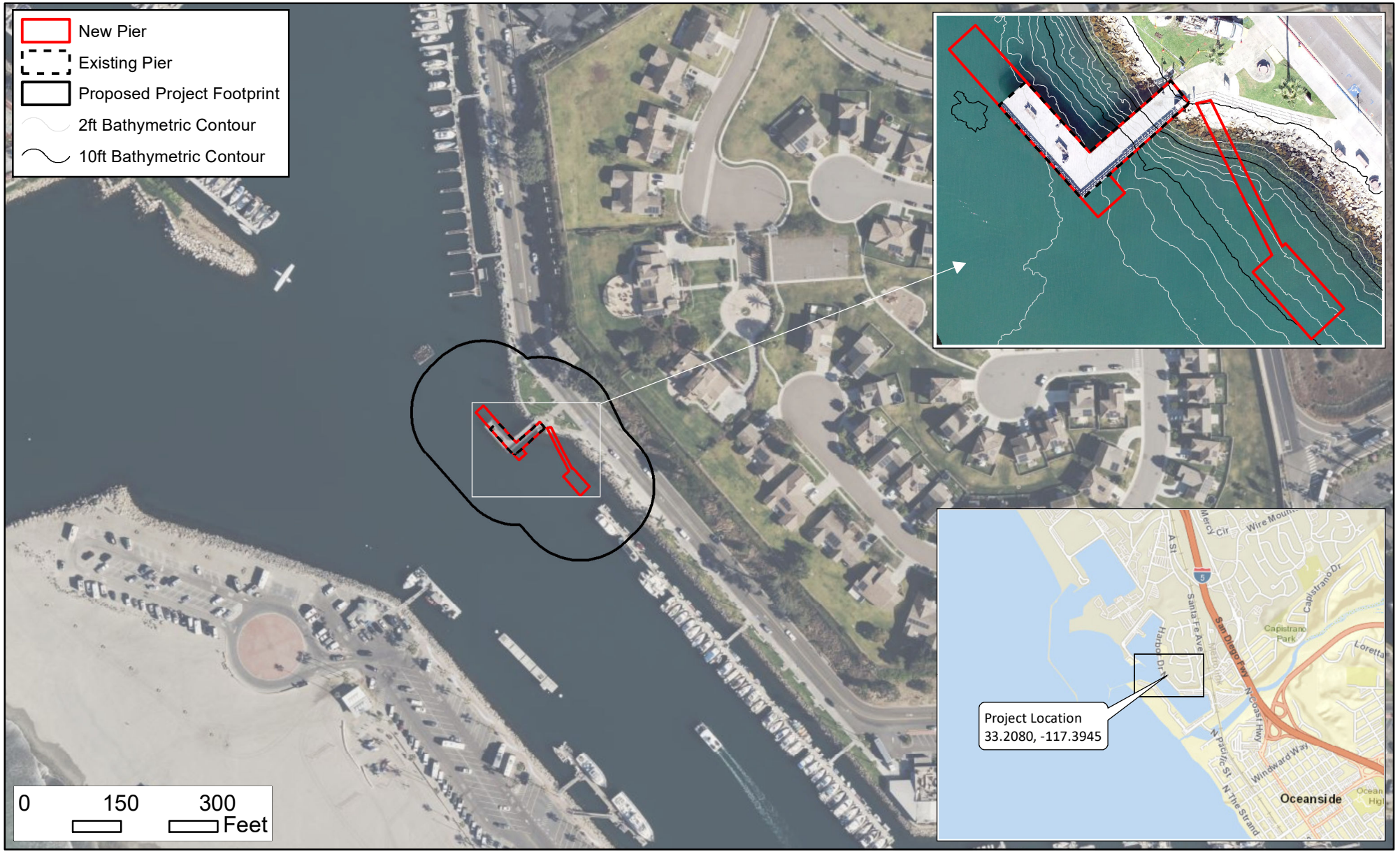
Code of Federal Regulations (CFR) 50 216.104 sets out 14 specific items that must be included in requests for take in accordance with Section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA). Those 14 items are addressed in Sections 1 through 14 of this IHA. If in-water pile removal and pile driving activities do not occur within the year anticipated, a request for renewal will be submitted and received by NMFS no later than 60 days prior to expiration of this IHA.

The public fishing pier in Oceanside Harbor was constructed in 1979 and is located near the center of the basin, close to the mouth (Figure 1-1). Oceanside Harbor provides a public boat launch, marina services, fuel dock, bait, shopping, dining, and beach front access to the public. The harbor is just south of and connected to the Del Mar Boat Basin, part of Marine Corps Base Camp Pendleton.

The current fishing pier structure was inspected in 2021 and determined to have structural deficiencies and critical failures. The fishing pier was closed pending further analysis and temporary repairs to stabilize the deck ensued. The fishing pier was re-opened in early November 2021 with a limited capacity of no more than 10 persons. Additionally, the nearby non-motorized paddleboard and kayak launch was installed in 2013, with fencing added and dock modules reconfigured in subsequent years. The inflatable dock modules used to create the current non-motorized launch have a limited design life of approximately 20 years.

The current condition of the pier has inadequate load-bearing capabilities. To maintain safe and secure ADA compliant public access to the harbor, the proposed action will include the following elements:

- Demolition of the existing pier including removal of four 16-inch concrete structural piles;
- Construction and installation of a new cement pier as well as the installation of up to 18-, 10-inch temporary guide piles and 18, 18-inch plastic coated structural steel pipe piles;



Project Location

Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvement Project

Figure 1-1

- Construction and installation of a non-motorized vessel launch and ADA compliant dock access ramp,
- Installation of ADA compliant parking stall and access to an existing restroom facility.

The proposed activities with the potential to result in harassment under the MMPA are the removal of piles by use of a vibratory pile extractor to loosen and pull piles out of the bottom, as well as pile installation using impact or vibratory hammers. Other pile removal methods, including removing piles via high-pressure water jet may also occur, but no additional Level B harassment is expected by combining these methods.

The Proposed Action is needed to provide the public with safe and adequate ADA compliant facilities to access the harbor for fishing or other recreational non-motorized vessel activities.

1.2 Description of Activities

Following top side demolition of existing pier elements, workers would remove the four existing 16-inch octagonal piles in one working day.

Table 1-1 describes the type and number of piles to be removed as well as the anticipated method of removal. Workers would extract piles using vibratory extraction, with or without high pressure water-jetting. Vibratory extraction has been assessed for take due to the similarity to vibratory pile installation. Section 6.2.2 below details why no take analyses will be presented for high pressure water-jetting in the IHA application.

Table 1-1. Oceanside Fishing Pier Piles to be Removed During this IHA Period

Pile Type	Number to be Removed	Removal Method
16-inch Octagonal Concrete	4	Vibratory Extraction[1]

[1] With or without high-pressure water jetting occurring simultaneously.

Existing concrete piles will be removed using a vibratory extractor and pile clamp by latching on to the pile with the clamp, vibrating the pile to break surface tension, and applying upward pressure to extract the whole pile. Once the piles are removed, a crane would remove the pile and set it onto a barge for transport. Throughout the demolition effort, material floats and collection bins would capture demolition debris before it enters the water. Workers in support boats would gather any floating debris for recycling or disposal, as appropriate. Once extracted, the piles will be loaded onto a support barge for eventual offloading. During pile removal, floating stick bar booms will be deployed around the active work area to provide a complete barrier to floating debris. Any floating debris will be gathered in work boats and will be disposed of or recycled as appropriate.

Following the removal of all existing piles, workers would install new 18-inch steel piles at a rate of up to four per day, with or without the use of 10-inch steel guide piles placed to assist in maintaining pile angles and position. At this rate, in-water pile installation activities are anticipated to require up to 5 working days. Table 1-2 describes the type and number of each pile to be installed, as well as the anticipated method of installation.

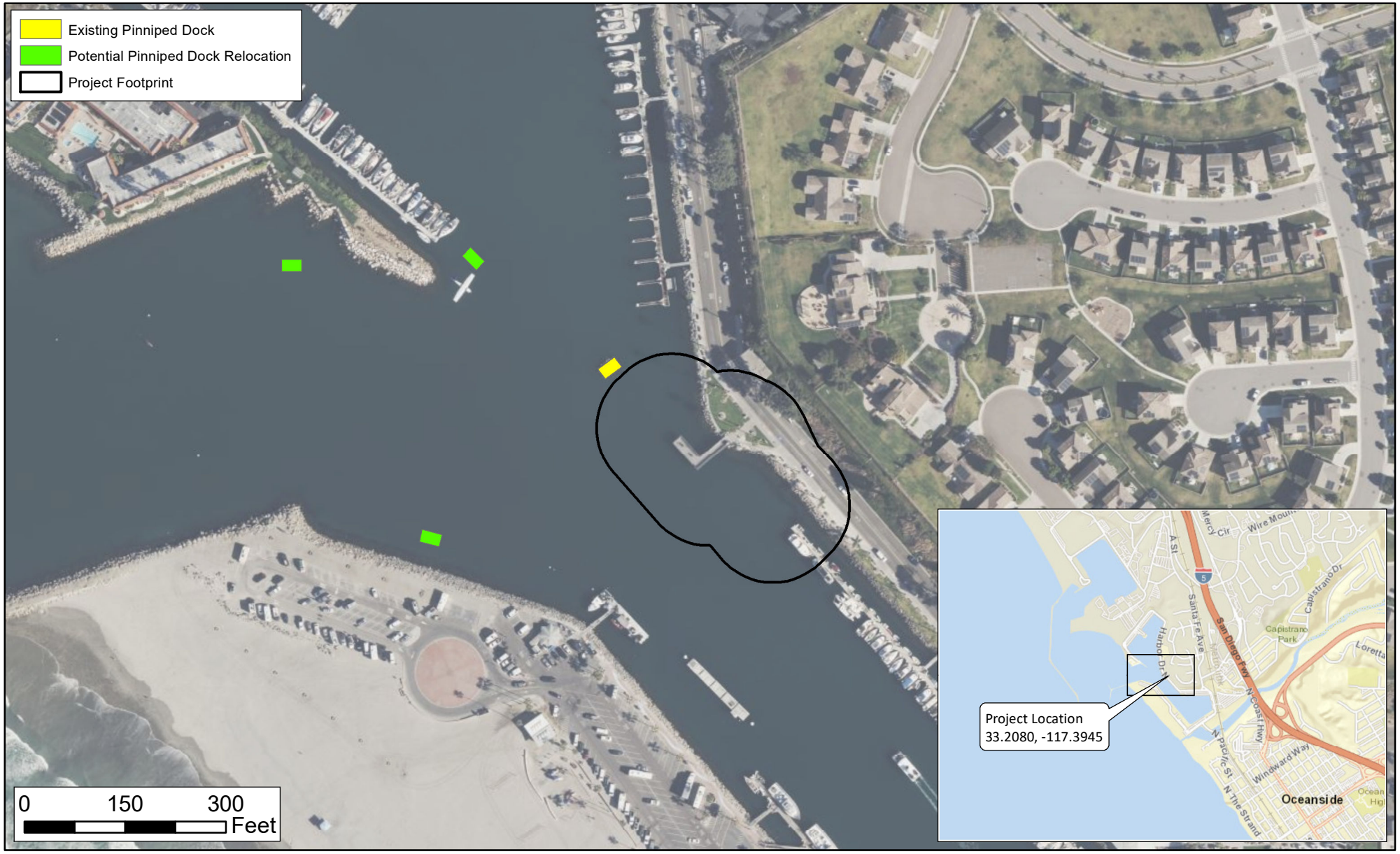
Prior to pile removal, the existing pinniped haul out dock anchored approximately 21 meters (m; 69 feet [ft]) north of the end of the existing fishing pier will be temporarily relocated by the Harbor Department to one of three potential locations (Figure 2-1). The dock would be relocated when no sea lions are present on the structure. Three locations have been chosen that are out of the way of construction as well as boat traffic, and the construction crew would work with the Harbor Department to pick the best location. The dock would be reinstalled at its present location following pile driving activities. This temporary relocation of the float will minimize the attraction of sea lions to the work area.

Table 1-2. Pier 302 Piles to be Installed During this IHA Period

Pile Type	Number to be Installed	Installation Method
18-inch Round Steel	18	Vibratory Hammer; Impact Hammer[1,2]
10-inch Round Steel[3]	18	Vibratory Hammer

[1] With or without high-pressure water jetting occurring simultaneously.
[2]Final 2 to 5 ft of hammering will use an impact hammer.
[3]Guide piles are not anticipated to be needed, however; take analysis is included to be conservative.

The 18-inch plastic coated steel piles will be structural piles, holding the weight of both the fishing pier and non-motorized vessel launch. While not expected to be required based on site geology, 10-inch steel piles may be used as temporary guide piles to aid in the installation of the larger structural piles. A water jet may be used as well during the installation process. New 18-inch steel piles will be installed with a vibratory hammer until they are within 2 to 5 ft of the required depth, at which point the remaining driving will be done with an impact hammer depending on observed sediment resistance. If 10-inch steel guide piles are needed, they will be installed and extracted via vibratory hammer. Guide piles are temporary and only installed to aid in installation of structural piles if hard sediments are encountered that will deflect pile positioning.



Potential Pinniped Dock Relocation

Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvement Project

Figure 2-1

2.0 DATES, DURATION, AND SPECIFIED GEOGRAPHIC LOCATION

2.1 Dates and Duration of Activities

For this analysis, it is assumed that the removal of 4 piles and installation of up to 36 piles (18 permanent and 18 temporary) would happen over approximately 6 days within the one-year IHA period (Table 2-1). Pile pulling and installation may not occur over consecutive days. Piles would be removed at a rate of approximately 4 per day, and installation of piles would occur at a rate of approximately 4 permanent per day. Temporary guide piles, should they be required, would be driven within the same timeframe as the permanent piles. All temporary piles will be removed once driving of the permanent piles is complete.

Table 2-1. Pile Type and Pile Removal and Installation Method and Duration

Method	Pile Type	# of Piles	Piles/Day	Total Estimated Days
Pile Removal				
Vibratory Extraction[1]	16-inch Octagonal Concrete	4	4	1
Pile Installation				
Vibratory Hammer; Impact Hammer[1,2]	18-inch Round Steel	18	4	5
Vibratory Hammer	10-inch Round Steel	18	4[3]	n/a[3]
Total in-water work days				**6**

[1] With or without high-pressure water jetting occurring simultaneously.
[2] Final 2 to 5 ft of driving of 18-inch round steel piles will use an impact hammer.
[3] No additional days are expected if guide piles are required.

2.2 Project Area Description

Oceanside Harbor was built in 1961 and is located north of the City of Oceanside and south of the Del Mar Boat Basin and Marine Corps Base Camp Pendleton. This manmade basin encompasses approximately 242,000 m² (60 acres) of area that includes a riprap lined channel and U-shaped basin. The Harbor contains a marina of more than 800 boat slips, a public boat launch south of the mouth, and a sandy beach on the south side of the channel sheltered by jetty walls to the north.

The project area for the Proposed Action can be found at approximately 1401 Harbor Drive North within the City of Oceanside. The proposed project footprint covers approximately 8,055 m² with depths ranging from approximately -6 m (-20 ft) below mean lower low water (MLLW) to +2.4 m (+7.8 ft) above MLLW (Figure 1-1). Table 2-2 describes in detail the breakdown of habitat types by depth within the proposed project footprint (Table 2-2).

Table 2-2. Habitat in the Oceanside Harbor Fishing Pier Proposed Project Footprint [m^2 (ft^2)].

Habitat Type	Supra-tidal Zone (>7.8 ft)	Intertidal Zone (7.8 to -2.2 ft)	Shallow Subtidal Zone (-2.2 to -12 ft)	Moderately Deep Subtidal Zone (-12 to -20 ft)	Deep Subtidal Zone (> -20 ft)	Upland	Total
Urban/ Developed	-	-	-	-	-	1,852 (19,932)	1,852 (19,932)
Rock Revetment, Rubble, Debris	202 (2,178)	647 (6,969)	121 (1,306)	-	-	-	970 (10,453)
Unvegetated Soft Bottom	-	-	872 (9,379)	4,339 (46,709)	22 (230)	-	5233 (56,318)
Total	**202 (2,178)**	**647 (6,969)**	**993 (10,685)**	**4,339 (46,709)**	**22 (230)**	**1,852 (19,932)**	**8055 (86,703)**

3.0 SPECIES AND NUMBERS OF MARINE MAMMALS

Little data exists regarding the frequency of marine mammals occurring in Oceanside Harbor. During a recent five-day, 24-hour marine mammal monitoring event near the mouth of Oceanside Harbor in spring of 2022 during dredging, the most frequently observed marine mammal was the California sea lion (*Zalophus californianus*), often seen in the waters of the survey area, and incidentally on the pinniped haul out dock, buoys, rocks, and other structures throughout the harbor (M&A 2022). Other species observed during the spring 2022 monitoring included bottlenose dolphin (*Tursiops truncatus*) and harbor seal (*Phoca vitulina*). The spring monitoring was conducted within the outer harbor waters and thus did not capture sea lion activities within the inner harbor.

During another recent monitoring event near the mouth of Oceanside harbor during dredging, 23 days of 24-hour monitoring was conducted for marine mammals during the spring of 2023. During this monitoring event, no green sea turtles were observed during the course of the monitoring, and a total of 163 data entries were made with 414 marine mammals being recorded by the observers. A total of five species were observed during the surveys. This included one otariid (California sea lion), one phocid (harbor seal), and three cetacean species (common dolphin, bottlenose dolphin, and gray whale). In addition, one unidentified dolphin was noted. Observations ranged from individual marine mammals to a group of approximately 100 common dolphins. Gray whales, common dolphins, and the unidentified dolphin were all observed outside of the harbor during the monitoring, while bottlenose dolphins and California sea lions were observed both outside and inside the harbor, and harbor seal were observed within the harbor mouth (M&A 2023).

Within the inner harbor area where the project is proposed, sea lions are regularly present and harbor seals are less common. Inquiries were made to the Oceanside Harbor Department staff regarding any data on sea lion abundance and any habitual haul out areas. However, information returned was mostly anecdotal as the Harbor Department does not keep records or counts. However, they noted that the abundance of sea lions varies substantially by day, week, and month, with variability also being driven by food availability and breeding season movements. The sea lions typically are concentrated around the pinniped dock that was placed near the project site several years ago to attract sea lions away from docks and boats where they were becoming a nuisance. The Harbor Department noted that the pinniped float varies from being completely full (maybe 100+ animals) to completely empty. A photograph of the pinniped float was provided as a good representation of the average density of animals. This photo is believed to exhibit 35 to 40 visible sea lions. The Harbor Department also noted that sea lions also attempt to haul out on the transient dock to the north of the site.

Typical number of sea lions on the pinniped float within the harbor. There are between 35 and 40 visible animals on the float with approximately 20% of the float being non-viewable. Source: City Harbor Department

On April 11 and 12, 2023 the number of sea lions on the float and in the surrounding waters were estimated at 53 and 46, respectively. Given the range in abundance of sea lions in the harbor at any given time, a conservative estimate of 100 sea lions has been used in developing the estimates for sea lions potentially subject to Level B take.

While not anticipated to be encountered in Oceanside Harbor, additional species considered under this IHA application include common dolphins (both short-beaked [*Delphinus delphis*] and long-beaked [*Delphinus capensis*]), northern elephant seal (*Mirounga angustirostris*) and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), based on these species' associations with the waters of Southern California. See section 6.8.7 for a brief explanation of species excluded from this analysis. Beyond the five-day monitoring event mentioned above, little marine mammal monitoring data exists for Oceanside Harbor. NMFS Stock Assessment Reports (Carretta et al. 2015, 2019, and 2022) are considered in determining the estimated baseline and minimum populations of each designated stock of marine mammals that have the potential to occur within the Project Area.

3.1 Species Status, Distribution, and Abundance

3.1.2 California Sea Lion

California sea lion are commonly seen in and around the waters and structures within Oceanside Harbor (M&A 2023). The California sea lion, an otariid pinniped, is now considered to be a full species, separated from the Galapagos sea lion (*Z. wollebaeki*) and the extinct Japanese sea lion (*Z. japonicus*) (Carretta et al. 2019).

It is assumed that the entire population cannot be counted at once because all age and sex classes are never ashore at the same time. In lieu of counting all California sea lions, pups are counted when all are ashore, in July during the breeding season, and the number of births is estimated from pup counts (Carretta et al. 2019). The size of the population is then estimated from the number of births and the proportion of pups in the population. Based on these censuses, the U.S. stock has generally increased from the early 1900s, to the most recent estimate of 257,606, with a minimum estimate of 233,515 (Carretta et al. 2019). There are indications that the California sea lion may have reached or is approaching carrying capacity, although more data are needed to confirm that leveling in growth persists (Carretta et al. 2019).

3.1.2 Harbor Seal

Harbor seals are members of the family Phocidae ("true seals"), with two subspecies extant in the Pacific: *P. v. stejnegeri* in the western North Pacific near Japan and *P. v. richardii* in the eastern North Pacific including the west coast of the U.S. Harbor seals are not as common in the waters and on the structures of Oceanside Harbor as California sea lions but are still present. Harbor seals are more common in the outer surge basin of Oceanside Harbor than they are within the inner harbor (M&A 2023).

Based on post-breeding counts of individuals at known haul outs, corrected for the proportion of the population that is out at sea, the population estimate for the California stock of harbor seal is 30,968, and the minimum population size is estimated as 27,348 (Carretta et al. 2015). The population size has increased since the 1980s and fluctuated during the past decade, with the highest counts in 2004 but lower counts in 2009 and 2012 (Carretta et al. 2015).

3.1.3 Bottlenose Dolphin

3.1.3.1 Species Description

The California coastal stock of bottlenose dolphin is distinct from the offshore population and is resident in the immediate (within 1 kilometer (km) of shore) coastal waters, occurring primarily between Point Conception, California, and San Quintin, Mexico (Hansen, 1990; Carretta et al. 1998; Defran and Weller 1999). Bottlenose dolphin sightings are not common, but do occur, in Oceanside Harbor. Typically, this species is seen within the larger outer surge basin of the harbor and is rare within the inner harbor.

Based on photographic mark-recapture surveys conducted along the San Diego coast from 2009 to 2011 (Weller et al. 2016), two separate population size estimates were generated from open and closed mark-recapture models. The best open model generated an estimate of 515 (95% confidence interval [CI] = 470–564, coefficient of variation [CV] = 0.05) animals, while the best closed model produced an estimate of 453 (95% CI = 411–524, CV=0.06) animals. These estimates are for marked animals only and do not include an estimated ~40% of animals that are not individually recognizable (Weller et al. 2016). The estimated fraction of unmarked animals is highly uncertain because it is unknown how often unmarked animals are resighted. The new estimates are the largest obtained for this stock, dating back to the 1980s. For comparison with previous estimates of this stock, the closed population estimate of 453 (CV=0.06) animals is used as the best estimate of abundance (Carretta et al. 2022).

3.1.4 Common Dolphin (Short-Beaked and Long-Beaked)

The California/Oregon/Washington stock of short-beaked common dolphin and the California stock of long-beaked common dolphin both occur in coastal southern California waters. While the long-beaked common dolphin is a nearshore species, the short-beaked common dolphin is widely distributed between the coast and at least 556 km (300 nautical miles [nmi]) offshore (Navy 2017). The short-beaked and long-beaked species were only recently separated and are difficult to distinguish at sea (NMFS 2022b, 2022c). While no data occurs for common dolphin in Oceanside Harbor, they are rare visitors to the northern portion of San Diego Bay and could be expected to be rare visitors within the outer portions of Oceanside Harbor.

The distribution and abundance of common dolphins in coastal California waters varies considerably with oceanographic conditions; therefore, a multi-year average abundance estimate is appropriate (Carretta et al. 2022). For short beaked common dolphins, Becker et al. (2020) generated species distribution models from fixed and dynamic ocean variables using 1991-2018 line-transect survey data to estimate density and abundance of cetaceans in the California Current Ecosystem, incorporating changes in species abundance and habitat shifts over time (Carretta et al. 2022). The best estimate of abundance is taken as the estimate from 2018, or 1,056,308 (CV=0.207) animals (Becker et al. 2020). Similarly, the abundance estimate for long-beaked common dolphins in California, Oregon and Washington waters is 83,339 (Becker et al. 2020).

3.1.5 Pacific White-Sided Dolphin

The Pacific white-sided dolphin is a North Pacific endemic and one of the most abundant pelagic species of dolphins found in the cold-temperate waters of this region. While no data for this species occurs within Oceanside Harbor, they were included in this analysis as they occur in the waters of southern California and could be expected to be rare visitors to the outer Oceanside Harbor.

As summarized by Carretta et al. (2022), the most recent estimate of abundance for Pacific white-sided dolphins of California, Oregon, and Washington waters is 34,999 animals with an estimated minimum population size of 29,090 animals.

3.1.6 Northern Elephant Seal

This species is not expected to occur in Oceanside Harbor but has been a rare visitor along southern California coastline in recent years.

The largest of the "true seals", this highly sexually dimorphic seal is found only in the eastern North Pacific. As summarized by Carretta et al. (2022) from a report from Lowry et al. (2020), the most recent estimate of abundance for Northern Elephant Seals in California waters is 187,386 animals (95% CI 161,876 – 214,418) with an estimated minimum population size of 85,369 animals.

3.2 SPATIAL DISTRIBUTION

Density assumes that marine mammals are uniformly distributed within a given area, although this is rarely the case. Marine mammals are usually clumped in areas of greater importance, for example, areas of high productivity, lower predation, safe calving, foraging, etc. Presently, the density of sea lions is extremely high on and around the pinniped float placed by the Harbor Department in 2015 to lure sea lions out of the marinas where they were hauling out on docks and berthed boats. The proposed temporary relocation of the pinniped float during pile driving activities is expected to result in a temporary spread in distribution of animals in an unpredictable manner, however it is expected that several of the sea lions will move back onto the adjacent transient dock where they presently sometimes haul out.

The access to potential haul out locations within the harbor requires that pinnipeds be in the water at some point to access the area. Further the greatest potential response to commencement of proximate pile driving activities will be to retreat to the water from a dock float, or boat upon commencement of driving. For this reason, no distinction has been made between pinnipeds in the water or hauled out with respect to potential exposure to noise impact.

3.3 SUBMERGENCE

This document assumes that both cetaceans and pinnipeds that occur in the vicinity will be submerged and at the same water depth as the sound source and will thereby experience the maximum received sound pressure levels (SPLs) predicted to occur at a given distance from the acoustic source on the basis of acoustic modeling. However, pinnipeds are also conservatively assumed to be out of the water for sufficient periods to be exposed to whatever airborne noise is generated by construction activities as well.

4.0 AFFECTED SPECIES STATUS AND DISTRIBUTION

4.1 CALIFORNIA SEA LION (U.S. STOCK)

4.1.1 Status and Management

California sea lions are protected under the MMPA and are not listed under the ESA. The NMFS has defined one stock for California sea lions (U.S. Stock), with five genetically distinct geographic populations: Pacific Temperate, Pacific Subtropical, Southern Gulf of California, Central Gulf of California, and Northern Gulf of California. The Pacific Temperate population includes rookeries within U.S. waters and the Coronado Islands just south of the U.S.-Mexico border. Animals from the Pacific Temperate population range north into Canadian waters, and movement of animals between U.S. waters and Baja California waters has been documented. The U.S. stock is not considered strategic or depleted under the MMPA.

4.1.2 Distribution

More than 95% of the U.S. Stock breeds and gives birth to pups on San Miguel, San Nicolas, and Santa Barbara islands. Some movement has been documented between the U.S. Stock and Western Baja California, Mexico Stock, but rookeries in the U.S. are widely separated from the major rookeries of western Baja California. Smaller numbers of pups are born on San Clemente Island, the Farallon Islands, and Año Nuevo Island (Lowry et al. 1991). The California sea lion is by far the most commonly sighted pinniped species at sea or on land in the vicinity of Oceanside Harbor. In California waters, California sea lions represented 97 percent (381 of 393) of identified pinniped sightings at sea during the 1998–1999 NMFS surveys (Carretta et al. 2000). They were sighted during all seasons and in all areas with survey coverage from nearshore to offshore areas (Carretta et al. 2000). California sea lions, while potentially present at-sea, are most commonly seen hauled out on rocks, docks, and buoys within Oceanside Harbor. In a study of California sea lion reaction to human activity, Holcomb et al. (2009) showed that in general California sea lions are rather resilient to human disturbance.

The distribution and habitat use of California sea lions varies with the sex of the animals and their reproductive phase. Adult males haul out on land to defend territories and breed from mid-to-late May until late July. Individual males remain on territories for 27 to 45 days without going to sea to feed. During August and September, after the mating season, the adult males migrate northward to feeding areas as far away as Washington (Puget Sound) and British Columbia (Lowry et al. 1991). They remain there until spring (March through May), when they migrate back to the breeding colonies. Thus, adult males are present in offshore areas only briefly as they move to and from rookeries. Distribution of immature California sea lions is less well known, but some make northward migrations that are shorter in length than the migrations of adult males (Huber 1991). However, most immature California sea lions are presumed to remain near the rookeries for most of the year. Adult females remain near the rookeries throughout the year. Most births occur from mid-June to mid-July (peak in late June).

Survey data from 1975 to 1978 were analyzed to describe the seasonal shifts in the offshore distribution of California sea lions near the Channel Islands (Bonnell and Ford 1987). The seasonal changes in the center of distribution were attributed to changes in the distribution of the prey species. If California sea lion distribution is determined primarily by prey abundance as influenced by variations in local, seasonal, and interannual oceanographic variation, these same areas might not be the center of California sea lion distribution every year. Melin et al. (2008) showed that foraging

female California sea lions showed significant variability in individual foraging behavior and foraged further offshore and at deeper depths during El Niño years as compared to non-El Niño years.

There are limited published at-sea density estimates for pinnipeds within southern California. At-sea densities likely decrease during warm-water months because females spend more time ashore to give birth and attend their pups. Radio-tagged female California sea lions at San Miguel Island spent approximately 70% of their time at sea during the nonbreeding season (cold-water months), and pups spent an average of 67% of their time ashore during their mother's absence (Melin and DeLong 2000). Different age classes of California sea lions are found in the San Diego region throughout the year (Lowry et al. 1991). Although adult male California sea lions feed in areas north of San Diego, animals of all other ages and sexes spend most, but not all, of their time feeding at sea during winter. During warm-water months, a high proportion of the adult males and females are hauled out at terrestrial sites during much of the period.

The geographic distribution of California sea lions includes a breeding range from Baja California to southern California. During the summer, California sea lions breed on islands from the Gulf of California to the Channel Islands and seldom travel more than about 50 km from the islands (Bonnell et al. 1983). The primary rookeries are located on the California Channel Islands of San Miguel, San Nicolas, Santa Barbara, and San Clemente (Le Boeuf and Bonnell 1980; Bonnell and Dailey 1993). Their distribution shifts to the northwest in fall and to the southeast during winter and spring, probably in response to changes in prey availability (Bonnell and Ford 1987). In the nonbreeding season, adult and subadult males, and juvenile males and females (McHuron et al. 2018) migrate northward along the coast to central and northern California, Oregon, Washington, and Vancouver Island in British Columbia, and return south in the spring.

4.1.3 Site-Specific Occurrence

In Oceanside Harbor, in general, California sea lions regularly occur on rocks, buoys and other structures. The closest haul out location to the Project fishing pier are the pinniped haul out dock located approximately 23 m (75 ft) to the northwest and the transient vessel dock located 60 m (197 ft) north of the Project location. An additional area of sea lion hauling out is the moored bait barge approximately 87 m (285 ft) to the southeast of the pier; however, the bait barge utilizes a haul out deterrent and is not typically occupied. Animals are frequently hazed off the transient dock and vessels and thus tend to aggregate on the pinniped dock where they are typically not harassed. California sea lions also haul out on other docks and rip rap around the harbor. Beyond these man-made structures, there are no known natural haul out locations in the vicinity of the Project area. As discussed in Chapter 3, California sea lion occurrence in the area surrounding the Project site is expected.

Little marine mammal data exists for Oceanside Harbor. In Spring of 2022, a 5-day monitoring event recorded an average of 12 individuals per day, with a daily high of 13. Data was collected across five days in 9, 12-hour shifts. To be conservative, a 24-hour period was considered a day, even though construction for the proposed Project would only occur during daylight hours not exceed a 12-hour period. This monitoring data, anecdotal data from the Oceanside Harbor Department, and two dates in April 2023 provide available information for estimating sea lion presence in the Project area. Because no other site-specific data exists for Oceanside Harbor marine mammals, these data represent the best information available on which to base sea lion abundance. The most conservative estimate of 100 sea lions present in the harbor has been adopted given the high variability in numbers and lack of detailed local abundance data.

4.1.4 Behavior and Ecology

Sexual maturity occurs at around 4 to 5 years of age for California sea lions, and the pupping and mating season begins in May and continues through July (Heath 2002). California sea lions are gregarious during the breeding season and social on land during other times. California sea lions' food consists of squid, octopus, and a variety of fishes (Antonelis et al. 1990; Lowry et al. 1990; Melin et al. 1993; Hanni and Long 1995; Henry et al. 1995).

California sea lions show a high tolerance for human activity (Holcomb et al. 2009), modify their foraging in response to spatial and temporal variations in the availability of different prey species (Lowry et al. 1991), and make opportunistic use of virtually any available structures as haul outs (Naval Facilities Engineering Systems Command Southwest (NAVFAC SW) and Port of San Diego (POSD) 2013).

California sea lions seek a variety of structures, such as rocks, piers, buoys, dredge pipelines, vessels, and low-profile docks for hauling out. These behaviors can be destructive to structures due to the weight of the animals and fecal fouling. If California sea lions find an easy food source at tourist spots or fishing piers, their presence can become a nuisance at certain areas as they have at marinas in Monterey and San Francisco Bay (Leet et al. 1992). Marina operators and commercial and sport fishermen tend to consider them a major nuisance, leading to some human-caused mortality.

4.2 HARBOR SEAL (CALIFORNIA STOCK)

4.2.1 Status and Management

Harbor seals are protected under the MMPA and are not listed as threatened or endangered under the ESA. NMFS has defined five distinct stocks on the U.S. west coast including California, Oregon/Washington Coast, Washington Northern Inland Waters, Southern Puget Sound, and Hood Canal. The Project site is located within the boundaries of the California Stock which is not considered depleted under the MMPA (Carretta et al. 2015).

4.2.2 Distribution

Harbor seals are considered abundant throughout most of their range from Baja California to the eastern Aleutian Islands. An unknown number of harbor seals also occur along the west coast of Baja California, at least as far south as Isla Asuncion, which is about 161 km south of Punta Eugenia. Peak numbers of harbor seals haul out on land during late May to early June, which coincides with the peak of their molt. They favor sandy, cobble, and gravel beaches (Stewart and Yochem 1994), with multiple haul outs identified along the California mainland and Channel Islands (Carretta et al. 2015).

There are limited at-sea density estimates for pinnipeds within southern California. Harbor seals do not make extensive pelagic migrations but do travel 300 to 500 km on occasion to find food or suitable breeding areas (Carretta et al. 2015). Based on likely foraging strategies, Grigg et al. (2009) reported seasonal shifts in harbor seal movements based on prey availability. When at sea, they remain in the vicinity of haul out sites and forage close to shore in shallow waters. In relationship to the entire California stock, harbor seals do not have a significant mainland California distribution south of Point Mugu due to beach urbanization and potential disturbance impacts.

4.2.3 Site-Specific Occurrence

Harbor seals are thought to be uncommon within Oceanside Harbor. Similar to California sea lions, harbor seals haul out on rocks, buoys and other structures, with regular hauling out on sand beaches,

as well. As stated above in Section 4.1.3, the nearest haul outs are the pinniped haul out dock approximately 25 m north of the pier, however this haul out is not known to be used by seals.

Based on the lack of data for harbor seals in Oceanside harbor, and in order to ensure the best information available is used, data from several years of marine mammal monitoring in San Diego Bay at Naval Base Point Loma was used to determine the number likely to occur in Oceanside Harbor (NAVFAC SW 2015). During year 2 of this San Diego Bay study, an El Nino year, 248 harbor seals were observed over a total of 100 monitoring days, for a daily average of 2.5 harbor seals per day.

4.2.4 Behavior and Ecology

Harbor seals prefer sheltered coastal waters and feed on schooling benthic and epibenthic fish species in shallow water (Bonnell and Dailey 1993). While not studied in Oceanside harbor, specific prey species have been studied in other California waters (Stewart and Yochem 1985, 1994; Oxman 1993; Henry et al. 1995). Although their ecological niche in the harbor has not been studied, this pinniped is not likely to play a significant role because of their low numbers. Harbor seals mate at sea and females give birth during the spring and summer although the "pupping season" varies by latitude. There are no pupping locations within Oceanside Harbor.

4.3 BOTTLENOSE DOLPHIN (CALIFORNIA COASTAL STOCK)

4.3.1 Status and Management

Bottlenose dolphins are protected under the MMPA and are not listed as threatened or endangered under the ESA. NMFS has defined two distinct stocks on the U.S. west coast including California Coastal and California/Oregon/Washington Off-Shore. The Project site is located within the boundaries of the California Coastal Stock. The U.S. stock is not considered strategic or depleted under the MMPA (Carretta et al. 2022).

4.3.2 Distribution

The bottlenose dolphin California Coastal stock occurs from Point Conception south into Mexican waters, at least as far south as San Quintin, Mexico. In southern California, animals are found within 500 m (152.4 ft) of the shoreline 99 percent of the time and within 250 m (76.2 ft) 90 percent of the time (Hanson and Defran 1993). Occasionally, during warm-water incursions such as during the 1982–1983 El Niño events, their range extends as far north as Monterey Bay (Wells et al. 1990). Bottlenose dolphins in the Southern California Bight – the coastal waters between Point Conception and just south of the Mexican border - appear to be highly mobile within a narrow coastal zone (Defran et al. 1986) and exhibit little seasonal site fidelity within the Southern California Bight (Defran and Weller 1999) and along the California coast; over 80 percent of the dolphins identified in Santa Barbara, Monterey, and Ensenada have also been identified off San Diego.

4.3.3 Site-Specific Occurrence

Bottlenose dolphins are thought to be uncommon within Oceanside Harbor. In the Spring of 2022, a five-day monitoring event recorded an average of 6 animal sightings per day, with a daily high of 12 individuals. The maximum observed count of 12 individual animals was used to estimate abundance for calculation of take. Data was collected across five days in nine, 12-hour shifts. To be conservative, a 24-hour period was considered one monitoring event, even though construction days for the proposed Project in this application would only be during daylight hours and not exceed a 12-hour period. Because no other site-specific data exists for Oceanside Harbor marine mammals, it

represents the best available and most conservative estimate for numbers of bottlenose dolphins that are likely to occur.

4.3.4 Behavior and Ecology

The coastal stock utilizes a limited number of fish prey species with up to 74 percent being various species of surfperch or croakers, a group of non-migratory year-round coastal inhabitants (Allen et al. 2006). For southern California, common croaker prey species include spotfin croaker, yellowfin croaker, and California corbina, while common surfperch species include barred surfperch and walleye surfperch (Allen et al. 2006). The corbina and barred surfperch are the most common surf zone fish where bottlenose dolphins have been observed foraging (Allen et al. 2006). Defran et al. (1999) postulated that the coastal stock of bottlenose dolphins showed significant movement within their home range (Central California to Mexico) in search of preferred but patchy concentrations of nearshore prey (i.e., croakers and surfperch). Bearzi et al (2009), in an analysis of bottlenose dolphins in the vicinity of Santa Monica, also concluded that low individual re-sighting rates indicates a large bottlenose dolphin distribution influenced by prey distribution. After finding concentrations of prey, animals may then forage within a more limited spatial extent to take advantage of this local accumulation until such time that prey abundance is reduced; the dolphins then shift location once again to be over larger distances (Defran et al.1999; Bearzi et al. 2009). Specific prey items of bottlenose dolphins along the California coast were studied by Defran et al. (1986).

4.4 COMMON DOLPHIN (SHORT-BEAKED AND LONG-BEAKED)

4.4.1 Status and Management

Both species of common dolphin are protected under the MMPA and are not listed as threatened or endangered under the ESA. Neither of the two stocks of common dolphins (classified as California/Oregon/Washington stock for short-beaked and California Stock for long-beaked) are considered strategic or depleted under the MMPA (Carretta et al. 2022).

4.4.2 Distribution

Short-beaked common dolphins are the most abundant cetacean off California and are widely distributed between the coast and at least 300 nmi offshore. In contrast, long-beaked common dolphins generally occur within 50 nmi of shore. Both species of common dolphin appear to shift their distributions seasonally and annually in response to oceanographic conditions and prey availability (Carretta et al. 2022). The long-beaked species apparently prefers shallower, warmer water than the short-beaked common dolphin (Perrin 2009). Both tend to be more abundant in coastal waters during warm-water months (Bearzi 2005).

4.4.3 Site-Specific Occurrence

Common dolphins are present in the coastal waters outside of Oceanside Harbor, but little is known about their occurrence within the harbor. Based on the lack of data for common dolphins in Oceanside Harbor, and to ensure the best information available is used, data from several years of marine mammal monitoring in San Diego Bay at Naval Base Point Loma was used to determine the number likely to occur in Oceanside Harbor (NAVFAC SW 2015). During year 2 of this San Diego Bay study, an El Nino year, 850 common dolphins were observed over a total of 100 monitoring days, for a daily average of 8.5 common dolphins per day.

4.4.4 Behavior and Ecology

Common dolphins are often found in large herds of hundreds or even thousands. They are extremely active, fast moving, and engage in spectacular aerial behavior. They are noted for riding bow and stern waves of boats, often changing course to bow ride the pressure waves of fast-moving vessels and even large whales. Common dolphins can be frequently seen in association with other marine mammal species. They feed on squid and small, schooling fish, sometimes working together to herd fish into tight balls, and occasionally taking advantage of fishing activities to feed on fish escaping from nets or discarded by fishermen (American Cetacean Society 2004).

4.5 Pacific White-Sided Dolphin (California/Oregon/Washington, Northern and Southern Stocks)

4.5.1 Status and Management

The stock structure of Pacific white-sided dolphins is dynamic and poorly understood. While the northern and southern stocks are differentiated based on distribution, genetics, and morphological characters, the two forms mix off Southern California (Carretta et al. 2022). Neither of the two stocks of Pacific white-sided dolphins is considered strategic or depleted under the MMPA.

4.5.2 Distribution

As summarized by Carretta et al. (2022), Pacific white-sided dolphins are endemic to temperate waters of the North Pacific Ocean and are common both on the high seas and along the continental margins. Off the U.S. west coast, Pacific white-sided dolphins occur primarily in shelf and slope waters. Sighting patterns from aerial and shipboard surveys conducted in California, Oregon and Washington suggest seasonal north-south movements, with animals found primarily off California during the colder water months and shifting northward into Oregon and Washington as water temperatures increase in late spring and summer (Carretta et al. 2022).

4.5.3 Site-Specific Occurrence

Pacific white-sided dolphins are present in the coastal waters outside of Oceanside Harbor, but little is known about their occurrence within the harbor. Based on the lack of data for this dolphin species in Oceanside Harbor, and to ensure the best information available is used, data from several years of marine mammal monitoring in San Diego Bay at Naval Base Point Loma was used to determine the number likely to occur in Oceanside Harbor (NAVFAC SW 2015). During year 2 of this San Diego Bay study, an El Nino year, 27 Pacific white-sided dolphins were observed over a total of 100 monitoring days, for a daily average of 0.3 Pacific white-sided dolphins per day.

4.5.4 Behavior and Ecology

Pacific white-sided dolphins are highly social and commonly occur in groups of less than a hundred but can form herds containing several thousands of individuals. They often associate with Risso's dolphins and short-beaked common dolphins, and occasionally feed in association with California sea lions and mixed species aggregations of seabirds. Cohesiveness of dolphin groups differences according to behavior: dispersed subgroups while milling, socializing, and feeding, and more tightly grouped while traveling and resting. Pacific white-sided dolphins are highly acrobatic and exhibit a variety of leap types.

These dolphins feed opportunistically on a variety of prey, such as squid and small schooling fish (capelin, sardines, and herring) (NMFS 2022d). Pacific white-sided dolphins can live more than 40 years with males reaching sexual maturity around 10 years and females around 8 to 11 years of age.

4.6 NORTHERN ELEPHANT SEAL (CALIFORNIA STOCK)

4.6.1 Status and Management

The California breeding stock of northern elephant seal is not considered strategic or depleted under the MMPA. Populations of northern elephant seals in the U.S. and Mexico have recovered after being reduced to near extinction by hunting, undergoing a severe population bottleneck and loss of genetic diversity with the population reduced to only an estimated 10-30 individuals. There are two distinct populations of northern elephant seals: (1) a breeding population in Baja California, Mexico, and (2) a breeding population on U.S. islands off California. Northern elephant seals in the San Diego County region could be from either population (Carretta et al. 2022).

4.6.2 Distribution

Northern elephant seals breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands. Spatial segregation in foraging areas between males and females is evident from satellite tag data (Carretta et al. 2022; Lowry et al. 2020).

4.6.3 Site-Specific Occurrence

Northern elephant seals occur in the southern California Bight and have the limited potential to occur in Oceanside Harbor. Due to their presence in the coastal waters, they have been included in this IHA application for consideration in take calculations. Based on the lack of data for Northern elephant seals in Oceanside Harbor, and to ensure the best information available is used, data from several years of marine mammal monitoring in San Diego Bay at Naval Base Point Loma was used to determine the number likely to occur in Oceanside Harbor (NAVFAC SW 2015). During year 2 of this San Diego Bay study, an El Nino year, a single northern elephant seal was observed over a total of 100 monitoring days, for a daily average of 0.1 Pacific white-sided dolphins per day.

4.6.4 Behavior and Ecology

Northern elephant seals are found in coastal areas and deeper waters of the California Current Large Marine Ecosystem (Carretta et al. 2022). The foraging range of northern elephant seals extends thousands of kilometers offshore from the breeding range into the central North Pacific Transition Zone; however, their range is not considered to be continuous across the Pacific (Simmons et al. 2010). Adult males and females segregate while foraging and migrating (Simmons et al. 2010; Stewart and DeLong 1995). Adult females mostly range west to about 173° W, between the latitudes of 40° N and 45° N, whereas adult males range farther north into the Gulf of Alaska and along the Aleutian Islands to between 47° N and 58° N (Le Boeuf et al. 2000; Stewart and DeLong 1995).

5.0 INCIDENTAL HARASSMENT AUTHORIZATION REQUEST

Under Section 101 (a)(5)(D) of the MMPA, M&A requests an IHA for the take of a small number of marine mammals, by Level B behavioral harassment only, incidental to the removal and installation of piles related to the Oceanside Fishing Pier.

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment] (50 CFR, Part 216, Subpart A, Section 216.3-Definitions). The proposed activities are not anticipated to result in any Level A harassment due to implementation of buffered Level A shutdown zone for harbor seals and northern elephant seals during impact pile driving of 18-inch steel pipe piles. The remaining level A shutdown zones generated from pile removal and installation activities are smaller than the 15 m (50-ft) buffered Physical Interaction Shutdown Zone that will be enforced by monitors to avoid physical interaction between marine mammals and Project pile driving and removal activities.

5.1 METHOD OF INCIDENTAL TAKING

This authorization request considers noise from pile removal via vibratory extraction, and pile installation via impact hammer, and vibratory hammer. For the purposes of the MMPA Level B take analysis in the following sections, use of a high-pressure water jet will not be considered because these activities are not expected to behaviorally harass marine mammals as they do not generate substantial underwater noise. Extraction via vibratory hammer and installation via vibratory hammer and impact hammer are the only Project related activities that are considered to have the potential to disturb or displace marine mammals or produce a TTS resulting in Level B harassment, as defined above, and will therefore be the focus of this quantitative take analysis.

Based on the available data associated with pile removal and installation, there is small potential for marine mammals to experience permanent threshold shift (PTS) during pile removal and install resulting in Level A take. However, Level A shutdown zones will be fully monitored to avoid take. To further eliminate the likelihood of Level A takes, a buffered shutdown zone out to 15 m (50 ft) would be implemented to halt activities that could potentially injure a marine mammal that is near in-water Project-related activities. All pile-removal and installation activities will either be delayed from starting or halted if any marine mammals approach the buffered Level A shutdown zone. No Level A take is anticipated with implementation of these buffered shutdown zones.

In-water pile removal and installation activities include a range of potential methodologies and sound sources (e.g., impact hammer, vibratory hammer). To provide a realistic worst-case scenario, this analysis has estimated takes by assuming pile removal and installation sound generating activities listed in Table 2-1 will occur on separate days. The total number of in-water workdays is estimated at 6. This analysis predicts 756 take exposures for all species (see Section 6 for estimates of exposures by species) that could be classified as Level B harassment under the MMPA. Project mitigation procedures, presented in Section 11, include monitoring during pile removal and installation activities to identify potential exposure and taking action to halt pile driving or pulling activities if necessary in the event a marine mammal moves into either the Level A shutdown or Level B monitoring zones. Proper implementation of the mitigation measures will be effective in avoiding marine mammal exposures to sound levels that would constitute Level A harassment.

6.0 TAKE ESTIMATES FOR MARINE MAMMALS

The NMFS application for an IHA requires applicants to determine the number of marine mammals that are expected to be incidentally harassed by an action and the nature of the harassment (Level A or B). The proposed Project activities have the potential to take marine mammals by Level A and B harassment through construction activities involving in-water pile removal and installation. Other activities, including land-side improvements, are not expected to result in take as defined under the MMPA. These Project-related activities are not anticipated to generate airborne noise beyond operation of combustion engines; however, if airborne noise levels do reach harassment level, it is assumed that if any animals are hauled out, based on the location of the Project, the individuals at some point would enter the water and be captured as Level B take as they pass through the various calculated monitoring areas discussed below.

6.1 Summary of Level A and B Monitoring Areas for the Project

Sound sources associated with pile removal and/or installation are not expected to result in Level A exposures of marine mammals as defined under the MMPA. All Level A shutdown zones are smaller than 15 m (50 ft) Physical Interaction Shutdown Zone, with the exception of impact pile driving of 18-inch steel pipe piles, with a Level A distance for harbor seals and northern elephant seals of 176.7 m (579.7 ft). This Level A distance threshold was buffered to 180 m (591 ft) to establish a shutdown zone triggering a cessation of pile driving should a seal enter the zone. This would ensure no Level A take of phocid pinnipeds (PW) during the impact pile driving activities (see Table 6-4, 6-6, Figure 6-2, and Appendix A). Combined with the best management practices (BMPs) identified in Section 11, 13, and the Marine Mammal Monitoring Plan, this buffered Level A shutdown zone is expected to stop all in-water sound producing activities prior to potential exposure to Level A thresholds. However, the noise-related impacts discussed in this application may result in Level B harassment. The methods for estimating the number and types of exposures to Level B harassment are summarized below.

The following methods were used to determine exposure of marine mammals:

- Estimating the area of impact where noise levels exceed acoustic thresholds for marine mammals
- Evaluating the potential presence of marine mammals based on historical occurrence
- Estimating potential harassment exposures by multiplying the estimated daily site-specific abundance of marine mammals the number of days of pile removal and installation activities.

6.1 Modeling Potential Noise Impacts from Pile Removal and Installation

In this IHA application, NMFS Technical Guidance and User Spreadsheet (NMFS 2018 and 2020a) and acoustic data from several sources, are used to identify the Level A (injury) and Level B (behavior) monitoring areas that would result from pile removal and installation activities. Table 6-1 below shows injury and disturbance threshold criteria for underwater noise by marine mammal hearing group (NMFS 2018) and Table 6.2 details what sources were used for each method of demolition and installation by pile size and type specific to the Proposed Project.

Table 6-1. Injury and Disturbance Threshold Criteria for Underwater Noise by Marine Mammal Hearing Group

Marine Mammal Hearing Group	Underwater Continuous Noise Thresholds (re 1 µPa)		Underwater Impulsive Noise Thresholds (re 1 µPa)	
	Level A Threshold[1] (PTS Onset)	Level B Threshold (Disturbance)	Level A Threshold[1] (PTS Onset)	Level B Threshold (Disturbance)
Low-Frequency Cetaceans[4]	199 dB SEL_{CUM}	120 dB RMS	219 dB Peak[2] 183 dB SEL_{CUM}[3]	160 dB RMS
Mid-Frequency Cetaceans	198 dB SEL_{CUM}		230 dB Peak[2] 185 dB SEL_{CUM}[3]	
High-Frequency Cetaceans[4]	173 dB SEL_{CUM}		202 dB Peak[2] 155 dB SEL_{CUM}[3]	
Phocidae	201 dB SEL_{CUM}		218 dB Peak[2] 185 dB SEL_{CUM}[3]	
Otariidae	219 dB SEL_{CUM}		232 dB Peak[2] 203 dB SEL_{CUM}[3]	

[1] Dual metric acoustic thresholds for impulsive sounds. Whichever results in the largest isopleth for calculating PTS onset is used in the analysis.

[2] Flat weighted or unweighted peak sound pressure within the generalized hearing range.

[3] Cumulative sound exposure level over 24 hours.

[4] No Low- or High-Frequency Cetaceans are anticipated to appear in the Project study area and PTS and TTS thresholds are included here for informational purposes only.

Abbreviations: µPa = microPascal; dB = decibel; PTS = permanent threshold shift; RMS = root mean square; SEL = sound exposure level; cum = cumulative

Table 6-2. Noise Source Data Used to Calculate Level A and B Monitoring Areas by Demolition or Installation Method and Pile Size and Type

Method	Pile Size and Type	Noise Source Data
Pile Removal Activities		
Vibratory Extraction	16-inch Octagonal Concrete[1]	Draft Interim Proxy Source Levels from Pier 6 Replacement Project, San Diego Bay (NAVFAC SW 2022))
Pile Installation Activities		
Impact Pile Driving	18-inch Round Steel[2]	Analysis of pooled reported data provided by NMFS(Caltrans 2020)
Vibratory Hammer	18-inch Round Steel	Prichard Lake Pumping Station Project in Sacramento, CA (Caltrans 2020)
Vibratory Hammer	10-inch round Steel[3]	Mad River Slough Pipeline Project in the Compendium of Pile Driving Sound Data (Illingworth & Rodkin 2007)

[1]In the absence of information on vibratory extraction of 16-inch octagonal concrete piles, interim proxy levels were provided by NMFS including unpublished data from NAVFAC SW 2022).
[2]In the absence of information on impact pile driving of 18-inch round steel piles, source data from several pile sizes were analysis by NMFS (Caltrans 2020).
[3]In the absence of information on Vibratory Installation of 10-inch round steel piles, source data from 12-inch round steel piles (Illingworth & Rodkin 2007) was used as a proxy source level.

6.2.1 Underwater Sound Propagation

Pile removal and installation activities would generate underwater noise that potentially could result in disturbance to marine mammals swimming by the Project area. Maximum distances to Level A thresholds for cumulative sound exposure were calculated using the current NMFS Technical Guidance and User Spreadsheet (NMFS 2018 and 2020a). Observed noise levels during pile removal and installation projects in the San Diego and San Francisco Bay area, northern California, and Alaska have been compiled and provide real-world examples of sound loss between source and far field points (see Table 6-2).

6.2.2 Underwater Noise from Pile Removal and Installation

The intensity of pile removal or installation sound is greatly influenced by factors such as the type of pile, the type of equipment, and the physical environment in which the activity takes place. To determine reasonable SPLs from pile removal or installation, activities with the same or similar properties to the proposed Project were evaluated. Table 6-3 presents measured or calculated maximum mean SPLs for impulsive and non-impulsive sources at 10 m (33 ft) from the pile. In the case of the source levels for vibratory extraction of the concrete piles, data were not available at source (10 m [33 ft]). As a result, the source levels were back-calculated to 10 m (33 ft) based on data collected at varying ranges and an assumed practical spreading model using a 15LogR transmission loss function. For the 16-inch octagonal concrete piles, unpublished data for vibratory extraction of 18-inch steel pipe piles from the Pier 6 Replacement Project (NAVFAC SW 2022) were used as a proxy source level. For impact pile driving of the 18-inch round steel piles, compiled data from 20-inch round steel piles recommended by NMFS (Caltrans 2020) were used as a proxy level. For vibratory installation of 10-inch round steel piles, source data for 12-inch round steel piles

(Illingworth and Rodkin 2007) was used as a proxy level. All data points present both a realistic and conservative approach to determining monitoring areas for Project-related activities.

Table 6-3. Source Levels, Durations, and Blow Count for Removal and Installation Activities Likely to Occur at Project Site

Method	Pile Size and Type	Peak[1,2]	RMS SPL (dB re 1 µPa) (at 10m)[1,2]	SEL[1,2]	Estimated Duration per Pile[3]	Estimated Blows per Pile[3]
Pile Removal Activities						
Vibratory Extraction	16-inch Octagonal Concrete	n/a	163	n/a	25 minutes	n/a
Pile Installation Activities						
Impact Pile Driving	18-inch Round Steel	200	185	175	n/a	300
Vibratory Hammer	18-inch Round Steel	196	158	n/a	25 minutes	n/a
Vibratory Hammer	10-inch Round Steel	171	155	n/a	10 minutes	n/a

[1] References for source level data by pile type and activity are in Table 6-2 above.
[2] As measured, or calculated, at 10 m (33 ft).
[3] Estimated durations and blow counts as provided by the construction contractor.
Abbreviations: µPa = microPascal; dB = decibel; RMS = root mean square; SPL = sound pressure level; m = meters

For the analyses that follow, the previously observed source levels and durations identified in Table 6-3 and the estimated numbers of piles to be removed and installed per day from Table 2.1 were utilized. Distances to Level A (onset PTS) thresholds were calculated using Single Strike sound exposure level (SEL), Peak, or decibel (dB) root mean square (RMS) Source Levels. Of those three acoustics metrics, the maximum distance to the Level A acoustic threshold is shown in Table 6-4. Appendix A presents all the data using the NMFS Technical Guidance and User Spreadsheets (NMFS 2018 and 2020a).

Pile removal and installation activities may include pile removal and driving with or without high-pressure water jetting occurring simultaneously. To combine sound levels from a vibratory source and an impact source, such as in this case, the Level A shutdown zone from the impact source would be used, and the largest Level B harassment zone would be used (USDOT 1995, WSDOT 2020, NMFS 2020a). No Level A take would occur from high-pressure water jetting, and the largest Level B harassment zone for the Project would be generated from vibratory extraction.

Table 6-4. Distance to Underwater Level A Threshold by Marine Mammal Hearing Group

Method	Pile Type and Size	Source Value (dB RMS @ 10 m for vibratory activities, and SEL for impact driving)	Duration (hours/day)	Projected Distances to Level A Thresholds (m [ft])		
				MF	PW	OW
Pile Removal Activity						
Vibratory Extraction	16-inch Octagonal Concrete Piles	163	1.67	1.2 (3.9)	7.9 (25.9)	0.6 (2.0)
Pile Installation Activity						
Impact Pile Driving	18-inch Round Steel	175	0.13	11.7(38.4)	**176.7 (579.7)**	12.9 (42.3)
Vibratory Hammer	18-inch Round Steel	158	1.67	0.5 (1.6)	3.7 (12.1)	0.3 (1.0)
Vibratory Hammer	10-inch Round Steel	155	0.67	0.2 (0.7)	1.3 (4.3)	0.1 (0.3)

Note: Bolded values are greater than the buffered shutdown zone of 15 m (50 ft) and will be monitored as shutdown zones to ensure no Level A takes of harbor seals or northern elephant seals occur during impact pile driving of 18-inch round steel piles.Abbreviations: RMS = root mean square, dB re 1 µPa = decibels referenced to a pressure of 1 microPascal, m = meters, ft = feet, MF = mid-frequency cetaceans, PW = phocid pinnipeds, OW = otariid pinnipeds

For this Project, the distance to the Level B threshold was determined using practical spreading loss (15LogR) as real time data was not available for Oceanside Harbor. The expected radial distances to Level B behavioral disturbance thresholds are summarized in Table 6-5. Table 6-6 summarizes all Level A and B shutdown and harassment zones to be monitored during construction. Figures 6-1 and 6-2 depict the extent of the buffered Level A and Level B monitoring associated with noise propagation specific to each of the pile removal and installation methods as well as the buffered shutdown zone of (15 m [50 ft]) from source.

Table 6-5. Distances to Underwater Level B Thresholds from Pile Removal and Installation

Method	Pile Type and Size	Source Value (dB RMS @ 10m)	Projected Distance to Level B Thresholds[1,2] m (ft)
Pile Removal Activities			
Vibratory Extraction	16-inch Octagonal Concrete Piles	163	7,356 (24,135)
Pile Installation Activities			
Impact Pile Driving	18-inch Round Steel	175[3]	100(328)
Vibratory Hammer	18-inch Round Steel	158	3,415 (11,203)
Vibratory Hammer	10-inch Round Steel	155	2,154 (7,068)

[1] The Level B harassment zones for continuous pile removal and installation activities are based on the distance for noise to decay to 120 dB re 1µPa, while 160 dB was used for impulsive sound.
[2] Assumes Practical Spreading Loss[3] Single Strike SEL value used for impact driving calculations as opposed to RMS
Abbreviations: dB re 1 µPa = decibels referenced to a pressure of 1 microPascal, m = meters, ft = feet, RMS = root mean square

Table 6-6. Monitored Distances to Level A and B Monitoring Areas

Method	Pile Type and Size	Source Value (dB RMS @ 10m)	Dur-ation (hours/day)	Monitored Level A ZOIs			Moni-tored Level B ZOIs [m (ft)]	Area of Level A Zone [m^2 (ft^2)]	Area of Level B Zone(m^2)[2]
				MF	PW	OW			
Pile Removal Activity									
Vibratory Extraction	16-inch Octagonal Concrete Piles	163	1.67	15 (50)	15 (50)	15(50)	7,356 (24,135)	705 (7,589)	373,652
Pile Installation Activity									
Impact Pile Driving	18-inch Round Steel	185(175)[5]	0.13	15 (50)	180[1] (591)	15 (50)	100(328)	76,762 (826,259)[3]	42,645
Vibratory Hammer	18-inch Round Steel	158	1.67	15(50)	15 (50)	15 (50)	3,415 (11,203)	705 (7,589)	373,630
Vibratory Hammer	10-inch Round Steel	155	0.67	15(50)	15 (50)	15 (50)	2,154 (7,068)	705 (7,589)	373,630

[1] Level A shutdown zone buffered from 176.7 m to 180 m.[2]Area of Physical Interaction Zone (no level A zone for MF and OW during Impact Pile Driving of steel piles
[3]Area of Level A shutdown zone for PW species only during Impact Pile Driving of steel piles
[4]Due to large areas, square footage left out of table for ease of reading
[5]For impact pile driving, the single strike SEL was used to calculate distances to Level A thresholds.
Abbreviations: dB re 1 µPa = decibels referenced to a pressure of 1 microPascal, m = meters, ft = feet, RMS = root mean square

In order to ensure no Level A take of harbor seals and northern elephant seals during impact pile driving of 18-inch steel pipe piles, the calculated 176.7 m (579.7 ft) shutdown zone has been buffered to 180m (591 ft).

6.3 IN-AIR NOISE ASSESSMENT

The generation of in-air noise is expected to result from construction activities with most of the construction noise being limited to non-impulsive construction equipment operating over variable periods during the work. The expected sound levels from the utilized non-pile driving equipment is summarized in Table 6-7. For project pile removal and driving, it is expected work would include vibratory extraction and driving, coupled with impact driving of 18-inch round steel piles as they approach final embedment depths.

Table 6-7. Construction Equipment Average Maximum In Air Noise Levels

Equipment Description	Average Maximum[1] L_{max}[2] at 50 feet (15 meters)
Backhoe	78
Compressor (air)	78
Concrete Mixer Truck	79
Concrete Pump Truck	81
Concrete Saw	90
Crane	81
Drill Rig Truck	79
Dump Truck	76
Excavator	81
Flat Bed Truck	74
Generator	81
Pickup Truck	75
Pneumatic Tools	85

[1]WSDOT measured data in FHWA's Roadway Construction Noise Mode Database (2005).

[2]L_{max} is the maximum value of a noise level that occurs during a single event.

Impact driving of hollow steel piles typically results in maximum decibel levels between 95 and 115 dBA (WSDOT 2020). Noise assessments by WSDOT have documented maximum levels of 103 dBA for 24-inch piles and 110 dB for 30-inch piles each measured at a range of 11 meters (Illingworth and Rodkin 2010). No in air sound data for 18-inch piles were located so the value of 103 dBA was applied. However, when assessing in-air noise for pinnipeds, un-weighted Root Mean Square (RMS) sound level for noise sources should be compared to the un-weighted RMS threshold values. For noise in air, Level B thresholds for pinnipeds have been defined in relation to in-air sound pressure level (SPL) disturbance thresholds (re 20 µPa (unweighted)) as 90 dB rms for harbor seals and 100 dB rms for other species (NMFS 2016).

Assessments by WSDOT have documented un-weighted RMS levels for a vibratory hammer to be between 88 dB (18-inch pile) and 98 dB (30-inch pile) at 15 meters (50 feet) (Laughlin 2010 as cited in WSDOT 2020). Un-weighted RMS impact hammer in-air sound levels were between 98 dB and 102 dB at 15 meters (50 feet) for 72-inch piles (Laughlin 2011 as cited in WSDOT 2020). It can be assumed

that 18-inch steel piles would produce lower impact hammer noise levels due to substantially lower energy required to drive the much smaller pile.

Applying a standard attenuation rate for hard site conditions of 6 dB per doubling of distance for point source noise the distance to Level B take thresholds were determined for construction activities in air. The in-air noise levels for non-pile driving activities fall below the Level B take thresholds at the generation source and as such can be dismissed. Similarly, for vibratory driving of 18-inch piles the noise as measured at 15 meters is expected to be below the Level B threshold and can also be dismissed. For impact driving, assuming the very liberal sound levels of 98-102 dB rms, Level B take resulting from in air sound would extend between 28 and 44 meters from the pile source. This distance is well inside the 180 meter in water Level B harassment zone for impact pile driving for the project. Based on this envelopment of in-air sound monitoring areass within those of the in-water sound and an inability for animals to access haul out locations without passing through the in-water monitoring areas, effects would not be added for in-air acoustic exposure unless animals remained out of the water within the threshold exposure distance throughout pile driving rather than fleeing to the water.

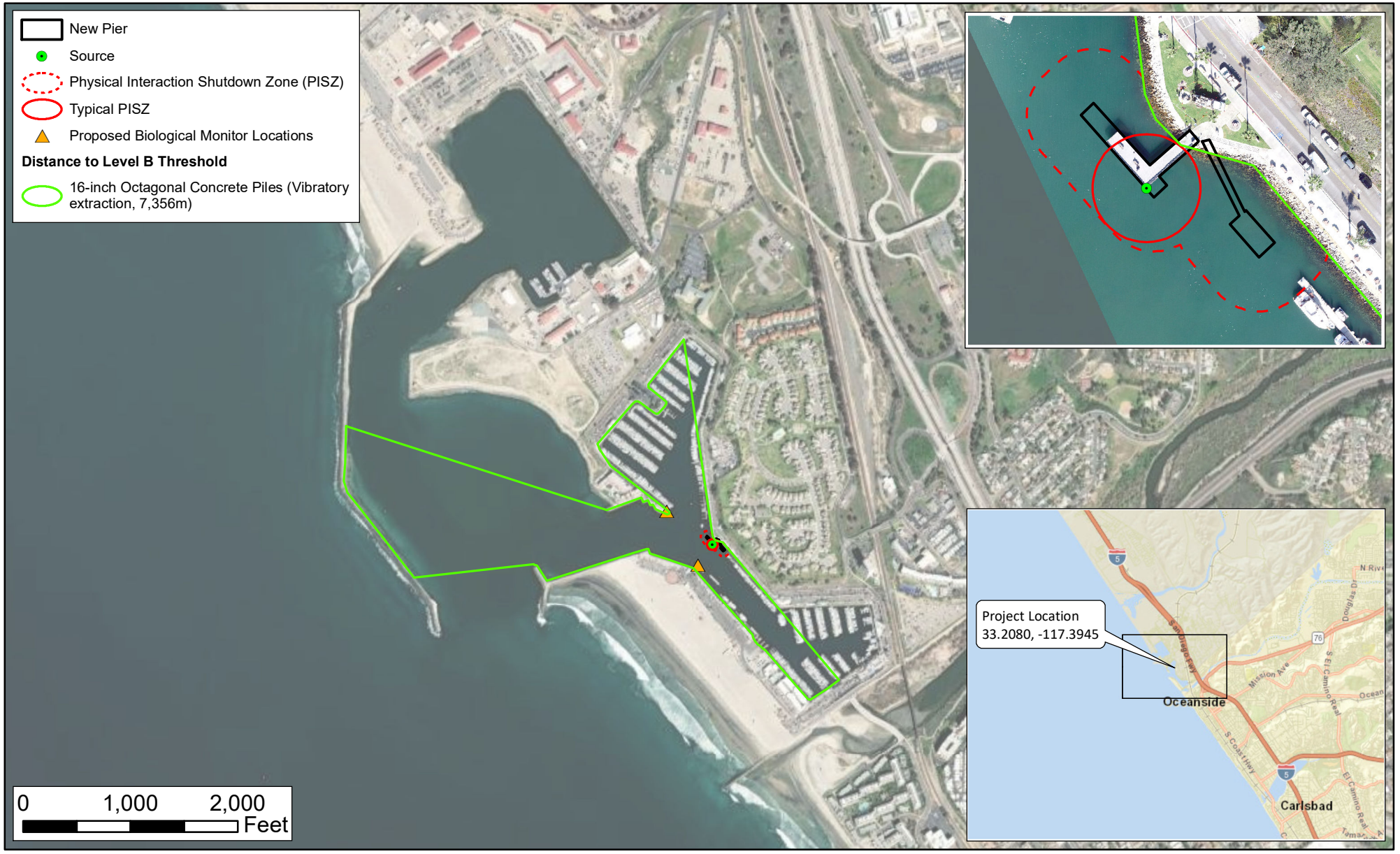
6.4 Basis for Estimating Take by Harassment

This application is seeking authorization for the potential Level B (harassment only) take of California sea lions, harbor seals, northern elephant seals, bottlenose dolphins, common dolphins, and Pacific white-sided dolphins in Oceanside Harbor resulting from activities associated with the removal and installation of piles during the Project. Marine mammals are present to varying degrees in Oceanside harbor year-round, with California sea lions being the most persistent and abundant species. The takes requested are expected to have no more than a minor effect on individual animals and no effect on the various marine mammal populations in general. Any effects experienced by individual marine mammals are anticipated to be limited to short-term disturbance of normal behavior or temporary displacement of animals near the source of the noise.

Level A (PTS onset) takes, as well as risks of physical injury, would not occur for all analyzed species with the implementation of the proposed buffered Level A shutdown zones during in-water pile removal and installation activities (Table 6-6).

Potential Level B takes would occur throughout pile removal and installation activities if marine mammals are present within the Level B harassment zones (Table 6-5 and 6-6, and Figures 6-1 and 6-2). Marine mammals observed in the area would likely be swimming and/or foraging. As such, potential takes by disturbance will have a negligible short-term effect on individual marine mammals and would not result in population-level impacts.

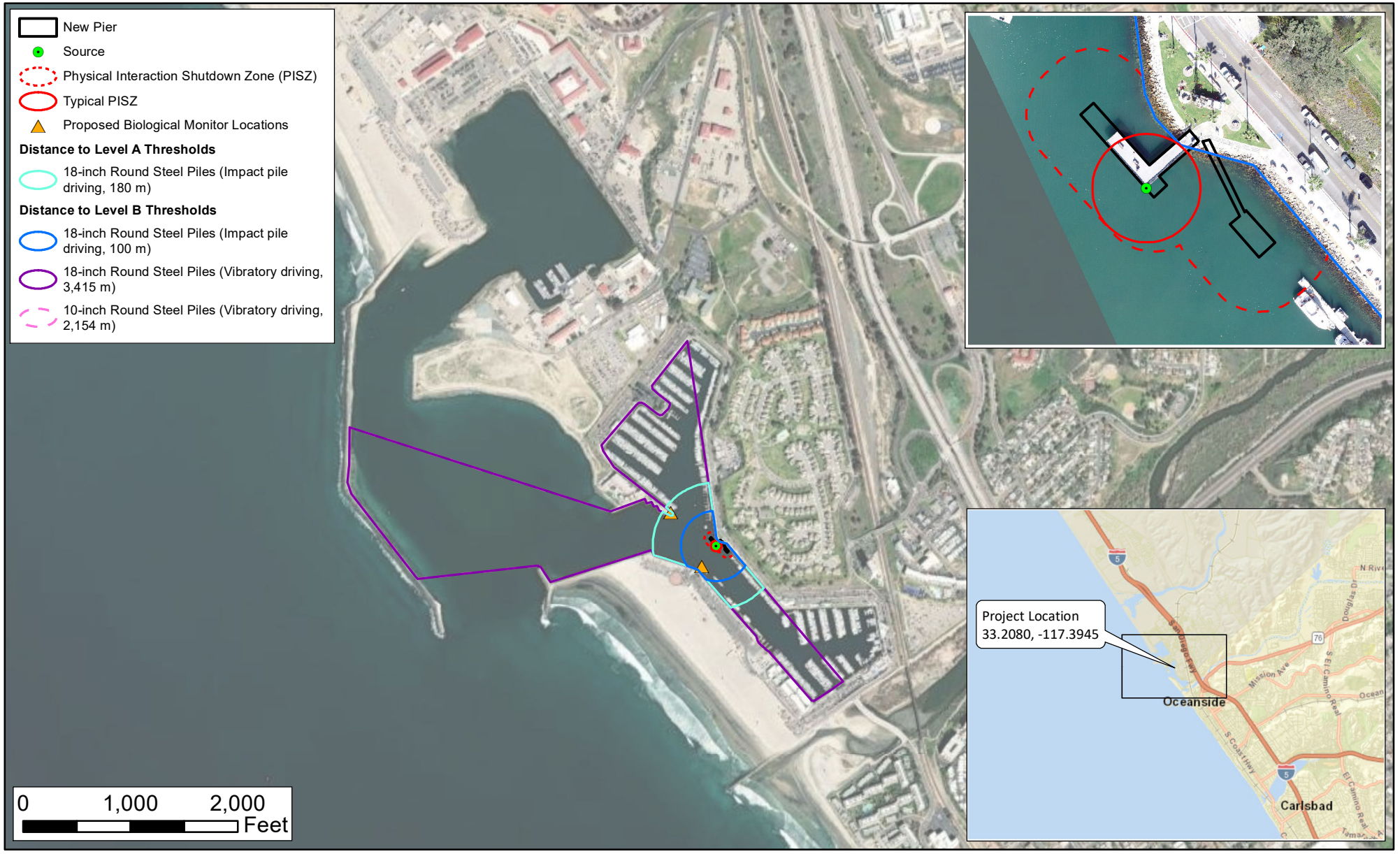
Beyond the size of the monitoring areas associated with pile removal and installation activities, estimated takes are based on the expected upper end daily number of individuals of a species, based on previously observed total species counts. In some cases, species are not expected to be in the harbor, but could enter during work activities. These species have been accounted for in the Level B take. Little published marine mammal monitoring data exists for Oceanside Harbor. The estimated takes requested are thought to be the best and most conservative at this time.



Level B Harassment Zone for the Oceanside Fishing Pier Pile Removal Activities using Practical Spreading Loss

Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvement Project

Figure 6-1



Level A Shutdown and Level B Harassment Zones for the Oceanside Fishing Pier Pile Installation Activities using Practical Spreading Loss

Oceanside Harbor Fishing Pier and Non-motorized Vessel Launch Improvement Project

Figure 6-2

6.4.1 California Sea Lion

California sea lions are present in Oceanside Harbor year-round, and numbers vary considerably. The high estimates provided by the Oceanside Harbor Department are as many as 100+ individuals. Limited counts from photographs and spot counts range to approximately 50 individuals and are known to be incomplete estimates. Based on the widely varying range of sea lions present in the harbor, a high estimate of 100 sea lions per day has been used in take calculations. This expected daily individual total was used to calculate the Level B take for California sea lions over the 6 days of pile removal and installation activities under the Project.

Potential takes would likely involve sea lions that are loafing on, or in the vicinity of, structures or moving through the area in route to foraging areas or structures where they haul out. California sea lions that are taken could exhibit behavioral changes (i.e., increased swimming speeds, increased surfacing time, or decreased foraging). Most likely, California sea lions may move away from the sound source and be temporarily displaced from the areas of pile removal and installation. As such, potential takes by disturbance will have a negligible short-term effect on individual California sea lions and would not result in population-level impacts.

6.4.2 Harbor Seal

Based on the observations presented in Navy Base Point Loma Fuel Pier Replacement Project Year 2 Monitoring Report (NAVFAC SW 2015), an average of 2.5 harbor seals per day (rounded to 3 per day) were observed. This expected daily individual count was used to calculate the Level B take for harbor seals.

Potential takes would likely involve harbor seals that are on the shoreline or structures within the Project area, or swimming in the vicinity. Harbor seals that are taken could exhibit behavioral changes (i.e., entering the water in response to airborne noise, increased swimming speeds, increased surfacing time, or decreased foraging). Most likely, harbor seals may move away from the sound source and be temporarily displaced from the areas of pile removal and installation. With the absence of any major rookeries and only a few isolated haul out areas near or adjacent to the Project site, potential takes by disturbance will have a negligible short-term effect on individual harbor seals and would not result in population-level impacts.

6.4.3 Bottlenose Dolphin

Bottlenose dolphins can occur at any time of year in the waters around Oceanside Harbor. Based on the observations presented in M&A 2022, an average of 6 bottlenose dolphins per day were observed with a peak of 12 individuals being observed on one day. This higher peak of 12 individuals was used to calculate the Level B take for bottlenose dolphin.

Potential takes could occur if bottlenose dolphins move through the area when pile removal or driving would occur. Bottlenose dolphins that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, bottlenose dolphins may move away from the sound source and be temporarily displaced from the areas of pile removal. There are no indications that bottlenose dolphins use or regularly occur in the area near the existing fishing Pier. Hence, any exposure to Project-generated sound is likely to be transient and at relatively long distances from animals in the area. Therefore, potential takes by disturbance will have a

negligible short-term effect on individual bottlenose dolphins and would not result in population-level impacts.

6.4.4 Common Dolphin (Short-Beaked and Long-Beaked)

Common dolphins are generally abundant in the outer coastal waters but are not known to occur regularly in Oceanside Harbor. Based on the observations presented in NAVFAC 2015, an average of 8.5 common dolphins per day (rounded to 9 per day) were observed. This expected daily individual count was used to calculate the Level B take for common dolphins.

It is expected that common dolphins, if they were to enter the harbor, would move rapidly through the area and likely only be present in the outer harbor stilling basin. Therefore, potential takes by disturbance will have a negligible short-term effect on individual common dolphins and would not result in population-level impacts.

6.4.5 Pacific White-Sided Dolphin

Pacific white-sided dolphins are commonly seen offshore southern California but are not known to occur regularly in Oceanside Harbor. Based on the observations presented in NAVFAC 2015, an average of 0.3 Pacific white-sided dolphins per day (rounded to 1 per day) were observed. This expected daily individual count was used to calculate the Level B take for Pacific white-sided dolphins.

Potential takes could occur if Pacific white-sided dolphins move through the area when pile removal or installation is happening. Pacific white-sided dolphins that are taken could exhibit behavioral changes such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, they may move away from the sound source and be temporarily displaced from the areas of pile removal or installation. There are no indications that Pacific white-sided dolphins use or regularly occur in Oceanside Harbor. Hence any exposure to Project-generated sound is likely to be transient and at relatively long distances from animals in the area. Therefore, potential takes by disturbance will have a negligible short-term effect on individual Pacific white-sided dolphins and would not result in population-level impacts.

6.4.6 Northern Elephant Seal

With increasing numbers, the presence of northern elephant seals in the greater San Diego waters is considered as a reasonable possibility (Carretta et al. 2022). Based on the observations presented in NAVFAC 2015, an average of 0.1 northern elephant seals per day (rounded to 1 per day) were observed. This expected daily individual count was used to calculate the Level B take for northern elephant seals.

Potential takes are not expected, but if they were to occur, would likely involve single individuals that are on the shoreline or structures at the identified location, or swimming in the vicinity, most likely near the mouth of the harbor. Northern elephant seals that are taken could exhibit behavioral changes such as entering the water in response to airborne noise, increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, elephant seals may move away from the sound source. With the absence of any rookery or regularly used foraging or haul out sites, potential takes by disturbance will have a negligible short-term effect on individual harbor seals and would not result in population-level impacts.

6.4.7 Species Not Included

Since Risso's dolphins have not been observed to enter Oceanside Harbor, and gray whales rarely occur in Oceanside Harbor, Level B harassment takes of these species are not expected. Furthermore, the proposed visual detection measures summarized in Sections 11 and 13, and in the Project-specific monitoring plan for non-IHA marine mammals, would negate take of these species.

6.5 Description of Take Calculation and Exposure Estimates

Pile removal and installation activities may take place concurrently, where multiple piles are extracted or installed during a day. However, piles will not be removed or installed at the same time, as the work is anticipated to be completed with a single derrick barge. The following assumptions were used to calculate potential exposures to pile removal and installation activity noise for each species:

- Each animal can be "taken" via Level B harassment once every 24 hours.
- Differing methods of pile removal via vibratory extraction and pile installation (i.e., impact pile driving and vibratory hammer) will not occur coincidentally. Pile driving and high-pressure water jetting may occur coincidentally, but this was accounted for in the exposure analysis.
- Pile removal and installation are estimated to require 6 days of in-water work within the 183-day period outside CLT nesting season over the course of the one-year IHA period.
- The number of individual takes by species is the expected average individuals per day (based on previous observations) multiplied by the number of days of pile removal and installation activities (6 days) described in Section 2 (Table 2-1) and is summarized in Table 6-8.

Table 6-8. Summary of Expected Daily Species Presence in Project Area and Requested Level B Takes

Species	Expected Average Individuals Per Day	Requested Level B Take
California sea lion[1]	100	600
Harbor seal[2]	3	18
Bottlenose dolphin[3]	12	72
Common dolphin (Long- and Short-beaked)[2]	9	54
Pacific white-sided dolphin[2]	1	6
Northern elephant seal[2]	1	6
Total		**756**

[1] Reported high estimate of sea lions observed on pinniped float by Oceanside Harbor District staff.
[2]Average daily counts based on observations during Year 2 of Navy Base Point Loma's Fuel Pier Replacement Project Monitoring, rounded up to nearest individual count (NAVFAC SW 2015).
[3] Average daily counts based on observations during Oceanside Harbor Dredging 2022 Project Monitoring, rounded up to nearest individual count (M&A 2022)..

7.0 ANTICIPATED IMPACTS TO MARINE MAMMAL SPECIES OR STOCKS

Level B take associated with this project is not expected to affect nor impact California sea lions, harbor seals, bottlenose dolphins, common dolphins, Pacific white-sided dolphins, or northern elephant seals at the species or stock level. Furthermore, because no rookery sites are located in Oceanside Harbor, there will be no impacts on birthing rates nor on pup survivorship. The estimated number of individual animals that could potentially experience Level B take harassment during project-related pile removal and installation (up to 756 over 6 days) are a small proportion of the overall population of each species discussed in Section 4 above.

Utilizing the stock estimate of 257,606 California sea lions (Caretta et al 2019), only a small portion of this population may be exposed to sound levels that could cause harassment on a daily basis during project activities. Using a projected exposure estimate of 100 animals per day, less than 0.1% of the overall harbor seal population may be exposed daily.

For bottlenose dolphins with a stock estimate of 453 (Caretta et al 2022), only a small portion of this population may be exposed to sound levels that could cause harassment on a daily basis during project activities. Using a projected exposure estimate of 12 animals per day, less than 2.6% of the overall bottlenose dolphin population may be exposed daily.

For harbor seals, common dolphins, Pacific white-sided dolphins, and northern elephant seals, on average, less than one animal per day for each species would be potentially exposed to project activities. This represents a very small percentage (less than 0.1%) relative to the overall stock estimates mentioned in Section 3 for these species (Caretta et al 2015, 2022).

8.0 ANTICIPATED IMPACTS ON SUBSISTENCE USES

Potential impacts resulting from the Proposed Action will be limited to individuals of marine mammals located in the above identified Oceanside Harbor Fishing Pier monitoring areas that have no subsistence requirements. Therefore, no impacts on the availability of species or stocks for subsistence use are considered.

9.0 ANTICIPATED IMPACTS ON HABITATS

The proposed activities at the Oceanside Fishing Pier are not expected to have substantial impact on habitat for marine mammals. The pier removal and replacement would result in minor changes in surface area coverage within an area utilized by California sea lion and, to a lesser extent, harbor seals. Following project completion, the habitat within the area would remain. Only small numbers of marine mammals are expected to be present during pile removal and installation activities, and there are limited haul out areas within the Project area available to seals or sea lions. Therefore, the main impact issue associated with the proposed activity will be temporarily elevated noise levels and the associated direct effects on marine mammals, as discussed in Sections 6 and 7. The most likely localized short-term impact to habitat will occur from pile removal and installation effects on marine mammal prey items (i.e., fish) and minor impacts to the immediate substrate during the removal of piles. Fish may be temporarily displaced locally around the piles during work.

9.1 Pile Removal and Installation Effects on Potential Prey (Fish)

The current IHA application addresses impulsive and continuous sounds associated with the machinery used to extract and install piles. Fish react to sounds which are especially strong and/or intermittent low-frequency sounds. Short duration and sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) and Popper and Hastings (2009) identified several studies that suggest fish may relocate to avoid certain areas of noise energy. Additional studies have documented effects of pile driving (or other types of continuous sounds) on fish, although several are based on studies in support of large, multiyear bridge construction projects (Scholik and Yan 2001, 2002; Govoni et al. 2003; Hawkins 2005; Hastings 1990, 2007; Popper et al. 2006; Popper and Hastings 2009). Sound pulses at received levels of 160 dB re 1 µPa may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson et al. 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality (Caltrans 2001; Longmuir and Lively 2001). Additionally, studies of fish response to pile driving for Pacific sardine and northern anchovy found that fish exhibited immediate startle response to individual strikes at 50 m (164 ft) but returned to "normal" pre-strike behavior following the conclusion of pile driving and no evidence of injury to fish as a result of pile driving (Appendix C in NAVFAC SW 2014).

The most likely impact to fish from pile removal and installation activities at the Project Area would be temporary behavioral avoidance of the immediate area. The duration of fish avoidance of this area after pile driving or removal stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary. Further, it is anticipated that preparation activities for pile driving or removal (i.e., positioning of the hammer) and upon initial startup of a device would cause fish to move away from the affected area outside areas where injuries may occur. Therefore, relatively small portions of the Project area would be affected for relatively short periods of time, and the potential for effects on fish to occur would be temporary and limited to the duration of sound-generating activities.

9.2 Pile Removal and Installation Effects on Potential Foraging Habitat

The area likely impacted by the Oceanside Fishing Pier Project is relatively small compared to the total available habitat in Oceanside Harbor. As a result, the removal and installation of pilings, substrate disturbance, and high levels of activity at the Project site would be inconsequential in terms of long-term effects on marine mammal foraging.

Turbidity is expected to increase in the short-term during pile removal. The size and shape of the turbidity plume from pile removal are difficult to quantify because of variability in naturally occurring conditions, such as wind and currents. Consequently, it is difficult to predict the specific areas that may be influenced by the plume. Pile removal and installation activities are likely to increase turbidity in the immediate vicinity, for example if high-pressure water jetting is used. Turbidity monitoring during jetting to remove caissons for the fourth year of the Navy's Fuel Pier Replacement Project revealed relatively minor, if any, changes, with only localized decreases in water clarity that dissipated within three to five minutes (but up to 10) from the start of jetting (NAVFAC SW 2018). Therefore, if water jetting is utilized during pile installation at the Project site, it would likely have similar effects to water jetting during previous pile removal activities with the resulting effects being relatively minor, local to the specific pile being removed or installed, and having only temporary negative effects on water quality lasting until sediment resettles.

9.3 Summary of Impacts to Marine Mammal Habitats

Given that the affected area has limited use as foraging habitat for marine mammals, the removal and installation of pilings, substrate disturbance, and high levels of activity at the Project site would be inconsequential in terms of effects on marine mammal foraging. Therefore, pile removal and installation are not likely to have a permanent, adverse effect on marine mammal foraging habitat in the Project area.

10.0 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The proposed activities at the Oceanside Harbor Fishing Pier are not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their larger populations. Based on the discussions in Section 9, there will be no impacts to marine mammals resulting from loss or modification of marine mammal habitat.

11.0 MITIGATION MEASURES TO PROTECT MARINE MAMMALS AND THEIR HABITAT

The exposures outlined in Section 6 represent the maximum expected number of marine mammals that could be exposed to acoustic sources reaching Level B harassment levels. The Project proposes to employ several mitigation measures, discussed below, in an effort to minimize the number of marine mammals potentially affected.

11.1 Mitigation for Pile-Removal and Installation Activities

11.1.1 Proposed Measures

1. Level A and Level B Harassment Monitoring Areas During Pile Removal and Installation
   a) During all in-water activities, regardless of predicted SPLs, a buffered shutdown zone of 15 m (50 ft) will be monitored. Since most marine mammals are fast-swimming, this is appropriate to reduce the likelihood of injury to marine mammal species due to physical interaction with construction equipment during in-water activities. If an animal enters the buffered shutdown zone, in-water activities would be stopped until the individual(s) has left the zone of its own volition, or not been sighted for 15 minutes.
   b) Prior to the start of impact pile driving each day, the contractor will implement soft start procedures for impact pile driving. Soft start requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets followed by thirty seconds between each set. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.
   c) A buffered Level A shutdown zone has been established for PW species during impact pile driving of 18-inch steel piles at 180 m (591 ft). Adherence to this shutdown zone will avoid and minimize the potential for Level A acoustic injury to PW species during impact pile driving. If any PW is seen within 180 m (591 ft) during impact pile driving of 18-inch steel piles, this activity would be stopped until the individual(s) has left the zone of its own volition, or not been sighted for 15 minutes.
   d) The Level B harassment zones will be monitored throughout the time required to remove or install each pile type as stated in Section 6 above. If a marine mammal is observed entering the Level B harassment zone, an exposure would be recorded, and behaviors documented.

Work would continue without cessation, unless the animal approaches or enters the 15 m (50 ft) or any Level A shutdown zone, at which point removal or installation activities shall be halted.

2. Visual Monitoring
   a) Pile Removal and Installation: Monitoring will be conducted for all buffered Level A shutdown zones and Level B harassment zones before, during, and after pile removal activities. The Level B harassment zone may be adjusted, subject to NMFS concurrence. Monitoring will take place from 30 minutes prior to initiation through 30 minutes post-completion of removal and installation activities.
   b) Monitoring will be conducted by qualified Biological Monitors. All Biological Monitors would be trained in marine mammal identification and behaviors and have experience conducting marine mammal monitoring or surveys. Trained Biological Monitors will be placed at the best vantage point(s) practicable (e.g., one on the dock near the Harbor Pelican Deli Mart, providing a good overview of the full construction area, and one near the Oceanside Marina Suites on a rock groin extending into the harbor). These two locations provide visibility of both the inner harbor and outer harbor areas within the monitoring areas. The positions allow adequate visibility to effectively implement shutdown/delay procedures, when applicable, by notifying the equipment operator of the need for a shutdown of pile removal or driving. The Biological Monitors will be positioned with a clear view of the buffered Level A shutdown zones and all Level B harassment zones based on the visibility of the monitoring area specific to each activity and visibility of that zone on a given day, as needed.
   c) Biological Monitors will provide monitoring data for all animals observed within the visual range of the Project area, regardless of the in-water activity.
   d) Pile removal and installation will only commence once observers have declared the buffered Level A shutdown zones clear of marine mammals; animals will be allowed to remain in the Level B harassment zones, and their behavior will be monitored and documented.
   e) If a marine mammal approaches/enters any buffered Level A shutdown zone during pile removal or installation operations, operations will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone, or 15 minutes have passed without a re-detection of the animal(s) from the last observation time.
   f) If a marine mammal species not covered in this IHA enters any Level B harassment zone, all pile removal activities shall be halted until the animal(s) has been observed to have left the Level B harassment zone or has not been observed for at least one hour.
   g) In the unlikely event that environmental conditions, such as heavy fog or low-light, prevent the visual detection of marine mammals within the buffered shutdown zone, in-water pile removal and installation activities will either be delayed or stopped until the environmental conditions allow Biological Monitors to fully observe the applicable monitoring areas.
   h) Based on the proposed Biological Monitors locations, most of each monitoring area will be observable. There is a small amount of area that will be hard to view based on the location of other docks in the area; however, due to the fact that marine mammals must travel through the project area to enter or exit the harbor, any mammal that may be temporarily unobservable must travel through the observable areas to get into or out of the Project area, and therefore would be accounted for in daily take numbers.
   i) If the take of a marine mammal species approaches the take limits specified in the IHA, NMFS will be notified, and appropriate steps will be discussed.

3. Daylight Pile Removal/Installation
   a) In-water pile removal and installation work will occur only during daylight hours that allow for sighting of marine protected species within all Project area and defined monitoring zones.
   b) Ambient lighting conditions will dictate the ability to see marine mammals. In the Project area, daylight hours will generally be considered as from 45 minutes after sunrise to 45 minutes before sunset. However, the on-site Biological Monitor will make a final determination on ambient lighting conditions based on their ability to see animals in the water.

11.1.2 Measures Considered but not Proposed

Acoustic mitigation measures were considered such as bubble curtains, however the overall Level A shutdown zones areas are relatively small for non-phocid species and phocids are relatively uncommon within areas that would be reached by the Level A shutdown zones such that avoidance measures dictated by monitoring are more practical than sound mitigation. For Level B harassment zones the exposure levels are fairly low and the pile count and duration of driving is minimal such that acoustic mitigation is considered to be impractical for the scale of potential effect relative to the project size and duration of work.

11.1.3 Mitigation Effectiveness

All Biological Monitors utilized for mitigation activities will be experienced biologists with training in marine mammal detection and behavior. Visual detection conditions in Oceanside Harbor are generally excellent. By its orientation, the harbor is mostly sheltered from large swells and infrequently experiences strong winds. Fog can be occasionally expected, typically in late night and early morning hours and could occasionally limit visibility for marine mammal monitoring. However, observers will be positioned in locations which provide the best vantage point(s) for monitoring, and the shutdown zone covers relatively small and accessible areas of the harbor. As such, proposed mitigation measures are likely to be very effective.

12.0 MITIGATION MEASURES TO PROTECT SUBSISTENCE USES

There is no subsistence use of marine mammal species or stocks in the Project area and therefore no mitigation measures to protect subsistence uses are proposed.

13.0 MONITORING AND REPORTING

13.1 MONITORING PLAN

The following monitoring measures would be implemented along with the mitigation measures (Section 11) in order to reduce impacts to marine mammals to the lowest extent practicable during the period of this IHA. A marine mammal monitoring plan will be developed further and submitted to NMFS for approval well in advance of the start of construction during the IHA period.

13.1.1 Visual Marine Mammal Observations

Biological Monitors will collect sightings data and behavioral responses to pile removal and installation activities for marine mammal species observed in the Project area. All observers are to be experienced with marine mammal identification and behaviors.

13.1.2 Methods of Monitoring

Biological Monitors will monitor all buffered Level A shutdown zones and Level B harassment zones before, during, and after pile removal activities. Based on NMFS requirements, the Marine Mammal Monitoring Plan would include the following procedures:

1. Trained Biological Monitors will be placed at the best vantage point(s) practicable to monitor marine mammals and implement shutdown/delay procedures.
2. Any Biological Monitor can notify the equipment operator of a need for a shutdown of pile removal or installation, but shutdowns will generally be called by the Biological Monitor closest to the in-water activities (referred to as the Lead Protected Species Observer (PSO)). The Lead PSO will coordinate monitoring efforts and construction starts/stops and provide updates to the other Biological Monitor.
3. Two Biological Monitors will be deployed at locations with a clear view of the buffered shutdown zones and harassment zones during pile removal and installation activities (Figure 6-2). The monitoring location(s) are based on providing the greatest visibility of the monitoring zone specific to each activity.
4. During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals within the visual range of the Biological Monitors.
5. Monitoring distances will be measured with range finders.
6. Distances to animals will be based on the best estimate of the Biological Monitors, relative to known distances to objects in the vicinity of the Biological Monitors.
7. Bearing to animals will be determined using a compass.
8. In-water activities will be curtailed under conditions of fog or poor visibility that might obscure the presence of a marine mammal within the shutdown zones.
9. The number, species, and locations of all marine mammals observed will be documented using an electronic tablet or hardcopy datasheets in compliance with NMFS reporting requirements.
10. Pre-Activity Monitoring:
    a) Visual surveys will occur for at least 30 minutes prior to the start of in-water activities.
    b) If a marine mammal is present within any buffered Level A shutdown zone, in-water activities will be delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone, or 15 minutes has elapsed since the last observation time without a re-detection of the animal.
    c) The shutdown zones may only be declared clear, and pile removal or installation started, when the entire shutdown zone is visible (i.e., when not obscured by poor light, rain, fog, etc.). If any shutdown zone is obscured by fog or poor lighting conditions, activity at the location will not be initiated until the shutdown zone is visible.
    d) If marine mammals are present within the Level B harassment zone, in-water activities will not need to be delayed.
11. During Activity Monitoring:
    a) If a marine protected species approaches, or appears to be approaching, a buffered Level A shutdown zone, the Biological Monitor who first observed the animal will alert the Lead PSO, who will notify the work crew of the animal's current status; in-water activities will be allowed to continue while the animal remains outside the buffered shutdown zone.
    b) If the marine protected species enters the buffered shutdown zone, a shutdown will be called by the Lead PSO. As the animal enters the shutdown zone, all pile removal or installation operations will be stopped, and the animal(s) will be continually tracked. Once a shutdown

has been initiated, all in-water activities that generate potentially impactful noise will be delayed until the animal has voluntarily left the shutdown zone and has been visually confirmed beyond the shutdown zone, or 15 minutes have passed without re-detection of the animal (i.e., the zone is deemed clear of marine protected species). The Lead PSO will inform the construction contractor that activities can re-commence.

c) If shutdown and/or clearance procedures would result in an imminent concern for human safety, then the activity will be allowed to continue until the safety concern is addressed. During that timeframe the animal will be continuously monitored, and the Project point of contact (POC) will be notified and consulted prior to re-initiation of Project-related activities.
d) Shutdown shall occur if a species for which authorization has not been granted, or for which the authorized numbers of takes have been met, approaches or is observed within the Level B harassment zone. For non-IHA species, pile removal using vibratory extraction will be allowed to proceed if the animal(s) is observed to leave the Level B harassment zone, or if one hour has lapsed since the last observation.
e) If a marine mammal is observed entering the Level B harassment zones, the pile segment being worked on will be completed without cessation, unless the animal enters or approaches the shutdown zone. Regardless of location within the Level B harassment zone, an initial behavior and the location of the animal(s) will be logged. Behaviors will be continually logged until the animal is either passed off to another Biological Monitor, the animal is no longer visible, or it has left the Level B harassment zone.

12. Post-Activity Monitoring:
    a) Monitoring of all zones will continue for 30 minutes following completion of pile removal and installation. These surveys will record all marine mammal observations following the same procedures as identified for the pre-construction monitoring time period and will focus on observing and reporting unusual or abnormal behaviors.

13.1.3 Data Collection

Biological Monitors will use monitoring forms that collect, at a minimum, the following information:

- Date and time that pile removal begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (e.g., wind, humidity, temperature);
- Tidal state and water currents;
- Visibility;
- Species, numbers, and if possible, sex and age class of marine mammals;
- Marine mammal behavior patterns observed, including bearing and direction of travel, and if possible, the correlation to SPLs;
- Distance from in-water activities to marine mammals and distance from the marine mammal to the observation point;
- Locations of all marine mammal observations;
- Other human activity in the area.

To the extent practicable, the Biological Monitors will record behavioral observations that may make it possible to determine if the same or different individuals are being "taken" because of Project activities over the course of a day.

13.2 REPORTING

A draft report will be submitted to NMFS within 90 calendar days of the completion of marine mammal monitoring. The results will be summarized in text supported by tables and graphics and include summary metrics as applicable. A final report will be prepared and re-submitted within 30 days following receipt of comments on the draft report from the NMFS.

The marine mammal report shall contain informational elements including, but not limited to:

- Beginning and end dates and times of all marine mammal monitoring.
- Construction activities occurring during each daily observation period, including how many and what type of piles were driven or removed and by what method.
- Weather parameters and water conditions during each monitoring period (e.g., wind speed, percent cover, visibility, sea state).
- The number of marine mammals observed, by species, relative to the pile location and if pile driving or removal was occurring at time of sighting.
- Age and sex class, if possible, of all marine mammals observed.
- Biological Monitor locations during marine mammal monitoring.
- Distances of each marine mammal observed to the pile being driven or removed for each sighting, if pile driving or removal is occurring at the time of sighting.
- Description of any marine mammal behavior patterns during observation, including direction of travel and estimated speed, and time spent within the Level A and Level B harassment zones while the source was active.
- Number of individuals of each species by month detected within the monitoring zone.
- Detailed information about implementation of any mitigation triggered (e.g., shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any.
- All Biological Monitors datasheets and/or raw sighting data in a separate file from the Final Report.

14.0 SUGGESTED MEANS OF COORDINATION

Each proposed activity with the potential to harass marine mammals will be evaluated relative to observed sound levels and detailed data will be collected on marine mammal reaction by type of sound source. Mitigation measures used will be discussed in project-related monitoring report(s) and recommendations will be made to improve effectiveness, if necessary. Based on the lack of marine mammal monitoring data for Oceanside Harbor, the monitoring report(s) will provide information useful for evaluating potential effects or permitting of future projects in the area.

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APPENDIX A. Level A and B Monitoring Zone Spreadsheets by Pile Type and Removal/Installation Method

Level A ZOI for 16-inch Octagonal Piles via Vibratory Extraction

VERSION 2.2: 2020

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Oceanside Harbor Fishing Pier Replacement Project- 16-inch octagonal concrete pile vibratory extraction
PROJECT/SOURCE INFORMATION	Vibratory extraction of 4, 16-inch octagonal concrete piles assumed to happen for 25 minutes at a time, 4 extractions a day, for a total of 100 minutes (1.67 hours) a day for 1 day

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz)¥	2.5	default

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	163
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	25
Duration of Sound Production within 24-h period (seconds)	6000
10 Log (duration of sound production)	37.78
Transmission loss coef	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**13.1**	**1.2**	**19.3**	**7.9**	**0.6**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

Level A ZOI for 18-inch Round Steel Piles via Vibratory Driving

VERSION 2.2: 2020

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Oceanside Harbor Fishing Pier Replacement Project- 18-inch steel pile vibratory hammer
PROJECT/SOURCE INFORMATION	Vibratory installation of 18, 18-inch steel piles assumed to happen for 25 minutes at a time, 4 installations a day, for a total of 100 (1.67hours) minutes a day for 5 days

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	158
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	25
Duration of Sound Production within 24-h period (seconds)	6000
10 Log (duration of sound production)	37.78
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz)¥	2.5	default

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**6.1**	**0.5**	**9.0**	**3.7**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

Level A ZOI for 18-inch round steel via impact pile driving

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Oceanside Harbor Fishing Pier Replacement Project-18-inch round steel impact pile driving
PROJECT/SOURCE INFORMATION	Impact pile driving of 18-inch round steel piles assumed to occur for up to 4 piles a day for 5 days

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor Adjustment (kHz)¥	2

STEP 3: SOURCE-SPECIFIC INFORMATION

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

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

Unweighted SEL_{cum} (at measured distance) = SEL_{ss} + 10 Log (#	**205.8**

SEL_{cum}

Single Strike SEL_{ss} ($L_{E,p,single\ strike}$) specified at "x" meters (Cell B32)	175
Number of strikes per pile	300
Number of piles per day	4
Transmission loss coefficient	15
($L_{E,p,single\ strike}$) measurement (meters)	10

PK

$L_{p,0\text{-}pk}$ specified at "x" meters (Cell G29)	200
Distance of $L_{p,0\text{-}pk}$ measurement (meters)+	10
$L_{p,0\text{-}pk}$ Source level	215.0

RESULTANT ISOPLETHS*

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

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS Isopleth to threshold (meters)	**330.3**	**11.7**	**393.4**	**176.7**	**12.9**
PK Threshold	219	230	202	218	232
PTS PK Isopleth to threshold (meters)	**NA**	**NA**	**7.4**	**NA**	**NA**

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

Level A ZOI for 18-inch Round Steel Piles via Vibratory Driving

VERSION 2.2: 2020

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Oceanside Harbor Fishing Pier Replacement Project- 10-inch steel pile vibratory hammer
PROJECT/SOURCE INFORMATION	Vibratory installation of up to 18, 10 inch steel piles assumed to happen for 10 minutes at a time, 4 installations a day, for a total of 40 (0.67hours) minutes a day for 5 days

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Weighting Factor	2.5	default

STEP 3: SOURCE-SPECIFIC INFORMATION

Sound Pressure Level (L_{rms}), specified at "x" meters (Cell B30)	155
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	10
Duration of Sound Production within 24-h period (seconds)	2400
10 Log (duration of sound production)	33.80
Transmission loss coefficient	15
Distance of sound pressure level (L_{rms}) measurement (meters)	10

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**2.1**	**0.2**	**3.1**	**1.3**	**0.1**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (-dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

Level B Harassment Zone Calculations

Installation/Removal Method:	Removal (Vibratory Extractor)	
Pile Size/Type/Material:	16-inch Octagonal Concrete Piles	
Metric	**Input**	**Notes**
Source Level (dB RMS):	163	NAVFAC SW 2022
Measurement Distance (m):	10	
Transmission Loss:	15	Practical Transmission Loss
Acoustic Threshold (dB RMS):	120	NMFS 2018
Distance to Threshold (m):	**7,356**	

Installation/Removal Method:	Installation (Vibratory Hammer)	
Pile Size/Type/Material:	18-inch Round Steel Piles	
Metric	**Input**	**Notes**
Source Level (dB RMS):	158	Caltrans 2020
Measurement Distance (m):	10	
Transmission Loss:	15	Practical Transmission Loss
Acoustic Threshold (dB RMS):	120	NMFS 2018
Distance to Threshold (m):	3,415	

Installation/Removal Method:	Installtion (Impact Pile Driving)	
Pile Size/Type/Material:	18-inch Round Steel Piles	
Metric	**Input**	**Notes**
Source Level (dB RMS):	175	Caltrans 2020
Measurement Distance (m):	10	
Transmission Loss:	15	Practical Transmission Loss
Acoustic Threshold (dB RMS):	160	NMFS 2018
Distance to Threshold (m):	**328**	

Installation/Removal Method:	Installation (Vibratory Hammer)	
Pile Size/Type/Material:	10-inch Round Steel Piles	
Metric	**Input**	**Notes**
Source Level (dB RMS):	155	Illingworth and Rodkin 2007
Measurement Distance (m):	10	
Transmission Loss:	15	Practical Transmission Loss
Acoustic Threshold (dB RMS):	120	NMFS 2018
Distance to Threshold (m):	**2,154**	