



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT
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March 13, 2020

Jolie Harrison
Division Chief,
Permits and Conservation Division
Office of Protected Resources
1315 East-West Highway, F/PR1 Room 13805
Silver Spring, Maryland 20910

Dear Ms. Harrison:

Please find the attached request for an incidental take authorization under section 101(a)(5) of the Marine Mammal Protection Act of 1972, as amended, for the take of marine mammals incidental to conducting breakwater repairs by the U.S. Army Corps of Engineers, Los Angeles District.

The U.S. Army Corps of Engineers plans to conduct breakwater repairs in Port San Luis, San Luis Obispo County, CA from April 2021-November 2021. Because the USACE activities have the potential to cause Level B Take of marine mammals, we are requesting an Incidental Harassment Authorization.

We look forward to working with you and your staff to answer any questions you may have about this application. Please feel free to contact Mrs. Natalie Martinez-Takeshita at 213-452-3306 or via email at Natalie.M.Martinez-Takeshita@usace.army.mil with additional questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "Eduardo T. De Mesa", is positioned above the typed name.

Eduardo T. De Mesa
Chief, Planning Division



**US Army Corps
of Engineers®**

**INCIDENTAL HARASSMENT AUTHORIZATION (IHA) APPLICATION
FOR
OPERATIONS AND MAINTENANCE (O&M)
PORT SAN LUIS HARBOR BREAKWATER REPAIRS
SAN LUIS OBISPO COUNTY, CALIFORNIA**

Submitted by:

**U.S. Army Corps of Engineers
South Pacific Division
Los Angeles District
915 Wilshire Blvd.
Los Angeles, California 90017**

Submitted to:

**National Oceanic and Atmospheric Administration (NOAA) Fisheries
Permits and Conservation Division, Office of Protected Resources
1315 East-West Highway, F/PR1 Room 13805
Silver Spring, MD 20910**

February 2021

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I. Description of Specified Activity: *A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.*

The Los Angeles District (LAD) of the U.S. Army Corps of Engineers (Corps), as part of its Operations and Maintenance (O&M) program, is proposing to perform O&M repairs to the Port San Luis Breakwater, Port San Luis Harbor, San Luis Obispo County, to maintain the breakwater's integrity. Port San Luis Harbor is located within San Luis Obispo Bay. The proposed project would perform O&M repair on the breakwater by resetting and replacing stone along the approximately 2,400 foot long and 20 foot wide breakwater. O&M repair work would focus on the most heavily damaged 1,420 feet of the structure located on the distal end between Stations 4+00 and 18+20 (Figure 4). O&M repair work would be conducted from the leeward side of the breakwater, due to the nature of the repairs and safety constraints due to adverse open ocean sea state conditions on the seaward side of the breakwater. The footprint of the breakwater would not be changed, but the crest elevation would be raised from +13 feet Mean Lower Low Water (MLLW) to +16 feet MLLW as a consequence of the armor stone size required for hydraulic stability and the breakwater prism. It is estimated that approximately 29,000 tons of existing stone would need to be reset, and 60,000 tons of new stone (individual stone sizes range from 5 to 20 tons) would be placed to restore the most heavily damaged portion of the breakwater to its original design. Repair work elevation changes could potentially extent to the seabed to ensure a stable slope is maintained ensuring structure stability. Repair work construction activities would be limited to day light hours (approximately 11 hours a day). Minor excavation of shoaled sediment (approximately 15,000 cubic yards) adjacent to the leeward side of the breakwater would be necessary to create adequate depths for barges and other vessels to access the breakwater for the O&M repair. The excavated material will be relocated approximately 1,000 feet north of the breakwater to minimize additional impacts to the existing eelgrass bed in the lee of the breakwater. The excavated and relocated sediment will be utilized to create an engineered eelgrass mitigation site in shallow waters. Mitigation to minimize resuspension and movement of these relocated sediments will minimize disturbance to marine mammals and their prey. Excavation of shoaled sediment could potentially occur during day and night hours (approximately 22 hours a day). In the event of adverse weather, the contractor will relocate the equipment from the lee of the breakwater and seek shelter, mooring within the established Port San Luis Harbor District designated anchorage or within Morro Bay Harbor. The proposed project is required to protect Port San Luis Harbor and maintain safe navigability within the port.

Construction would be sea-based, conducted by a crane-equipped barge (1), barges carrying rock (2), tug boats (3), and small craft support vessels (3), possibly a clamshell dredge (1), and possibly a scow (1); quantities of equipment are worst case estimates and may differ slightly depending on the individual contractor awarded the construction contract. The first phase of construction will be the excavation of shoaled sediment adjacent to the breakwater to allow for access of the equipment required to repair the breakwater. The excavation of shoaled sediment will require a crane-equipped barge (possibly the same crane-equipped barge utilized for the repair work) or a clamshell dredge, possibly a scow, tugboats, and small craft support vessels. While it is anticipated the excavation of the entire shoaled area requiring excavation by the

contractor for repair equipment access will take place prior to the repair rock work commencing, additional excavation throughout the duration of the construction may be required to maintain adequate working depths if unforeseen shoaling of the excavated area occurs. The second phase of construction will consist of the repair work to the breakwater structure, requiring a crane-equipped barge, barges carrying rock, tugboats, and small craft support vessels. Repair work will consist of resetting of existing stone and placement of new stone on the breakwater structure. Dropping of armor stone is not permitted, but it should be expected that some stones may be accidentally dropped during placement. Stones would be carefully placed and interlocked with existing stones to maximize stability and minimize the intensity of sound due to stone placement. The crane-equipped barge and attached storage barge will pull approximately a couple hundred feet away from the breakwater at the end of the work day for overnight mooring for safety purposes and pull back into working position in the morning, unless adverse weather is expected. Construction activities are expected to take no more than 174 work days.

The following is a description of each type of equipment and how it will be utilized.

Crane-equipped Barge(s). The crane-equipped barge (estimated to be as large as 260 ft by 80 ft) is a barge with an attached crane that will be utilized for the breakwater repair work (Figure 8) and may be utilized for the excavation of shoaled sediment. Should the crane-equipped barge be utilized for the excavation of shoaled sediment the crane will be outfitted with a clamshell bucket. The contractor may opt to utilize a separate clamshell dredge (a crane-equipped barge outfitted with a clamshell bucket, estimated to be approximately 120 ft by 60 ft) to excavate the shoaled sediment. During excavation the clamshell bucket will be lowered by the crane operator to the sea floor to excavate sediment. The crane will place material on an adjacent storage barge or into a scow for placement at a designated placement site within the vicinity. During breakwater repair construction a barge with an attached crane will be outfitted with lifting tongs to reset existing stone and retrieve stones from an adjacent storage barge tied up to the crane-equipped barge, and then place those stones on damaged sections of the jetties. A boat operator in a skiff, and spotter on the jetty, would direct the operation of the crane in order to pick and place the stones. The picked stone must be able to match the dimensions of the voids along the jetty. Approximately 30 to 35 stones can be picked and placed per day using this vessel (Roughly three to four stones per hour on average). On average the crane-equipped barge and attached storage barge would move once a week along the breakwater, approximately repairing 75-100 ft linear feet per week. The movement of the barges along the breakwater would take approximately 30 minutes to 6 hours dependent on whether the main anchors require resetting. The crane-equipped barge and attached storage barge will pull approximately a couple hundred feet away from the breakwater at the end of the work day for overnight mooring for safety purposes and pull back into working position in the morning, unless adverse weather is expected. The movement of the barges at night to pull away from the breakwater will not require the main anchors to be reset, taking approximately 30 minutes.

Support Vessels. Self-propelled vessels that serve as tenders, tugs, and spotting craft. The main purpose of a support vessel is to assist the crane operator as well as to ferry equipment and crew back and forth from the shore, jetties, staging areas, and the crane and storage barges. On average every two to three weeks new stone will be brought to the site on a storage barge to be

exchanged with the empty storage barge; when this occurs the maximum anticipated number of support vessels on site is six. During the majority of the construction duration the daily norm would be two support vessels on site, one skiff and one tug. The complement of these vessels is usually just one operator unless ferrying other crew.

Storage/Rock Barge. Another floating barge which serves as the stockpile of stone for repair work will be utilized. This barge is typically towed in from an offsite quarry location (likely Pebbly Beach Quarry on Santa Catalina Island) and is then tied up to the crane-equipped barge. The complement of this vessel is usually a spotter/oiler who works with the crane operator to select stones. The rock barge is expected to carry approximately 2,000 to 4,000 tons of stone per trip. On average every two to three weeks new stone will be brought on a storage barge to be exchanged with the existing empty storage barge, the exchange of storage barges will take approximately two to three hours each time. The unused/awaiting barges will be stored within a designated existing mooring within the established Port San Luis Harbor District designated anchorage or within Morro Bay Harbor.

The Corps is seeking an IHA for the O&M Port San Luis (PSL) Breakwater Repair project, components of the project may result in Level B harassment take of pinnipeds that are hauled-out on the breakwater structure or in the water nearby. Level B harassment may also occur due to visual disturbance during the excavation of shoaled sediment adjacent to the breakwater and in transit to the mitigation area. Level B harassment will likely occur due to visual and auditory disturbances during the repair work of the breakwater that will consist of resetting existing stone and setting new stone.

On 25 Feb 2019 a team of researchers from the U.S. Army Corps of Engineers Los Angeles District and Engineer Research and Development Center traveled to the Breakwater Repair Project at the Port of Long Beach, CA to collect representative sound files. Maintenance activities on the Long Beach, CA breakwater provided near identical conditions to the proposed work activities of the PSL breakwater repair. The sound files were collected based on guidance documents set in NMFS 2011 a/b and NOAA OPR-55. The sound files were analyzed to determine whether the anthropogenic noise exceeded the thresholds for underwater acoustic activities set by the National Oceanic and Atmospheric Administration. On 27 Feb 2019 ambient sound files were collected at San Luis Obispo, CA near the breakwater to be used as a baseline measurement for proposed repair work. The complete hydroacoustic and acoustic summary report can be found in the appendix.

Table 1. Hydroacoustic Data from LS-1 Recorder during Rock Resetting at the USACE 2019 O&M Port of Los Angeles and Port of Long Beach Breakwater Repair Project analyzed for a 60 second window.

	Low F.	Mid F.	High F.	Pinniped F.	Otaridae F.
Weighted Broadband Source Levels (dB re 1 μ Pa/m)	132.09	122.57	119.67	129.53	129.63
Unweighted Broadband RMS source level (dB re 1 μ Pa/m) at 100% of energy	140.35				

Table 2. Hydroacoustic Data from Snap recorder for ambient noise in Port San Luis, CA.

	Low F.	Mid F.	High F.	Pinniped F.	Otaridae F.
Weighted Broadband Source Levels (dB re 1 μ Pa/m)	107.39	94.13	91.90	100.98	100.98
Unweighted Broadband RMS source level (dB re 1 μ Pa/m)	131.55				

Table 3. Acoustic Data from Galaxy CM-170 Sound Pressure Meter (dB Peak).

	Port of Long Beach, CA	Port San Luis, CA
Maximum decibels during Crane Operation	82.9*	n/a
Average decibels over 8-minute recording	66.7*	62.6**

*Data was recorded at a 30-meter standoff from the crane during construction activities.

**The average ambient noise level from the breakwater at Port San Luis was due to heavy wave action on the breakwater structure.

II. Dates, Duration, and Specified Geographic Region: *The date(s) and duration of such activity and the specified geographical region where it will occur.*

Port San Luis is located on the central California Coast, approximately midway between Los Angeles and San Francisco, in San Luis Obispo County (Figures 1 & 2). Breakwater repairs are tentatively scheduled to occur from April 2022 to October 2022, thus the Corps requests the IHA issuance by May 2021 in order to secure contracts and IHA effective dates to be April 1, 2022 to March 31, 2023. O&M PSL breakwater proposed repair schedule is time dependent on weather conditions, equipment availability, working performance of the equipment, contractual commitments, and availability of funds. Due to the location of the PSL breakwater, the contractor would be fully or partially exposed to open ocean wave conditions. Adverse wave and inclement winter weather conditions at PSL preclude safe working conditions during the months of November to March when PSL experiences consistently high and/or rough sea conditions. Therefore, the work season *generally* extends from April through October, with extensions, contractions, and additional work windows outside of the summer season varying by weather patterns.

The breakwater structure is an approximately 2,400-foot long large armor stone revetment that extends from the rocky headlands of Point San Luis towards the southeast. The breakwater has approximately 2,700 feet (ft) of shoreline on each side of the breakwater due to bulges in the shoreline along the breakwater resulting from native terraces of Point San Luis and Whaler’s Island that are integrated into the breakwater. Water depths along the leeward and seaward interfaces of the seafloor and the PSL breakwater structure range from approximately 0 ft MLLW to -40 ft MLLW, reaching the deepest depths at the head of the breakwater. Water depths within 1,000 feet of the immediate area surrounding the leeward and seaward sides of the PSL breakwater range from 0 ft MLLW to -50 ft MLLW. Water depths are deepest at the centerline of the head section of the structure dropping off into deeper waters, reaching -50 ft

MLLW approximately 350 ft from the terminal end of the head section.

The following is summary excerpt from the May 2019 Biological Investigations of the Port San Luis Breakwater Report and January 2021 PSL Eelgrass Mitigation and Monitoring Plan (Merkel & Associates 2019 & 2021). On the leeward east facing portion of the breakwater extending out to sea from Whaler's Rock the rock structure is similar to that on the seaward side but is less impacted by wave energy. As a result, the breakwater supports a differing algal and invertebrate community with a more restricted tidal zone at the upper margins of the rock due to reduced wave, swell, and spray influence. In February 2019, eelgrass (*Zostera pacifica*) was mapped as a continuous bed extending for approximately half a mile along the protected shore in the lee of the breakwater. The bed extends southeasterly along the breakwater out to just short of Station 12+00 (Figure 10). Along the shoreline the bed extends past Smith Island where the bed diminishes. Torrey's surfgrass (*Phyllospadix torreyi*) was found to occur extensively on the native bedrock of Point San Luis and Whaler's Island, and to a much lesser degree on the low-lying boulder rock on the leeward side of the breakwater (Figure 10). Although *P. torreyi* was specifically observed, Scouler's surfgrass (*P. scouleri*) is also present in the area with records existing from Diablo Canyon and Pismo Beach, and it would not be unexpected for both species to be represented in the study area. On the seaward side of the breakwater, surfgrass is found only within the partially sheltered areas near Point San Luis. On the lee side of the breakwater, surfgrass was most abundant on small areas of bedrock outcrops extending above the sand or adjacent to the breakwater boulder. However, surfgrass was also found on the lower intertidal imported boulder rubble that extended outward from the breakwater. The canopy kelp in Port San Luis is dominated by giant kelp (*Macrocystis pyrifera*) which is present within scattered beds on rocky bottom habitats within Port San Luis. Historically, beds have been found both inside the breakwater protection and outside of the breakwater. Over at least the past couple of years during which time surveys have been completed for the breakwater repairs project, little to no kelp has been noted outside of the breakwater within the project study area (Figure 10). In June-July 2018 no kelp was noted on the breakwater. Additional kelp surveys were conducted in January-February 2019 and kelp was not noted at this time. Because of the absence of kelp in 2018 and the absence of kelp in winter 2019, a kelp frequency analysis was undertaken to identify how often kelp occurred in the project area and along the breakwater using data from CDFW kelp canopy surveys. This analyses revealed kelp at a low frequency of occurrence (14 percent of the surveys) with presence of narrow fringes of kelp being observed, principally on the lee of the breakwater. The distribution showed kelp at the tip of the breakwater and, erroneously, on intertidal and very shallow subtidal rock not suited to supporting giant kelp or bull kelp (*Nereocystis luetkeana*). Rather it is believed that the CDFW mapping likely included the understory feather boa kelp (*Egregia menziesii*) that is present in these areas. In spring 2020, kelp was more expansive in the project study area, but canopy kelp remained absent from the inside margin of the breakwater. A small amount of kelp canopy was present in small stands near the toe of the outer portions of the breakwater and was fairly extensive in the harbor (Figure 10). Based on the frequency distribution analyses of CDFW data and observations from 2018-2020, canopy kelp is not believed to be a significant habitat resource within the work area.

Table 4. Breakwater Repair Area Stationing Coordinates.

Breakwater Repair Stationing	Latitude	Longitude
Station 4+00	35° 09' 30.96" N	120° 45' 12.39" W
Station 18 +00	35° 09' 21.43" N	120° 44' 59.06" W

Table 5. Tentative Construction Schedule.

Construction Activity	Duration (days)*	Frequency (hours/day)	Dates (2022)
Excavation of Shoaled Sediment	6 to 18	11 to 22	April
Breakwater Repair	156	11	April - October

*Assumes a 6 day work week.

III. Species and Numbers of Marine Mammals: *The species and numbers of marine mammals likely to be found within the activity area.*

Breakwater repair activities will be limited to the immediate area surrounding the PSL breakwater (extending approximately 300 feet into the leeward waters immediately adjacent to the breakwater) and the eelgrass mitigation area. Three pinniped species (seals and sea lions) may be present in the area impacted by the construction. Table 6 summarizes the population status and abundance of each of these species.

Other marine mammal species that have the potential to occur within the waters surrounding San Luis Obispo County are the: Guadalupe fur seal (*Arctocephalus townsendi*), Northern elephant seal (*Mirounga angustirostris*), Humpback whale (*Megaptera novaeangliae*), Blue whale (*Balaenoptera musculus*), Fin whale (*Balaenoptera physalus*), Killer whale (*Orcinus orca*), Eastern North Pacific Gray whale (*Eschrichtius robustus*), Pacific whitesided dolphin (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), Northern right whale dolphin (*Lissodelphis borealis*), Long-beaked common dolphin (*Delphinus capensis*), Short-beaked common dolphin (*Delphinus delphis*), Dall's porpoise (*Phocoenoides dalli*), and Bottlenose dolphin (*Tursiops truncatus*). Occurrences within the vicinity of the project area of the species listed above are considered uncommon and would be not be expected in the limited project area within the lee of the breakwater. Generally, these species would be observed seaward of the breakwater and within the open waters of Port San Luis Bay and at a distance from the work area where thresholds for the onset of temporary threshold shifts in marine mammal hearing would not be triggered. The above listed species do not have the potential to be harassed thus the Corps is not requesting take for these species and the species have been excluded from subsequent analysis and will not be considered further in this application.

The federally threatened Southern sea otter (*Enhydra lutris nereis*) has the potential to infrequently occur within the project area. Infrequent occurrences, more transient in nature have been observed of solitary individuals within the vicinity of the project area. One mile east of the project area within Port San Luis Bay, in the kelp beds a raft(s) of Southern sea otters were consistently observed during marine mammal surveys conducted in 2018 and monthly throughout 2019. An on-site marine mammal monitor will implement a shutdown of work

should any Southern sea otters be observed within an area that would pose risk to the animal. Pursuant to Section 7 of the Endangered Species Act the Corps will initiate informal consultation for the Southern sea otter with the US Fish and Wildlife, the agency responsible for managing Southern sea otters.

Table 6. Marine Mammal Stock Assessment.

Species	Stock	ESA Status	MMPA Status	Stock Abundance (N ^{MIN})	PBR	Annual M/SI
California Sea Lion (<i>Zalophus californianus</i>) ¹	U.S.	Not Listed	Non-depleted	257,606	14,011	≥321
Steller Sea Lion (<i>Eumetopias jubatus</i>) ²	Eastern U.S.	Delisted (2013)	Non-strategic	43,201	2,592	112
Harbor Seal (<i>Phoca vitulina richardii</i>) ³	California	Not Listed	Non-depleted	27,348	1,641	42.8

¹NMFS Marine Mammal Stock Assessment Report: CA Sea Lion, revised 3/18/2019

²NMFS Marine Mammal Stock Assessment Report: Steller Sea Lion, revised 12/30/2019

³NMFS Marine Mammal Stock Assessment Report: Harbor Seal, revised 7/31/2015

IV. Affected Species Status and Distribution: *A description of the status and distribution, including seasonal distribution (when applicable), of the affected species or stocks of marine mammals likely to be affected by such activities.*

The following three pinniped species may be present in the affected area during breakwater repair construction. Two species of pinnipeds were observed utilizing the PSL breakwater as a consistent haul-out site when weather permitted, the California sea lion and Steller sea lion. PSL abundance estimates reported below are from monthly marine mammal surveys conducted by the US Army Corps of Engineers Biologist in 2019, survey efforts on average were two hours per survey event (Table 8).

Surveys conducted by the Corps Biologist and Merkel and Associates (M&A) (see appendix for M&A Biological Marine Mammals Survey Report) between 2018 and 2019 observed the general distribution of marine mammals along the PSL breakwater is influenced by direct wave energy against exposed breakwater segments. An offshore rock formation on the seaward side of the breakwater’s southern end absorbs direct wave energy and reduces the intensity of waves reaching the breakwater. This allows for manageable haul out locations on both the seaward and leeward sides of the breakwater in proximity to this rock. As Figure 5 shows, the most densely populated haul out areas for California sea lions and Steller sea lions occur on the leeward side of the south eastern end of the breakwater and spread around the revetment stone to the protected segment of the seaward side of the breakwater. Pinniped density increased at the south eastern end of the breakwater, reaching highest densities at the head section of the breakwater. The head section will refer to station 17+00 to 18+20 for the purposes of this document. Pinniped haul out utilization of the breakwater extended from station 9+00 to 18+20 of the breakwater. Pinniped density remained consistently concentrated at the head section, with over half of the pinnipeds present on any given survey occupying the south eastern end of the breakwater. Decreased pinniped density was documented as one moved away from the head section towards station 9+00. Breakwater repair construction would be sequenced to

commence at the farthest station (station 4+00) from the head section of the breakwater, work would progress slowly (approximately 75-100 feet per week), thus at times work would be 1,000 feet from the head section of the breakwater most commonly utilized by the pinnipeds. As the breakwater repair work progresses the barges will move slowly along the breakwater towards the head section, at times overlapping with the sections of the breakwater utilized as a haul-out by both pinniped species, resulting in the displacement of pinnipeds from these sections while work is being conducted. Therefore, it is anticipated that pinnipeds may not be impacted throughout the entire duration of the construction period as animals become habituated to the presence and noise of the barges and vessels.

California Sea Lion (*Zalophus californianus*)

California sea lions (CSL) range along the west coast of North America from British Columbia to Baja California and throughout the Gulf of California. Breeding occurs on islands along the coast of western Baja California, Gulf of California, and southern California (Channel Islands) (Barlow et al. 1995). Pupping season in Southern California is generally recognized as May through August, although some pupping has been observed outside of these months. There are three recognized CSL stocks (U.S. stock, Western Baja stock, and the Gulf of California stock) with the U.S. stock ranging from the U.S./Mexico border into Canada. CSLs in the U.S. are not listed as "endangered" or "threatened" under the Endangered Species Act or as "depleted" under the MMPA. The stock is estimated to be approximately 40% above its maximum net productivity level (MNPL = 183,481 animals), and is considered within the range of its optimum sustainable population (OSP) size (Laake *et al.* 2018).

El Niño events are known to negatively influence pup production, although pup counts have generally increased since the mid-1970s (NOAA 2014). Current contributors of CSL mortality include gill netting, trawl fisheries and related entanglement. Other mortality threats include boat and car collisions, shootings, entanglement and ingestion of marine debris, toxic algal blooms, predation control, and entrainment in power plants (NOAA 2014). Increasing sea-surface temperatures in the California Current negatively impact prey species availability and reduce survival rates of CSLs (DeLong *et al.* 2017, Laake *et al.* 2018, Lowry *et al.* 1991, Melin *et al.* 2008, 2010). Thus, increasing ocean temperatures may continue to limit the population size of the CSL stock within the California Current (Cavole *et al.* 2016, DeLong *et al.* 2017, Laake *et al.* 2018).

California sea lions are common in PSL year round where they are often hauled out on the PSL breakwater structure and within San Luis Obispo Bay on buoys and work docks (Figures 7 & 9). The general distribution of CSLs along the breakwater is influenced by direct wave energy against exposed breakwater segments. The distribution of CSLs on the breakwater is greatly influenced by the season and day to day sea state conditions. Four dead young pup carcasses were observed on the breakwater during the June 2018 survey conducted by M&A, no very young live pups were noted during either the on-water surveys or within the aerial survey photographs. During the contractor's marine mammal surveys (Table 9) and the Corps' monthly 2019 marine mammal surveys (Table 8) there was no observed nursing occurring by any of the CSLs in PSL and the majority of the animals in the pup-yearling size class (Table 9) were in the

higher end of the size class, suggesting the smaller live pup-yearlings observed on the PSL breakwater may have been born elsewhere and not on the breakwater. It is believed based on observations that the pupping activities on the breakwater rock are not highly successful due to large voids between rocks that allow young pups to fall and become trapped inside the breakwater (per communication with M&A, see appendix). The PSL breakwater site is not as suitable of a pupping area as the natural rock formations found in the natural pupping grounds off the Channel Islands. Generally, the breakwater is utilized by CSLs beginning in April extending through December, with greater densities observed hauled out at the south eastern end of the breakwater, and the greatest densities consistently observed at the head section of the breakwater. In addition, greater densities were observed on the leeward side as opposed to the seaward side. Based on the Corps' 2019 surveys the abundance of pinnipeds on the PSL breakwater was highest June through November (Table 8). Although surveys were conducted monthly by the Corps biologist in 2019, adverse open ocean sea state conditions prevented surveys of the seaward side of the breakwater every month, but CSLs are not expected to haul out there during these high sea state conditions. For the purposes of the analyses for pinniped abundance estimates, the months with the highest abundance and where complete surveys of the leeward and seaward sides of the breakwater were conducted (June, July and September 2018) were used to be conservative. The monthly surveys by the Army Corps biologist could not distinguish between pinniped species. Therefore, pinniped species ratios were calculated from the more detailed M&A June 2018 surveys to estimate the ratio of CSLs to SSLs. This ratio was applied to other survey months to estimate the numbers of each species present at other times. Merkel & Associates June 2018 survey identified pinnipeds to species level (CSL and SSL); approximately 94% of pinnipeds hauled out on the breakwater were CSLs and 6% SSLs. This ratios of CSL:SSL were used to calculate the average abundance of CSLs and SSLs (Table 7) hauled out on the PSL breakwater from the calculated averaged abundance of pinnipeds hauled out on the PSL breakwater during the June, July, and September 2019 USACE surveys. As a result we estimate approximately 302 individual CSLs per day are on the breakwater. Age class and sex classifications from the M&A June 2018 survey are summarized in Table 9.

Due to adverse wave and inclement winter weather conditions at PSL it is generally not possible to safely work outside of CSL pupping season (May to August) or outside of the months the breakwater is utilized by CSLs. Therefore, breakwater repair activities will likely affect hauling out behavior, and may affect nursing behaviors due to visual and auditory disturbance. The acoustic data collected on similar breakwater repair activities did not exceed the NOAA acoustic thresholds established for the CSL (Table 3). The hydroacoustic data (Table 1) slightly exceeds the NOAA acoustic thresholds established for the CSL at 10 meters from the noise source, although it is not anticipated that CSLs would be within a minimum 20 meter radius of equipment and personnel due to the visual disturbance caused by the presence of the equipment, personnel, and construction activities.

Steller Sea Lion (*Eumetopias jubatus*)

Steller sea lions (SSL) range along the North Pacific Rim from northern Japan to central California (Loughlin et al. 1984), with regions of abundance and distribution in the Gulf of

Alaska and Aleutian Islands. Individual SSLs travel extensive distances outside of the breeding season (late May to early July), likely correlating to locations of seasonally important prey resources. Based on distribution, population dynamics, and genotypic data, the species occurring in United States waters has been divided into two stocks, the eastern U.S. stock (east of Cape Suckling, AK) and the western U.S. stock (west of Cape Sucking, AK) (Loughlin 1997). The eastern stock rookeries occur in Alaska, British Columbia, Oregon, and California. Pitcher et al. (2007) documented a northward shift in the overall breeding distribution has occurred, with a contraction of the range in southern California and new rookeries established in Southeast Alaska. The Eastern U.S. stock of SSLs was delisted under the ESA in 2013 and is not considered depleted (classified as a non-strategic stock) under the MMPA. The counts of eastern SSLs have steadily increased over a 30+ year period, the Eastern U.S. stock is likely within its Optimum Sustainable Population (OSP); however, no determination of its status relative to OSP has been made (NMFS Marine Mammal Stock Assessment Report: Steller Sea Lion, revised 12/30/2016).

The Eastern U.S. stock has experienced a sustained increase throughout its breeding range. Although, in the southern end of its range (Channel Islands in southern California), it has declined considerably since the late 1930s and several rookeries and haulouts south of Año Nuevo Island have been abandoned (NMFS Marine Mammal Stock Assessment Report: Steller Sea Lion, revised 12/30/2016). Changes in the ocean environment, particularly warmer temperatures, may be factors that have favored CSLs over SSLs in the southern portion of the SSL's range (NMFS 2008). The risk of oil spills to this stock may increase in the next several decades due to increased shipping, including tanker traffic, from ports in British Columbia and possibly Washington State (COSEWIC 2013, NMFS 2013, Wiles 2014) and LNG facility and pipeline construction (COSEWIC 2013).

Steller sea lions have been observed intermittently hauling out on the PSL breakwater and work docks within San Luis Obispo Bay. Like the CSLs, the general distribution of SSLs when present along the breakwater is influenced by direct wave energy against exposed breakwater segments, the season, and day to day sea state conditions. Greater densities of SSLs were observed at the south eastern end of the breakwater (especially concentrated at the head section of the breakwater) during a June 2018 survey performed by Merkel & Associates (2019). Data has not been collected to support a fine scale analysis investigating frequencies at which SSLs are present on the PSL breakwater, however, surveys did confirm SSLs were not utilizing the breakwater as a haul-out site in the months of December, and January through April (Table 8). Based on the Corps' 2019 surveys the abundance of pinnipeds on the PSL breakwater was highest June through November (Table 8). Although surveys were conducted monthly by the Corps biologist in 2019, adverse open ocean sea state conditions prevented surveys of the seaward side of the breakwater every month, but SSLs are not likely to be hauled out during rough conditions. The pinniped species ratios calculated from the M&A June 2018 surveys were used to determine the average abundance of SSLs on the PSL breakwater; the result was approximately 19 individual SSLs per day. Age class and sex classifications from the M&A June 2018 survey are summarized in table 9. This estimate is based on peak season survey data,

although, based on observational data it is believed that SSLs are not present every day, thus this is likely an over estimation of SSL abundance per day on the PSL breakwater.

Breakwater repair activities will likely affect hauling out behavior, due to visual and auditory disturbance. The acoustic data collected on similar breakwater repair activities did not exceed the NOAA acoustic thresholds established for the SSL (Table 3). The hydroacoustic data (Table 1) slightly exceeds the NOAA acoustic thresholds established for the SSL at 10 meters from the noise source, although it is not anticipated that SSLs would be within a minimum 20 meter radius of equipment and personnel due to the visual disturbance caused by the presence of the equipment, personnel, and construction activities.

Harbor Seal (*Phoca vitulina richardii*)

Harbor seals (*Phoca vitulina*) are widely distributed along coastal areas of the North Atlantic and North Pacific. Two subspecies exist in the Pacific: *P. v. stejnegeri* in the western North Pacific, near Japan, and *P. v. richardii* in the eastern North Pacific. *P. v. richardii* inhabits coastal and estuarine areas from Mexico to Alaska. While these seals do not make extensive pelagic migrations, they do travel 300-500 km to find food or suitable breeding areas (Herder 1986; Harvey and Goley 2011). In California, approximately 400-600 harbor seal haulout sites are widely distributed along the mainland and on offshore islands, including intertidal sandbars, rocky shores and beaches (Hanan 1996; Lowry *et al.* 2008). Harbor seals breed and pup throughout their range.

A review of harbor seal dynamics through 1991 concluded that their status relative to OSP could not be determined with certainty (Hanan 1996). The California stock of harbor seals are not listed as "endangered" or "threatened" under the Endangered Species Act nor designated as "depleted" under the MMPA. (NMFS Marine Mammal Stock Assessment Report: Harbor Seal, revised 7/31/2015)

Since statewide censuses were first conducted in the 1980s, population size has increased, peaking in 2004. Although, subsequent counts in 2009 and 2012 have been lower. Expanding pinniped populations in general have resulted in increased human-caused serious injury and mortality, due to shootings, entrapment in power plants, interactions with recreational hook and line fisheries, separation of mothers and pups due to human disturbance, dog bites, and vessel and vehicle strikes (Carretta *et al.* 2014). All west-coast harbor seals that have been tested for morbilliviruses were found to be seronegative, indicating that this disease is not endemic in the population and that this population is extremely susceptible to an epidemic of this disease (Ham-Lammé *et al.* 1999).

Harbor seals have not been observed hauling out on the PSL breakwater or work docks within the San Luis Obispo Bay. However, 2019 monthly marine mammal surveys documented harbor seals hauled out on the low lying bedrock benches of nearby Smith Island (Figure 3) from January to May and again in December. The greatest number of individuals observed on a day was 25, observed during the December 2019 survey. During the Corps' monthly 2019 surveys

only one individual was observed swimming within the immediate vicinity of the breakwater, 15 feet off the head of the breakwater (March 2019 survey). Merkel & Associates (during June 2018 invertebrate surveys) observed harbor seals swimming in proximity to the breakwater in low abundance and intermittently, less than a dozen observations of likely fewer individuals. The distance between the nearest work area (station 4+00) and Smith Island is approximately 1,300 feet (Figure 3). The greatest density of harbor seals was observed on low lying bedrock benches located near Cal Poly Pier, approximately 1.5 miles from the PSL breakwater. During the 2019 surveys low numbers of individuals (no more than eight on any given survey, not clustered together in one area) were observed foraging and resting in various small patch kelp beds throughout the inner harbor, ranging from 0.5 to 1.5 miles from the breakwater.

While harbor seals were not observed hauled out on the PSL breakwater during the Corps' 2019 monthly marine mammal surveys, they were observed hauled out at the low lying rocky benches of Smith Island (approximately 1,300 feet from the nearest repair area (Station 4+00) (Table 10). The potential for the harbor seals to transit the waters near or within the project area exists. The average abundance for harbor seals within the project area (Table 7) was calculated using the Corps' monthly 2019 marine mammal survey data, for the purposes of the analysis the surveys with the highest abundances within the potential work window period were used to be conservative, note all three observation locations were included (swimming near breakwater, hauled out at Smith Island and swimming near Smith Island). The average abundance, which was approximately 10 SSLs per day, was calculated as to capture any individuals that may swim within the vicinity of the repair area during construction while transiting to and from the open sea to Smith Island. The calculated take estimates took a conservative approach, likely these take estimates are an overestimation given that harbor seals were not present throughout the year, infrequently observed swimming within the immediate vicinity of the breakwater, Smith Island is located at a distance that one would not anticipate impacts to harbor seals from the breakwater repair activities, the open lay out of Port San Luis gives harbor seals adequate area to transit in and out of PSL without requiring them to transit through the project area, and harbor seals would likely avoid the project area due to the visual disturbance of the construction associated equipment and personnel.

Breakwater repair activities are not expected to affect hauling out behavior, due to the distance from the construction activities. Auditory disturbance is also not expected due to the distances of haul out and foraging areas from the noise sources. The work footprint is confined to a small area and it is not anticipated that harbor seals would be within a minimum 20 meter radius of the crane mounted barge due to the visual disturbance caused by the presence of the equipment, personnel, and construction activities. Port San Luis is an open bay and the small work footprint would not limit the movements of harbor seals in the area or exclude/prevent them from accessing established harbor seal haul out or foraging sites.

- V. **Type of Incidental Taking Authorization Requested:** *The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury, and/or death) and the method of incidental taking.*

In this application, the Corps requests an IHA for the take of marine mammals incidental to the proposed action, the PSL breakwater repair construction activities, effective April 1, 2022 to March 31, 2023. The term “take” as defined in Section 3 [16 U.S.C. § 1362 (13)] of the MMPA means, “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” “Harassment” was further defined in the 1994 amendments to the MMPA, which provided two levels of harassment: Level A— potential injury, and Level B— potential behavioral disruption.

Under the MMPA, NMFS has defined levels of harassment for marine mammals. Level B harassment is defined as, “Any act of pursuit, torment, or annoyance which 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.” The Incidental Take Authorization requested herein is for the authorization of Level B harassment to marine mammals protected under the MMPA that are identified in Chapter 6 as a result of visual and auditory disturbances associated with the breakwater repair construction activities. Incidental take would be a temporary and localized disturbance of animals from elevated sound levels, construction and barge traffic, and visual stimulus from construction activities on the breakwater.

Therefore, the Corps requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take of three pinniped species listed in Section 4 by Level B harassment during the PSL breakwater repair construction activities.

VI. Take Estimates for Marine Mammals: *By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.*

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS’ consideration of “small numbers” and the negligible impact determination. Authorized takes would be by Level B harassment, as use of the acoustic source (i.e., rock laying) and construction has the potential to result in disruption of behavioral patterns for individual marine mammals.

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (e.g., frequency, predictability, duty cycle), the environment (e.g., bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*,

2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 microPascal (μPa) (root mean square (rms)) for continuous (*e.g.*, vibratory pile-driving) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, impact pile driving, or rock setting) sources.

Based on the sound source measurement study discussed above, underwater sound levels are not expected to exceed the Level B harassment acoustic thresholds underwater outside of the required 10 m shutdown zone for all construction equipment and vessels (see above).

Airborne Acoustic Effects - Pinnipeds that occur near the project site could be exposed to airborne sounds associated with rock setting that have the potential to cause behavioral harassment, depending on their distance from rock setting activities. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA. For in-air sounds, NMFS has established Level B harassment acoustic thresholds that harbor seals exposed above received levels of 90 dB re 20 μPa (rms) will be behaviorally harassed, and other pinnipeds will be harassed when exposed above 100 dB re 20 μPa (rms). Based on the sound source measurement study discussed above, airborne sound levels are expected to exceed the Level B harassment acoustic thresholds for a distance no-greater than 100 m for rock setting activities (Dr. Shane Guan, NMFS, personal communication).

The construction activity and movement of the barges is expected to cause visual disturbance to hauled-out pinnipeds on the breakwater, especially as the construction work moves toward the head of the breakwater where the most pinnipeds haul out. It is expected that the visual disturbance of the construction equipment and personnel will result in the take of hauled out pinnipeds within the immediate work area, based on observational data from similar construction activities pinnipeds maintained a minimum approximate 150 foot distance from construction equipment and personnel once flushed from the area (personal communication with Marine Construction Contractors and Merkel & Associates). Based on discussions with our consultant and contractors we decided it was reasonable to assume animals within 300 feet of the immediate work area would be disturbed (due to visual disturbance) and possibly flushed from the area each day. Therefore, the anticipated area of take would be 300 feet extending from each direction of the crane-equipped barge and the barge itself (approximately 100 ft), for a total of 700 feet, rather than the entire length of the breakwater daily. The repair area is approximately 1,420 feet, therefore approximately half of the repair area would be considered an area of take on any given day.

While our baseline studies discussed above indicate most pinnipeds are hauled out at the head of the breakwater and may not be disturbed during the early phases of work when the activity is focused on the base end of the breakwater, and the project is likely to occur at least partly during times of the year when less pinnipeds may be present, we conservatively request take for

our estimate of daily pinniped presence during the most abundant season for all days of project work. The summary presented in Table 7 indicates the total number of calculated Level B take estimates that may result from the Proposed Action at the PSL Breakwater. Level B take request estimates for marine mammals were based on the estimated abundance of animals per day on the PSL breakwater and in waters within a 300 foot radius of the breakwater. Construction duration was estimated to be 174 days (based on a seven month construction duration and 6 day work week). It is assumed that the majority of the animals taken each day will likely be the same individuals taken throughout the duration of the construction period, thus the take estimate is reflecting a high frequency of takes of a smaller number of individuals (Estimated Density in Table 7) taken multiple times throughout the duration of the construction period.

The calculated Level B take estimates that may result from the Proposed Action at the PSL Breakwater in Table 7 are conservative take estimates and reflect a worst case scenario of take, assuming that every animal is flushed and displaced from the entire PSL breakwater everyday throughout the duration of the construction period. It is expected that an initial startle response will be elicited from the pinniped species present when equipment is mobilized to the project area. Once equipment and personnel are present it is expected that the pinnipeds within the vicinity of PSL breakwater will become habituated to the construction activities, and presence of equipment and personnel. The nature of breakwater repair construction is a very slow progression, approximately 75 to 100 feet of the breakwater would be repaired per week. The slow progression of the work would further allow for habituation to the construction equipment, personnel, and activities by the pinniped species hauled out on the PSL breakwater. Furthermore the construction would be sequenced to begin at station 4+00 to minimize disturbance to the pinnipeds at the south eastern end of the breakwater, where the greatest densities and utilization of the breakwater occur. Thus, one could estimate that the actual take could potentially be half or less than that of the take estimated in Table 7. However, due to the unpredictable nature of animals in the wild, the Corps took the most conservative approach when calculating the Level B take estimates that may result from the PSL breakwater repair construction activities, assuming that every animal is flushed and displaced from the entire PSL breakwater everyday throughout the duration of the construction period.

Table 7. Level B Take Estimates requested by species at the PSL Breakwater Project Area.

Species	Averaged Daily Abundance*	Level B Harassment Per Day	Total Take**	Stock Abundance (N ^{MIN})	% of Stock (take/abundance * 100)
California Sea Lion (<i>Z. californianus</i>)	302.05	302.05	52,557	257,606	20.4%
Steller Sea Lion (<i>E. jubatus</i>)	19.28	19.28	3,355	43,201	7.8%
Harbor Seal (<i>P. vitulina richardii</i>)	10.33	10.33	1,797	27,348	6.6%

*Average abundance of pinnipeds present on the PSL Breakwater and in waters within a 300 ft radius of the breakwater per day.

**Total Take estimation based on seven month construction period (6 working days/week) = 174 total days.

Table 8. USACE 2019 PSL Breakwater Pinniped Survey Data.

Survey Date	Leeward	Seaward	Total
1/30/2019	0	0	0
1/31/2019	0	0	0
2/1/2019	0	0	0
3/1/2019	0	*	0*
3/24/2019	0	*	0*
3/30/2019	0	*	0*
3/31/2019	0	*	0*
4/1/2019	0	*	0*
5/1/2019	0	+	18 ⁺
5/28/2019	188	*	188
6/3/2019	182	115	297
7/29/2019	166	25	191
8/27/2019	0	1	1
9/25/2019	326	150	476
11/6/2019	398	*	398*
12/5/2019	113	*	113*
12/28/2019	0	0	0**

*Seaward side of breakwater not surveyed because of sea state conditions, no pinnipeds expected to be hauled out during these times.

**No pinnipeds hauled out on breakwater, 3 observed swimming near head of breakwater.

+Pinnipeds distributed at head section along centerline to seaward side of the breakwater structure.

Bold indicates months survey data was used to calculate the average abundance of pinnipeds on the PSL Breakwater per day.

Table 9. PSL Breakwater Marine Mammal Survey, June 30, 2018, Merkel & Associates.

CA Sea Lion	Adult female	30
	Adult Male	31
	Pup-yearling*	57
	Sub-adult-juvenile	164
CA Sea Lion Total		282
Steller Sea Lion	Adult Female	5
	Adult Male	5
	Sub-adult-juvenile	9
Steller Sea Lion Total		19
Pinniped Total		301

*Pup-yearling age class defined as birth to 1 year old, note the majority of the individuals in this age class were at the higher end of the size class.

Table 10. USACE 2019 PSL Breakwater and Smith Island Harbor Seal Survey Data.

Survey Date	Swimming Near PSL Breakwater (Leeward Side)	Hauled Out at Smith Is.	Swimming near Smith Is.
1/30/19-2/1/19	0	13	Several
3/1/2019	0	15	0
3/24/2019	1 Individual, 15 ft off head	14	3
5/1/2019	0	10	0
5/28/2019	0	2	1
6/3/2019	0	0	0
7/29/2019	0	0	0
8/27/2019	0	0	0
9/25/2019	0	0	0
11/6/2019	0	0	0
12/5/2019	0	25	0
12/28/2019	0	1	1

Bold indicates months survey data was used to calculate the average abundance of pinnipeds on the PSL Breakwater per day.

VII. Anticipated Impact of the Activity: *The anticipated impact of the activity to the species or stock of marine mammal.*

Due to adverse wave and inclement winter weather conditions at PSL it is generally not possible to safely work outside of CSL pupping season (May to August) or outside of the months the breakwater is utilized by CSLs. Therefore, breakwater repair and shoal excavation activities will likely effect hauling out behavior, and may affect pupping and nursing behaviors due to visual and auditory disturbances. It is anticipated that individuals will utilize other areas of the breakwater or possibly relocate to a haul out site other than the PSL breakwater, such as the buoys, work docks, or jetties at neighboring harbors/bays. The proposed action is not expected to have a consequential impact to foraging or feeding of California sea lions because the small footprint of the project area accounts for only a small fraction (less than 1%) of the available foraging area within San Luis Obispo Bay.

Breakwater repair and shoal excavation activities will likely effect hauling out behaviors of SSLs due to visual and auditory disturbances. It is anticipated that individuals will utilize other areas of the breakwater or relocate to a haul out site other than the PSL breakwater, such as the buoys, work docks, or jetties at neighboring harbors/bays. The proposed action is not expected to have a consequential impact to foraging or feeding of Steller sea lions because the small footprint of the project area accounts for only a small fraction (less than 1%) of the available foraging area within San Luis Obispo Bay. The proposed action is not expected to impact the reproduction of Steller sea lions.

The open lay out of PSL gives harbor seals adequate area to transit in and out of PSL without requiring them to transit through the project area, and harbor seals would likely avoid the project area due to the visual disturbance of the construction associated equipment and personnel. The conservative take estimate requested by the corps represents a worst case scenario for Level B

take, accounting for 6.6% of the California stock (based on the minimum population estimate). Although, one should take into consideration that this would not imply 6.6% of the California stock would be impacted, as this number likely accounts for a majority of the same individuals being taken multiple times throughout the duration of construction. The proposed action is not expected to have a consequential impact to foraging or feeding of Pacific harbor seal because the small footprint of the project area accounts for only a small fraction (less than 1%) of the available foraging area within San Luis Obispo Bay. The proposed action is not expected to impact hauling out behaviors or the reproduction of harbor seals.

Behavioral responses to audio and visual disturbance can be highly variable and context-specific. A number of factors may influence an animal's response to noise, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure. Behavioral state or differences in individual tolerance levels may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing noise levels than animals that are highly motivated to remain in an area for feeding (Richardson et al., 1995; National Research Council, 2003; Wartzok et al., 2004). Indicators of disturbance may include sudden changes in the animal's behavior or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise or visual disturbance and/or it may swim away from the sound source and avoid the area. Types of responses during the shoal excavation and breakwater repair activities may range from; no response, avoidance of the project area, NOAA's three-point pinniped disturbance scale responses (alert, movement, flushing), reduced haul-out time on the PSL breakwater, to relocation from the PSL breakwater to another area for the duration of construction.

Based on communication with a contractor and their experience at Redondo Harbor many years ago where the head section of the breakwater there was utilized as a haul-out and common knowledge of behavior of pinnipeds due to visual disturbance, the response of CSLs to the proposed rock placement may include alert behavior, approaches to the water, and flushes into the water. The contractor observed animals often relocated and hauled out on nearby trunk sections of the breakwater where construction activities were not taking place. These potential disturbances could be caused by the visual disturbance caused by the presence or movement of construction equipment and/or the noise produced by the equipment. Behaviorally, pinnipeds may respond to rock placement and shoal excavation activities by vacating the surrounding area. Some may redistribute themselves along portions of the breakwater away from construction activities and potentially to other haul out sites within PSL Harbor or along the coast to the south and north.

Based on past responses to similar activities, it is likely that pinniped exposure to rock placement and shoal excavation activities would change their use of the PSL breakwater and the amount of time they would otherwise spend hauled out in the immediate vicinity of the work areas on the PSL breakwater. The changes in pinniped use of the breakwater may potentially be nominal should the pinnipeds become habituated to the presence of the construction equipment and personnel. Repetitive, short-term displacement is likely to cause repetitive, short-term disruptions in their normal behavioral patterns at the PSL breakwater. Disruption from visual or auditory disturbance would be limited to working hours during the predicted construction season. In addition, the background acoustic levels at the breakwater are likely elevated at times given

the strong tides, high winds, and breaking surf conditions.

The anticipated impact upon the CSLs and SSLs includes temporary disturbance (alert and flushing behaviors) and temporary displacement of animals to other parts of the breakwater or other nearby haul out sites until work is discontinued. Other limited and likely less desirable haul out availability for pinnipeds exists throughout other parts of the breakwater and within the PSL inner harbor regions. Potential alternative haul out sites exist to the north and south of PSL, although, it is not known whether pinnipeds would relocate to these areas. Observations on a past breakwater repair project in Redondo Harbor, California by the construction contractor (Connolly-Pacific) observed that pinnipeds that were flushed from the breakwater repair areas did not leave the surrounding area but rather relocated and hauled out on other sections of the breakwater. Animals that flush from the breakwater would be expected to move to other parts of the breakwater, likely resulting in increased haul out densities in some areas. It is not expected that there would be a reduction in prey resources as a result of the Proposed Action.

There are no current threats to the species that are either part of the environmental baseline or cumulative effects in the action area that are anticipated to affect pinnipeds in addition to the activities of the Proposed Action described above. Effects of the action are not anticipated to appreciably reduce the species' ability to survive and recover.

VIII. Anticipated Impacts on Subsistence Uses: *The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.*

Not applicable, project site is located in California. Project activities are not in or near a subsistence hunting area and will not affect the availability of a species or stock of marine mammal for subsistence uses. There are no relevant subsistence uses of marine mammals implicated by this action.

IX. Anticipated Impacts on Habitat: *The anticipated impact of the activity upon the habitat of the marine mammal populations and the likelihood of restoration of the affected habitat.*

The Proposed Action would not result in in-water acoustic sound that would cause significant injury or mortality to prey species and would not create barriers to movement of marine mammals or prey. Behavioral disturbance caused by in-air acoustic impacts (Table 3) may result in marine mammals temporarily moving away from or avoiding the exposure area but are not expected to have long term permanent impacts.

Impacts to habitat from the Proposed Action are expected to include increased human activity and noise levels, minimal impacts to water quality, and negligible changes in prey availability near the individual project site.

The Corps does not anticipate any measureable long-term impact to the marine mammal habitat. Repairing the PSL breakwater by resetting and adding additional stone would not reduce the availability, quality, or accessibility of habitat for pinniped species. Pinnipeds haul out on the

existing breakwater structure, and are easily able to climb up several vertical feet. They use sections of the breakwater composed of angular breakwater stone in areas of differing slope and commonly use side slopes and the top of the breakwater. They have excellent climbing abilities on breakwater stone and therefore are expected to easily make use of the repaired breakwater. In addition, repair of the breakwater will minimize large voids that exist in the current breakwater structure that young CSL pups are thought to be falling into and becoming trapped inside the breakwater.

Transport of stone via barges would nominally increase vessel traffic along major navigation routes in existing harbors and navigation channels during the project duration, but impacts are not likely to be permanent. The number of additional barge trips per year attributable to the Proposed Action is expected to be approximately 40 trips. This is small (< 1%) annual percentage increase relative to the current number of other commercial and recreational vessels already using any of these potential routes. Additional noise could be generated by barge-mounted equipment, such as cranes and generators, but this noise would typically not exceed existing background underwater noise levels. Impacts to marine mammals from these noise sources are expected to be negligible.

Some degree of localized reduction in water quality would occur as a result of in-water construction activities. Most of this effect would occur during the excavation of shoaled sediment adjacent to the breakwater. Any effects to turbidity are expected to be short-term and minimal. Turbidity would return to normal levels within a short time after completion of the Proposed Action.

Chemical properties such as dissolved oxygen (DO), temperature, pH, salinity, and nutrients are not expected to be substantially altered by the excavation of shoaled sediment; water quality monitoring would be conducted during the excavation of shoaled sediment to ensure these chemical properties are not substantially altered outside of the immediate work area and 500' buffer zone, and that any alteration due to the project is temporary. Excavation of organically enriched or anaerobic sediments and suspension of these sediments could cause direct temporary impacts to DO. Excavation and discharge activities would also cause direct temporary water quality impacts due to turbidity and reduced light transmissivity. Increases in turbidity detectable above background levels are usually confined from 100 to 500 feet from the crane- equipped barge depending on sediment character and tidal current conditions. Sediment adjacent to the PSL breakwater is expected to be characterized as sands, which fall out of the water column quicker decreasing the turbidity plume. A clamshell bucket has impacts across the entire water column as sediments are carried up to the surface in the clamshell. It is expected that plumes would remain in the harbor area and not migrate into the open ocean environment. The duration of the plume is expected to be short; suspended solid concentrations would likely return to background levels within an hour to 24 hours after excavation ceases, dependent on sediment character and tidal current conditions. Monitoring would be conducted during excavation of sediment for salinity, pH, temperature, DO, turbidity and light transmissivity. Excavation of sediments would be controlled to keep turbidity impacts to acceptable levels.

It is not anticipated that the environment within the vicinity of the breakwater would be significantly affected by sediments being stirred up into the water column due to construction involving the resetting and placement of new stones. Dropping of armor stone is not permitted,

but it should be expected that some stones may be accidentally dropped during placement. Stones would be carefully placed and interlocked with existing stones to maximize stability, the careful placement should minimize stirring up of sediment. Small amounts of soil adhering to the stone may become temporarily suspended in the water column, causing a slight increase in turbidity. Due to the small amounts of turbidity involved, the project will not cause water quality conditions to change. Impacts are expected to be less than significant in terms of increased turbidity. No direct effects to marine mammals are expected from turbidity impacts.

Direct impacts (habitat loss/degradation or reduction in population size) to marine resources would be extremely limited due to resetting and placement of stone on the breakwater. Resetting and placement of stone could smother and/or crush sessile organisms currently attached to the currently exposed rock. However, following their replacement, these rocks would be recolonized, making any impact temporary in nature.

Excavation of shoaled sediment adjacent to the breakwater will directly affect approximately 3.6 acres of the benthic community. Extensive Pacific eelgrass (*Zostera pacifica*) beds are located throughout PSL, some degree of impact is expected and will be addressed through the Essential Fish Habitat (EFH) consultation process with the NMFS, Long Beach office. Direct estimated impacts to Pacific eelgrass due to the shoal excavation are 1.8 acres. A worst case full area of potential effects estimate to Pacific eelgrass is 4.39 acres. To minimize additional impacts to the eelgrass beds the excavated material will be relocated approximately 1,000 ft north of the breakwater, where it will be utilized to create an engineered eelgrass mitigation site. Mobile species are expected to relocate out of the area until dredging activities are finished. Some marine populations, particularly benthic organisms, would be destroyed by the excavation of sediment, but are expected to recolonize the area once excavation of sediment has ceased. Effects of a clamshell dredge project in San Diego Bay on demersal fish, epibenthic invertebrate, and benthic infaunal invertebrate communities have previously been studied. Results indicated that demersal fish took between 14 and 22 months to recover. Benthic infauna recovered within 5 months relative to density and biomass, but examination of community indices indicated that full recovery of community structure may have taken 17 to 24 months. Epibenthic invertebrates recovered within 29 to 35 months in terms of density and biomass. However, the epibenthic invertebrate community composition was still changing or had achieved an alternate stable state near the end of the study (Merkel & Associates 2010).

Recovery rates of some of the PSL benthic communities may be decreased in relation to the Merkel & Associates 2010 study of San Diego Bay due to the shallow excavation of sediment and small area of excavation compared to the San Diego Bay study. Turbidity caused by the excavation of sediment can impact plankton populations by lowering the light available for phytoplankton photosynthesis and by clogging the filter feeding mechanisms of zooplankton. Turbidity would be expected to be mostly confined to the local disturbance area. Because turbidity effects would be localized and short-term, with respect to ambient conditions, and the marine plankton are transitory in nature, impacts on phytoplankton and zooplankton would not be significant. Environmental effects from turbidity and sediment fallout would primarily impact intertidal and subtidal macroalgae and directly and potentially indirectly impact eelgrass species. Prolonged light limitation negatively effects photosynthesis, growth, and recruitment of algal and eelgrass species. Any benthic flora within the immediate project area would be eliminated by the sediment excavation activities because of site excavation and substrate removal. The most

direct impact of sediment excavation would be the elimination of benthic organisms from the immediate area. A secondary impact would be the redistribution of suspended sediments on adjacent areas. Benthic organisms are more susceptible to turbidity. Mechanical or abrasive action of suspended silt and detritus can negatively impact filter-feeding organisms by clogging their gills and impairing proper respiratory and excretory functioning and feeding activity. After excavation terminates, the affected area would be recolonized. Field studies indicate that recolonization initiates immediately and lost productivity rates are re-established in 2 to 3 years. Local fishes would likely avoid disturbance areas, thus lethal effects of suspended sediment on fishes are not anticipated to be great. Turbidity would likely be localized in time and space. As construction occurs, it is expected that demersal and pelagic fishes would temporarily relocate to avoid potential water quality impacts (i.e., turbidity plumes). While colonization of fishes may occur quickly in the excavated areas by local fishes temporarily displaced due to construction activities, complete recovery of the demersal fish community could take 1 to 2 years. Although, the demersal fish community may not experience significant direct mortality due to dredging there is likely a dependent correlation between the recovery of the benthic infauna and epibenthic invertebrate community recovery rates and that of the fish communities. Adverse impacts to EFH are expected to occur in the area requiring excavation of shoaled sediment, although, this area is small (less than 1%) relative to the available benthic, sandy bottom habitat in PSL harbor and excavation of shoaled sediments will be short term (possibly less than one week, maximum three weeks).

No permanent adverse effects are anticipated for critical habitat of prey species for marine mammals. Prey resources in the vicinity are not expected to be reduced.

X. Anticipated Effects of Habitat Impacts on Marine Mammals: *The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.*

The Corps does not anticipate repairs to the PSL breakwater would result in any measurable loss or habitat modification affecting marine mammal populations. The Corps does not expect loss of marine mammal prey or foraging resources. Temporary, seasonal disturbance at the PSL breakwater haul out site during breakwater repair construction activities is not expected to reduce post-construction use of the area by the pinnipeds species. The PSL breakwater is not designated critical habitat under the ESA for any listed marine mammal.

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

Provided below is a summary of the avoidance and minimization measures and best management practices (BMPs) that will be implemented.

- A marine mammal monitor (a trained biologist with experience identifying and monitoring marine mammal species expected to be present in PSL) pre-approved by the Corps and NMFS will monitor for marine mammals 30 minutes prior to the start of

construction activities (including prior to construction related vessels and barges mobilizing/starting up for the day), during construction activities, and 30 minutes after the completion of construction activities. A monitoring plan will be implemented as described in Section 13. This plan includes specific procedures in the event a mammal is encountered and reporting requirements.

- The Corps will conduct Marine Mammal Training for all construction personnel and the marine mammal monitors that will cover the following: marine mammal identification, clear explanation of responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
- The Corps will implement a soft-start procedure at the beginning of the work day. The objective of a soft-start is to provide a warning and/or give animals in close proximity to construction activities a chance to leave the area prior to operating at full capacity thereby, exposing fewer animals to visual disturbances, and underwater and airborne sounds that may elicit a startle response. A soft start procedure will be used at the beginning of each day, crews will slowly approach the work site creating a visual disturbance allowing animals in close proximity to construction activities a chance to leave the area prior to stone resetting or new stone placement.
- The marine mammal monitor will scan the waters for 30 minutes before and during all construction activities. If any species for which take is not authorized are observed within the immediate work area during or 30 minutes before work commences, the observer(s) will immediately notify the on-site supervisor, and require that work either not initiate or temporarily cease until the animals have moved outside of the area of potential effect (breakwater area immediately adjacent to crane-equipped barge and buffer area 300 feet along breakwater on either side of the crane-equipped barge).
- Direct physical interaction with marine mammals will be avoided during construction activities. If a marine mammal comes within 10 meters of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction.
- If rock setting is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.
- Breakwater construction associated equipment and vessels will not travel at speeds greater than 8 knots within PSL Harbor.
- A Water Quality Protection and Monitoring Plan will be implemented in coordination with the California Regional Water Quality Control Board per Clean Water Act conditions during the excavation of shoaled sediment.
- A spill prevention and response plan will also be developed and kept onsite with appropriate supplies.
- An Environmental Protection Plan will be developed and implemented prior to the commencement of any construction activities. The plan will identify biological resources within the project vicinity and outline avoidance and minimization measures and BMPs to be implemented throughout the project duration. The plan also identifies construction elements and recognizes spill sources at the site. The plan outlines BMPs, response actions in the event of a spill or release, and notification and reporting procedures. The plan also outlines contractor management elements such as personnel responsibilities,

project site security, site inspections, and training.

- No petroleum products, chemicals, or other toxic or harmful materials will be allowed to enter surface waters.
- Equipment that enters surface waters will be maintained to prevent any visible sheen from petroleum products.
- No oil, fuels, or chemicals will be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters to occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. will be checked regularly for leaks and will be maintained and stored properly to prevent spills.
- No cleaning solvents or chemicals used for tools or equipment cleaning will be discharged to ground or surface waters.

XII. Mitigation Measures to Protect Subsistence Uses: *Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, you must submit either a plan of cooperation (POC) or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses.*

There are no relevant subsistence uses of marine mammals impacted by this action, see Section VIII. There will be no impact on subsistence uses because the project activities will not take place in or near Arctic subsistence hunting areas, nor will they affect the availability of species or stocks for subsistence uses.

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

- The Corps will designate a NMFs-approved biologically trained on-site marine mammal monitor to carry out the monitoring and reporting. The Corps will include the following minimum qualifications for marine mammal monitors:
 - Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred).
 - Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance. Use of binoculars or spotting scope may be necessary to correctly identify the target.
 - Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
 - Experience or training in the field identification of marine mammal species

- expected to occur in PSL and identification of behaviors.
- Writing skills sufficient to prepare a report of observations. Reports should include such information as number, type, and location of marine mammals observed; their behavior in the area of potential sound effects during construction; dates and times when observations and in-water construction activities were conducted; dates and times when in-water construction activities were suspended because of marine mammals, etc.
- Ability to communicate orally, by radio, or in-person with project personnel to provide real time information on marine mammals observed in the area, as needed.
- A marine mammal monitor will be placed at the best vantage points practicable (from the construction barges, breakwater, or independent monitoring vessel).
- The Corps will conduct one pinniped monitoring survey, and any other observed marine mammal species (by species and age class if possible) present on the PSL breakwater and immediate surrounding area within 1 week prior to commencing work (including mobilization activities) at the PSL breakwater (see below for minimum requirements and data to be collected during survey and monitoring efforts).
- During construction the marine mammal monitor will scan the waters for 30 minutes prior, during, and 30 minutes after construction activities (excavation of sediment, stone resetting and placement of new stone) have completed.
- If weather or sea conditions restrict the marine mammal monitor's ability to observe, or become unsafe for monitoring, construction will cease until conditions allow for monitoring to resume.
- Stone resetting and new stone placement will only occur during daylight hours from sunrise to sunset when it is possible to visually monitor marine mammals.
- If the Corps or its contractors discover an injured or dead marine mammal species in the action area, regardless of known cause:
 - The Corps will immediately report the incident to the Office of Protected Resources (OPR) (PR.ITP.MonitoringReports@noaa.gov), NMFS and to the NMFS West Coast California Regional Stranding Network (Justin Viezbicke/Justin Greenman) as soon as feasible. If the death or injury was clearly caused by the specified activity, the Corps must immediately cease the specified activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. The Corps must not resume their activities until notified by NMFS.
 - Reporting of the incident must include the following:
 - Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable)
 - Species identification (if known) or description of the animal(s) involved
 - Condition of the animal(s) (including carcass condition if the animal is dead)
 - Observed behaviors of the animal(s), if alive
 - If available, photographs or video footage of the animal(s)
 - General circumstances under which the animal was discovered
- If any species for which take is not authorized are observed within the area of potential effects during or 30 minutes prior to excavation of sediment, stone resetting, or new stone placement, the marine mammal monitor will immediately notify the on-site supervisor,

and require that these construction activities either not initiate or temporarily cease until the animals for which take is not authorized have moved outside of the area of potential effect.

- The marine mammal monitor will monitor for marine mammals and have the authority to implement shutdown/delay procedures when applicable (in the unlikely and unexpected event an animal is in a location that would result in a Level A take, or a species not covered for Level B incidental take under this IHA is present within the vicinity that could result in take).
- During construction at the PSL breakwater, a final report will be provided to the NMFS.
 - These reports will provide dates, time, tidal height, maximum number of pinnipeds on the breakwater and any observed disturbances (detailing marine mammal species and behavior(s)). The Corps also will provide a description of construction activities at the time of observation, any mitigation actions that were implemented, and an assessment of the implementation and effectiveness of the mitigation measures.
- At a minimum, the following information will be collected on the marine mammal monitor's observation forms during all survey and monitoring events.
 - Monitor's name performing the survey/monitoring
 - Date and time that survey and construction activities begin and end.
 - Construction activities occurring during each observation period.
 - Weather parameters (e.g., percent cover, visibility).
 - Sea state/tidal conditions [e.g., sea state, tidal state (incoming, outgoing, slack, low, and high)].
 - Upon observation of a marine mammal the following information will be recorded:
 - Monitor who sighted animal and monitor's location
 - Activity at time of sighting
 - Time of sighting
 - Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified), monitor's confidence in identification, and the composition of the group if there is a mix of species
 - Distance and bearing of each marine mammal observed to the construction activity for each sighting
 - Estimated number of animals (min/max/best)
 - Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.)
 - Animal's closest point of approach and estimated time spent within the harassment zone
 - Description of any marine mammal behavioral observations (e.g., observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (e.g., no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching)
 - Disturbance must be recorded according to NMFS' three-point pinniped disturbance scale

- Note other human activity in the area not associated with the project activities.
 - Note in behavioral observations, to the extent practicable, if an animal has remained in the area during construction activities. Therefore, it may be possible to identify if the same animal or different individuals are being taken.
 - Monitor will note observation of tagged animals and pertinent information regarding species, age class, and sex to the maximum extent possible.
- Collected data will be compiled following the completion of construction and submitted to the NMFS within 90 days of completion of construction at the PSL breakwater.
 - Post-construction surveys will document the pinniped use of the PSL breakwater.

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

Besides NMFS, the USFW and CDFW, will be apprised of the Corps work and results of the monitoring efforts. The data will be made publicly available, will be made available upon request, and will be provided to the local citizen science and non-profit marine mammal groups within San Luis Obispo and Morro Bay.

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Figure 1. Regional Vicinity Map & Figure 2. Local Vicinity Map



Figure 1 Regional Vicinity Map

Figure 2 Local Vicinity Map

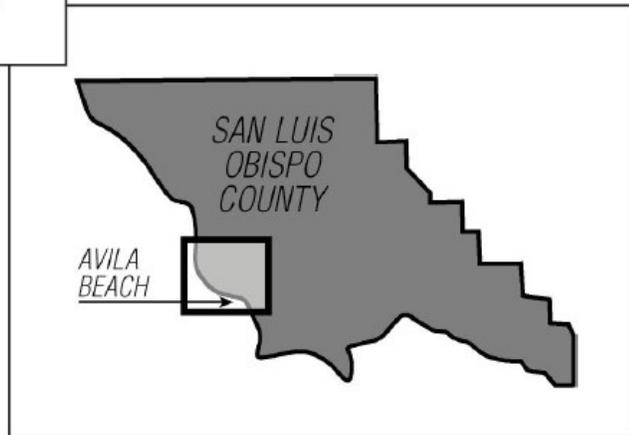


Figure 3. Port San Luis Harbor Site Map



Figure 5. Breakwater Pinniped Haul Out Site June 2018 Merkel & Associates

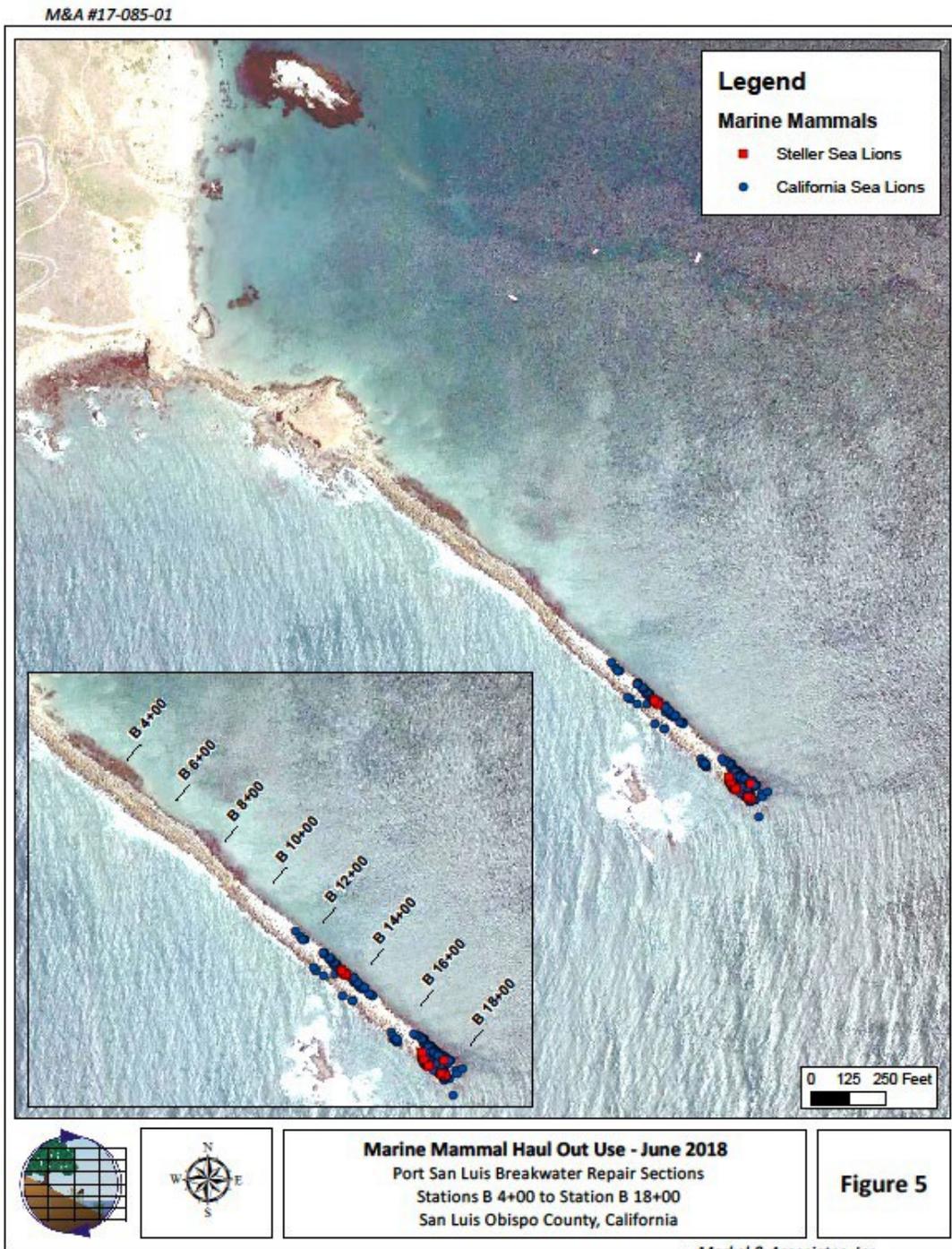


Figure 6. Breakwater Pinniped Haul Out Site & Project Footprint

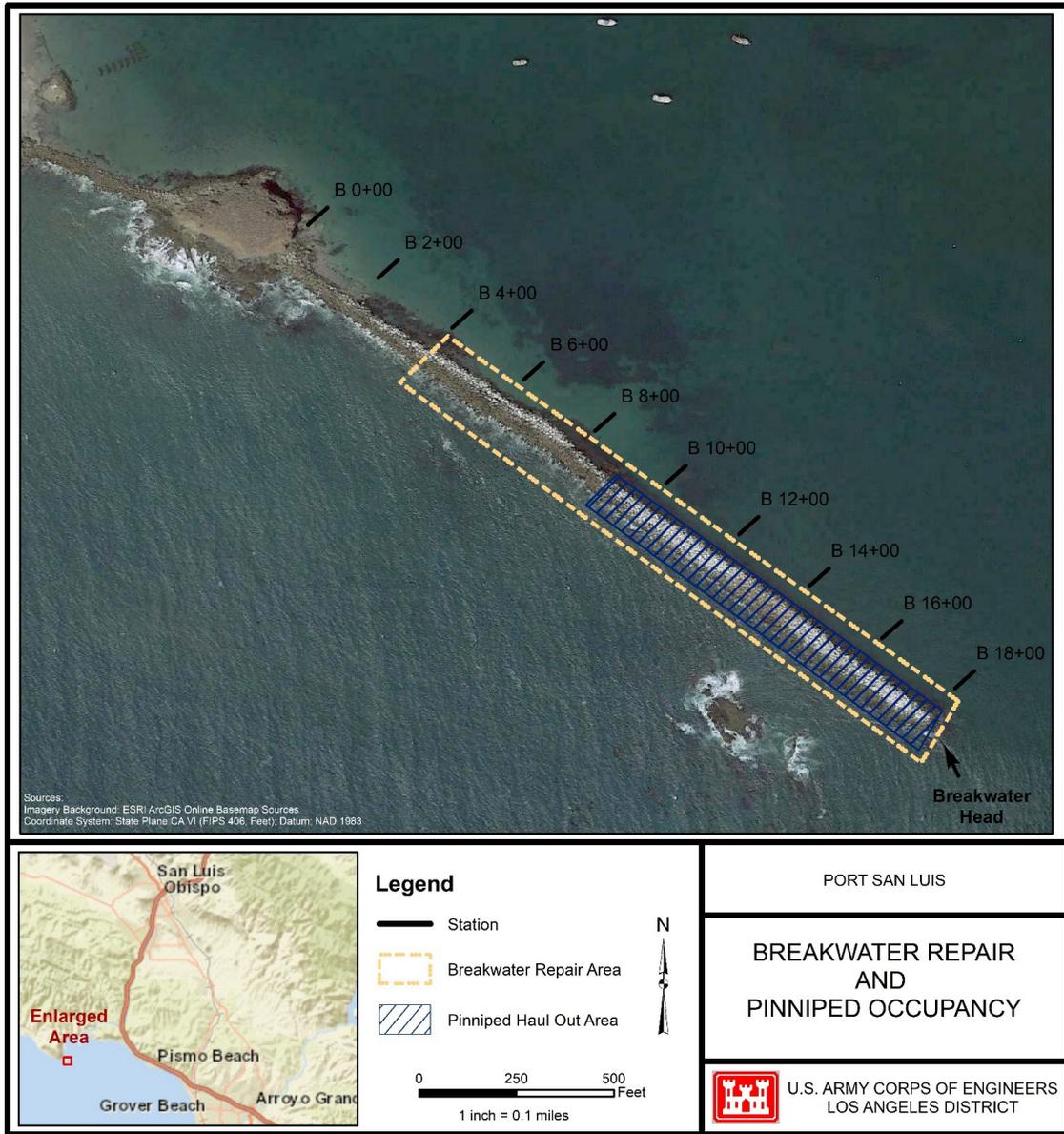


Figure 7. Pinniped Breakwater Images

PSL Breakwater: Head Section, Leeward. 6NOV2019



PSL Breakwater: South Eastern Section looking north towards Whaler's Rock, Leeward. 6NOV2019





Figure 8. Crane-equipped Barge & Rock Barge at LA/LB Harbor Breakwater Repair Site

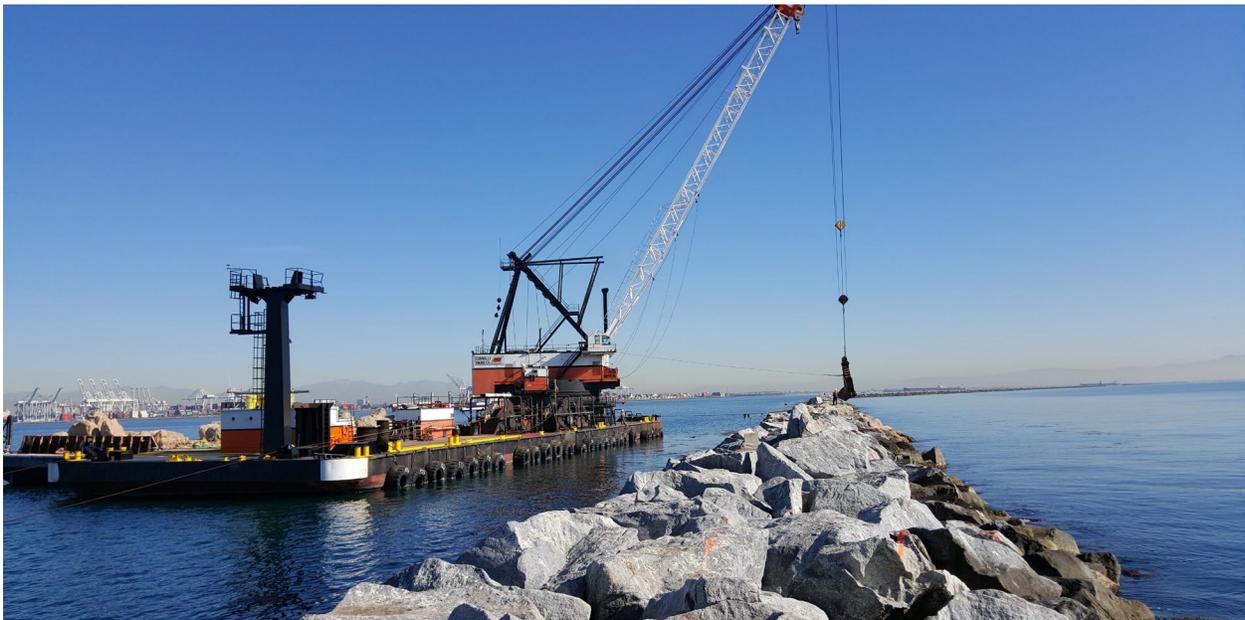
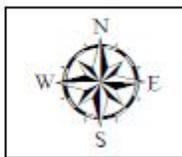
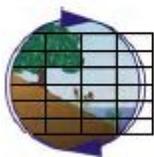
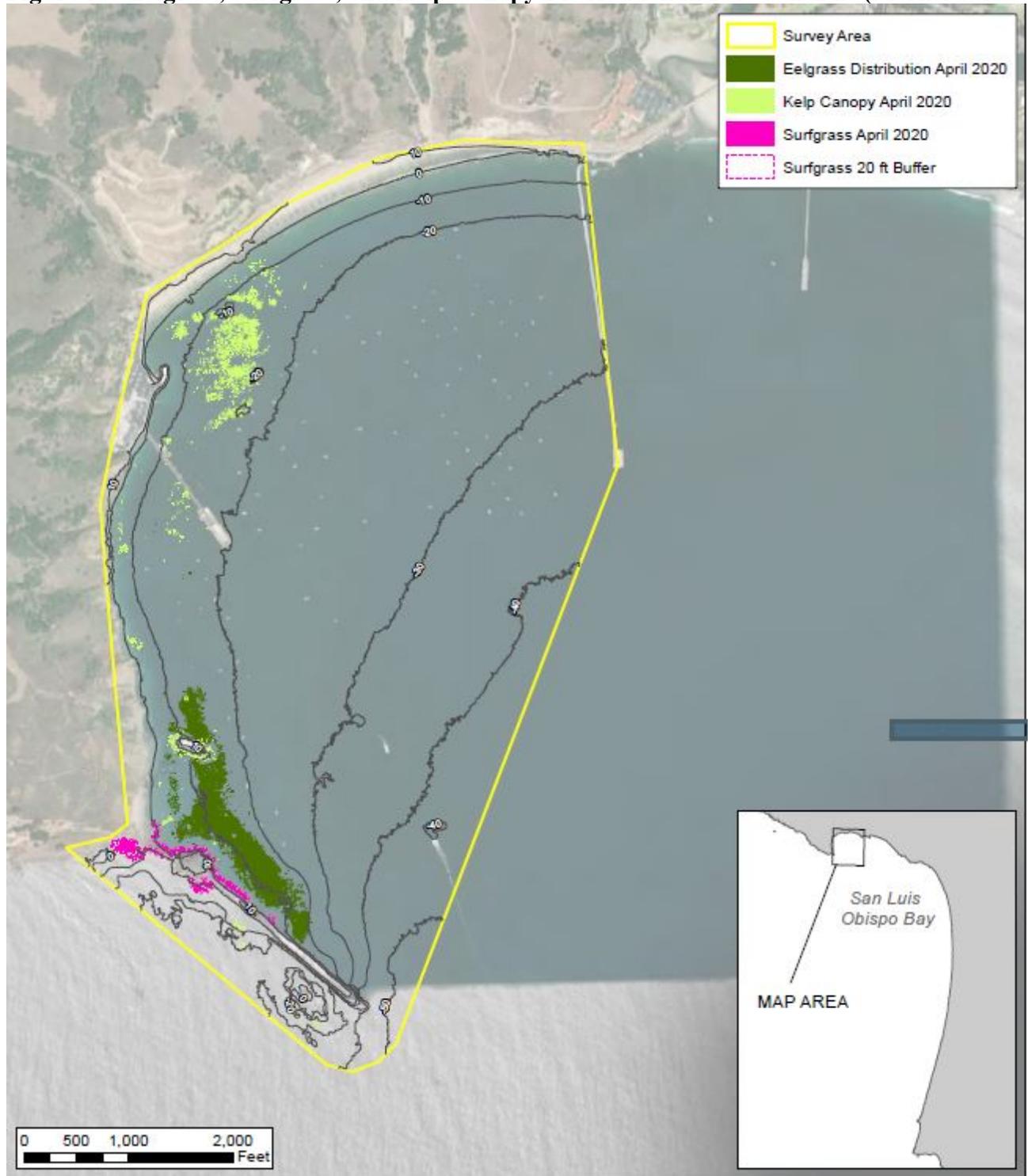


Image Source: Connolly-Pacific Co.

Figure 9. PSL Work Dock along Harford Pier (0.75 miles from the PSL Breakwater).



Figure 10. Eelgrass, Surfgrass, and Kelp Canopy Distribution in Port San Luis (Merkel & Associates)



Survey Area and Resource Overview Map
 Port San Luis Breakwater Repair Sections
 San Luis Obispo County, California

Figure 1

Merkel & Associates, Inc.

APPENDIX

USACE Hydroacoustic & Acoustic Summary Report

Los Angeles Breakwater Repair Bioacoustic Monitoring Report 14MAY2019

On 25Feb2019 a team of researchers from the U.S. Army Corps of Engineers Los Angeles District and Engineer Research and Development Center traveled to the Breakwater Repair Project at the Port of Long Beach, CA to collect representative sound files. The sound files were collected based on guidance documents set in NMFS 2011 a/b and NOAA OPR-55. The sound files were analyzed to determine whether the anthropogenic noise exceeded the thresholds for underwater acoustic activities set by the National Oceanic and Atmospheric Administration. 27Feb2019 ambient sound files were collected at San Luis Obispo, CA near the breakwater to be used as a baseline measurement for proposed repair work.

Site Selection & Hydrophone Placement

Maintenance activities on the Long Beach, CA breakwater provided near identical conditions to the proposed work activities of the Port San Luis breakwater repair. Sound files were collected during rock placement and scraping. Sound measurements occurred at 10, 50, 100, and 250 meters from the rock placement site. Distance was measured from the placement of the rock to the location of the hydrophone. Hydrophones were placed at 25% and 75% of the water column height from the seafloor. The project was conducted in shallow water with sound energy coming from the surface reflection path, bottom directed path, and direct path (Richardson *et al.* 1995). All terminology used for reporting are defined in NMFS-OPR-55. Terrestrial measurements were made by personnel standing on the breakwater and recording at 50, 75, 100, and 150 meters.

Temporal Consideration

Sounds were recorded at each distance/depth for 30 minutes. The lifting, moving, and placing of the material was treated as one sample period. Non-construction activities in the vicinity, such as shipping traffic and recreational boat noise, were excluded from the dataset. Samples that captured construction equipment failure or an anomalous placement event (e.g., rock falls out of the grapple when the crane is moving) were also excluded. Rocks were only placed on the surface of the breakwater while we were onsite.

Equipment Selection

A Loggerhead LS-1 and SNAP data logger equipped with a HTI-96-min hydrophone were moored to an anchor. The HTI-96-MIN 3V/ LED hydrophones were connected with a Seacon MCIL3M & MCDLSF connector. The hydrophones were calibrated by a NIST approved ISO 9001 compliant third party lab, as required by USACE regulations. The hydrophone sensitivities were -169.5 and -170 dBV re: 1 μ Pa, respectively. Sampling rates were set to 44.1 kHz. Data were recorded in uncompressed .WAV file format. A copy of all data is available in uncompressed WAV format for independent analysis. Recording equipment was selected based on criteria in NMFS 2011a,b. A Galaxy Audio CM-170 type 2 SPL meter was used to measure in air sound pressure levels. The galaxy meter sound files were set to record in dBA at a slow time weighting.

Mooring Design

A concrete anchor was used. Nylon rope connected the rubber buoy to the anchor with no metal to eliminate possible sound contamination. Recording equipment was fastened to the rope with a zip tie and allowed to suspend from the bailer connector perpendicular to the sea floor. Flow shields were not placed around the hydrophone due to low wave activity (> 1.5m/s) present at the fieldsite. The data was collected inside the breakwater with a direct noise path to the barge to represent the worst case scenario.

Project Information

The contractor Connolly-Pacific Co. used a 350 ton crane to move approximately 16-ton stones from a staging barge to the damaged section of the breakwater structure. Boulders were placed above the surface of the water and fully came to rest before the clamp could be released from the boulder.

Results

Underwater acoustics

The data files selected represented the most intense activities of the crane. The crane was “resetting” the rocks that were being placed by actively picking up individual rocks on the breakwater and quickly placing them back on the structure. This created a sound file with the largest signature due to the crane being fully throttled to lift the rocks in quick succession (<30 seconds). A 60 second sub-file was pulled from each recording device and used as the dataset. The recorded files were collected at the same time. The snap logger was deployed at 25% depth and the LS-1 logger was deployed at 75% depth from surface. Data were first filtered in Audacity to remove clicks/ distortion in the .wav file using high pass/ low pass filters. Data was then checked for clipping and anomalies that were not representative of the signal generated by the rock placement event. The data was then analyzed for individual events (impulse- i.e. rock placement) or broadband acoustic. The noise generated by the crane masked the sound of the rock placement therefore broadband event calculations were used. Broad band acoustic noise measurements were made using the equations set by OPR-55. All python script is available upon request.

Los Angeles Breakwater Repair Bioacoustic Monitoring

Table 1. Calculation variables for the Field sites are listed below:

	Long Beach, CA	San Luis Obispo, CA
Temperature (C)	13.2	12.4
Salinity (ppt)	33.51	31.19
pH	7.89	7.84
Distance from source (m)	15	n/a
Depth of source (m)	0	n/a
Number of source events per 24 hours	480	n/a
Duration of event (minutes)	60	n/a
Transmission loss coefficient	Near shore	Near shore

Table 2. Data from LS-1 Recorder during Rock Resetting analyzed for a 60 second window.

	Low F.	Mid F.	High F.	Pinniped F.	Otaridae F.
Distance to Permanent Threshold Shift (m)	10	10	10	10	10
Distance to Temporary Threshold Shift (m)	10	10	10	10	10
Weighted Broadband Source Levels (dB re 1 μ Pa/m)	132.09	122.57	119.67	129.53	129.63
Unweighted Broadband RMS source level (dB re 1 μ Pa/m)	140.35				

Table 3. Data from Snap recorder for ambient noise in Port San Luis Obispo, CA.

	Low F.	Mid F.	High F.	Pinniped F.	Otaridae F.
Distance to Permanent Threshold Shift (m)	10	10	10	10	10
Distance to Temporary Threshold Shift (m)	10	10	10	10	10
Weighted Broadband Source Levels (dB re 1 μ Pa/m)	107.39	94.13	91.90	100.98	100.98
Unweighted Broadband RMS source level (dB re 1 μ Pa/m)	131.55				

Data show no significant effect on 24-hour weighted duration Sound exposure level measurement. The number of source events per 24 hours were considered 480 based on an 8-hour work day. This is not a true reflection based on crew breaks and equipment repair, representing a maximum level of exposure.

Los Angeles Breakwater Repair Bioacoustic Monitoring

Table 4. Data from Galaxy CM-170 Sound Pressure Meter

	Long Beach, CA	San Luis Obispo, CA
Maximum decibels during Crane Operation	82.9	n/a
Average decibels over 8-minute recording	66.7	62.6

The data was recorded at a 30-meter standoff from the crane during construction activities. The average noise from the breakwater at San Luis Obispo was due to heavy wave action on the breakwater structure.

References

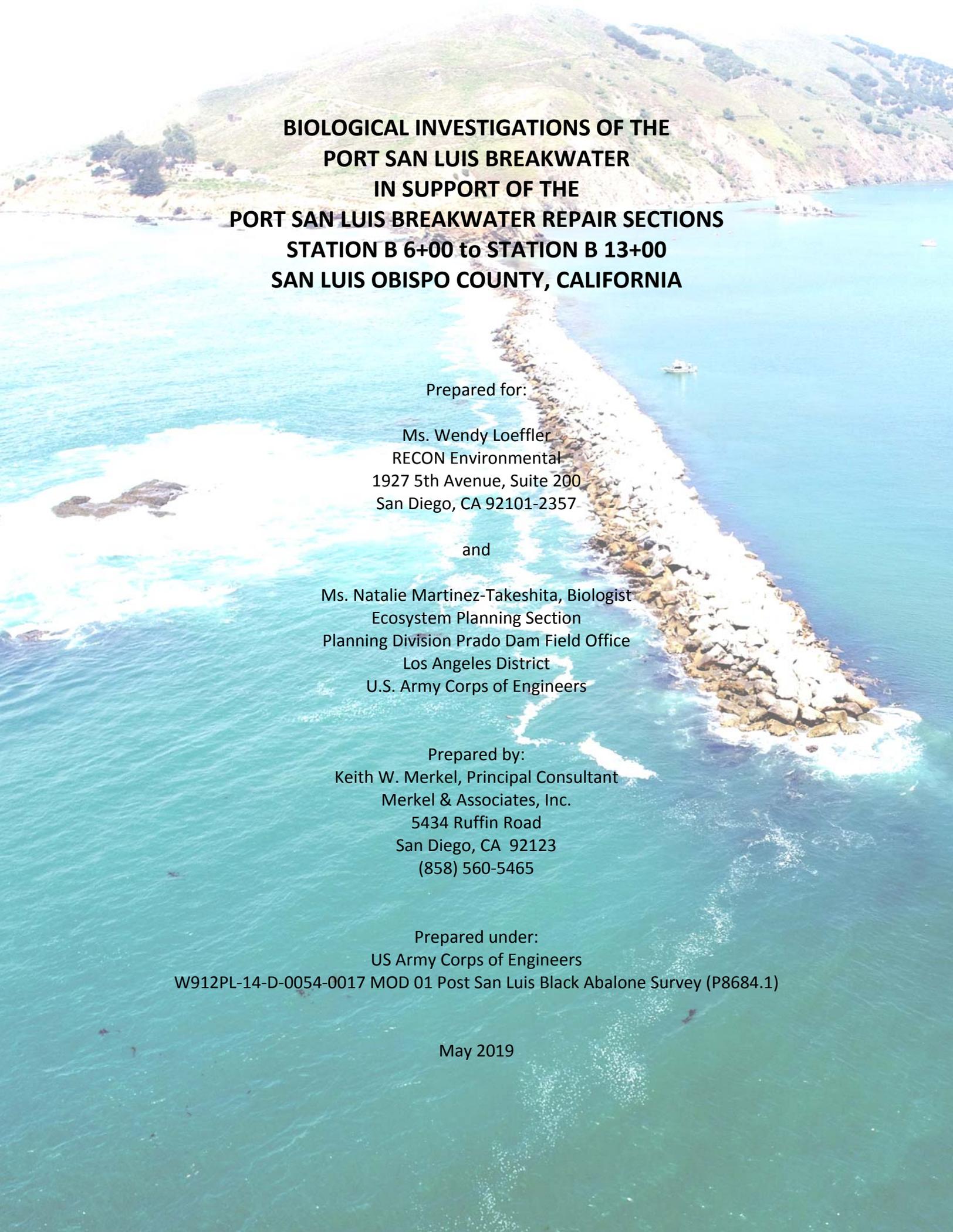
NMFS. 2011a. Guidance Document: Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon. Memorandum from NMFS Northwest Region and Northwest Fisheries Science Center to Interested Parties.

NMFS. 2011b. Guidance Document: Data Collection Methods to Characterize Impact and Vibratory Pile Driving Source Levels Relevant to Marine Mammals. Memorandum from NMFS Northwest Region and Northwest Fisheries Science Center to Interested Parties.

Richardson, J. W., C. R. Greene, C. I. Malme, and D. H. Thomson. 1995. Marine Mammals and Noise. Academic Press, San Diego, CA.

APPENDIX

**Merkel & Associates May 2019 Biological Investigations of the Port San Luis Breakwater
Report: Marine Mammals Survey**



**BIOLOGICAL INVESTIGATIONS OF THE
PORT SAN LUIS BREAKWATER
IN SUPPORT OF THE
PORT SAN LUIS BREAKWATER REPAIR SECTIONS
STATION B 6+00 to STATION B 13+00
SAN LUIS OBISPO COUNTY, CALIFORNIA**

Prepared for:

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RECON Environmental
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San Diego, CA 92101-2357

and

Ms. Natalie Martinez-Takeshita, Biologist
Ecosystem Planning Section
Planning Division Prado Dam Field Office
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Prepared under:

US Army Corps of Engineers
W912PL-14-D-0054-0017 MOD 01 Post San Luis Black Abalone Survey (P8684.1)

May 2019

3.5 Marine Mammals Survey

3.5.1 Methods

Marine mammal surveys were conducted in order to identify hauled out mammals along the Port San Luis breakwater and in proximity to the breakwater. Investigations were completed by two methods. The first was visual surveys conducted from a vessel navigated slowly along the breakwater and adjacent rocks to identify marine mammals hauled out. In addition, anecdotal observations were made of marine mammal in the project area during completion of various biological investigations in June-July 2018 and January-February 2019.

The second method of survey was a quantitative assessment of marine mammals on the breakwater and adjacent rock islands completed by completion of multiple UAV overflights. The marine mammal surveys were conducted during two different seasons with varying weather, sea state, and environmental conditions. Surveys were completed on June 30, 2018 and again on January 30 during high and low tides, January 31 during low tide, and February 1, 2019 during high tide and low tides. Aerial flights were conducted at elevations of 250 meters with true vertical overflights and offset oblique photographs of the breakwater and nearby rock islands. Using the collected photographs, marine mammals were identified, counted, and mapped on the breakwater using ESRI ArcGIS spatial mapping software.

The first surveys conducted by M&A biologists for the Port San Luis breakwater repair were completed between June 29–July 1, 2018 and were ancillary to focused surveys for black abalone. During the first survey, biologists noted the presence of marine mammals in the water and on the breakwater, as well as within the protected waters of Port San Luis. During the surveys a UAV was flown over the breakwater to produce an orthomosaic image of the survey area. The field observations and the photomosaic were subsequently used to inventory mammals on the breakwater. During the survey period, the cloud cover was typically overcast in the morning and approximately 20 percent cover in the afternoon. Winds were 0-1 Beaufort Scale (BS), and calm sea state with waves in the range of 1-2 feet on the lee of the breakwater and 3-6 feet on the windward side of the breakwater.

The second set of marine mammal surveys was conducted between January 29 and February 1, 2019. During this time, the Port of San Luis area was experiencing several days of stormy weather conditions and high surf just prior to the commencement of the survey. The weather was generally misty or rainy during the period. The conditions were wet and windy with surf between 4 and 6 feet outside of the breakwater. Breaks in the weather allowed the completion of all necessary aerial survey flights. Conditions during the surveys were between 53 °F to 63°F. Cloud cover ranged from 100 to 30 percent, winds ranged between 0 and 3 BS. Surveys were initially intended to be completed twice, one day apart, but due to an absence of any marine mammals hauled out on the breakwater on the first day, January 29, surveys were conducted on all three days.



Sea lions photographed in June 2018 using high resolution low altitude UAV aerial photography. Overflights provided an opportunity to map individual animals hauled out by species, gender, and age class.



January-February 2019 visual surveys and UAV surveys of the breakwater did not identify any marine mammals. However, during this period Smith's Island supported hauled out Pacific harbor seals.

3.5.2 Results

There were four marine mammal species observed during both surveys. *Species present in the area included Steller sea lion (*Eumetopias jubatus*), California sea lion (*Zalophus californianus*), Southern sea otter (*Enhydra lutris nereis*), and Pacific harbor seal (*Phoca vitulina*). Other marine mammals are known to be sighted within San Luis Obispo County, but are more transient and not likely to utilize the Port San Luis Breakwater repair sections project area as a substantial habitat area.*

Mammals known in the San Luis Obispo County waters but not observed during the current surveys include: Guadalupe fur seal (*Arctocephalus townsendi*), Northern elephant seal (*Mirounga angustirostris*), Humpback whale (*Megaptera novaeangliae*), Blue whale (*Balaenoptera musculus*), Fin whale (*Balaenoptera physalus*), Killer whale (*Orcinus orca*), Eastern North Pacific Gray whale (*Eschrichtius robustus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), Northern right whale dolphin (*Lissodelphis borealis*), Long-beaked common dolphin (*Delphinus capensis*), Short-beaked common dolphin (*Delphinus delphis*), Dall's porpoise (*Phocoenoides dalli*), and Bottlenose dolphin (*Tursiops truncatus*). While not observed during the present survey, whale vertebrae, probably from gray whale, were observed at multiple locations on the breakwater during both the 2018 and 2019 surveys.



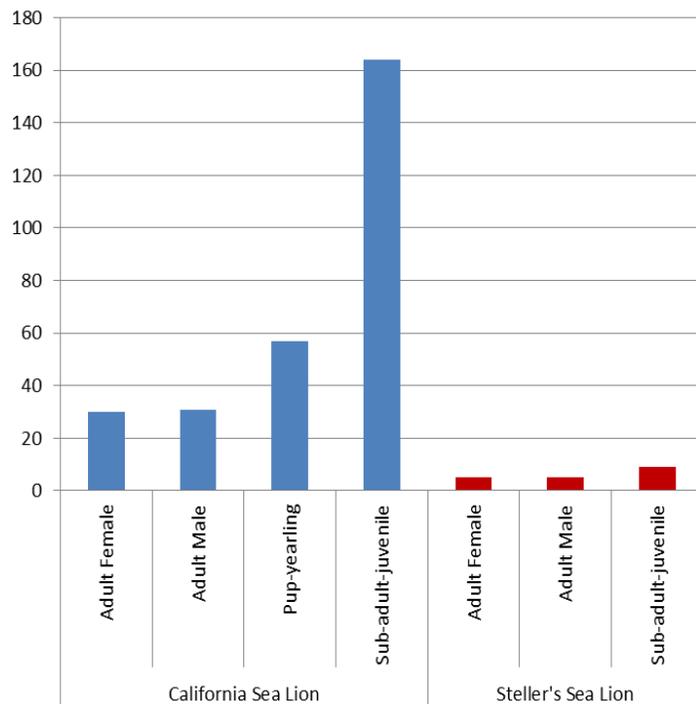
One of two whale vertebrae observed on breakwater June 30, 2018

The marine mammal species observed within the project location during the 2018 survey include Southern sea otter, Pacific harbor seal, Steller sea lion, and California sea lion. During the 2018 black abalone survey work Southern sea otters and Pacific harbor seal were observed in proximity to the breakwater in low abundance and intermittently, and were more common within the inner harbor where they were observed foraging and resting in small patch kelp beds. During the course of the surveys, only two to three otters were observed and observations of seals were likely less than a dozen observations of likely fewer individuals. While not observed, it is believed that the otters were likely foraging on the breakwater as it appears that there are abundant crabs, shellfish, and octopus available on the subtidal and intertidal rocks. Also observed in abundance in the water along the breakwater were otariid pinnipeds including Steller sea lion and California sea lion. No attempt was made to count pinnipeds in the water during the surveys.

High resolution aerial imagery collected on June 30, 2018 allowed counting of hauled out pinnipeds on the breakwater. A total of 282 California sea lions and 19 Steller sea lions were observed occupying areas on the breakwater. The survey divided observed marine mammals first by species then by age class. The most abundant age class was the sub-adult-juvenile class followed by pup-yearling and leaving an almost equal amount of both the adult male and adult female classes in both California sea lion and Steller sea lion. Also notable during the surveys were four dead young pup carcasses on the breakwater rocks. No very young live pups were noted during either the on-water surveys or within the aerial survey photographs.

The general distribution of marine mammals along the breakwater is influenced by direct wave energy against exposed breakwater segments. An offshore rock formation on the seaward side of the breakwater’s southern end absorbs direct wave energy and reduces the intensity of waves reaching the breakwater. This allows for manageable haul out locations on both the seaward and leeward sides of the breakwater in proximity to this rock. As Figure 7 shows, the most densely populated haul out areas occur on the leeward side of the south eastern end of the breakwater and spread around the revetment stone to the protected segment of the seaward side of the breakwater. In the open water, near the breakwater shoreline, sea lion were noted to be abundant, but it was not possible to count animals, or positively identify species or demographic metrics. As such, they were noted but not enumerated.

Total Pinnipeds on Breakwater - June 2018

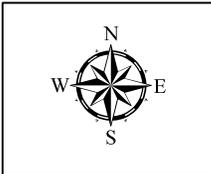
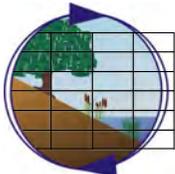
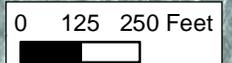
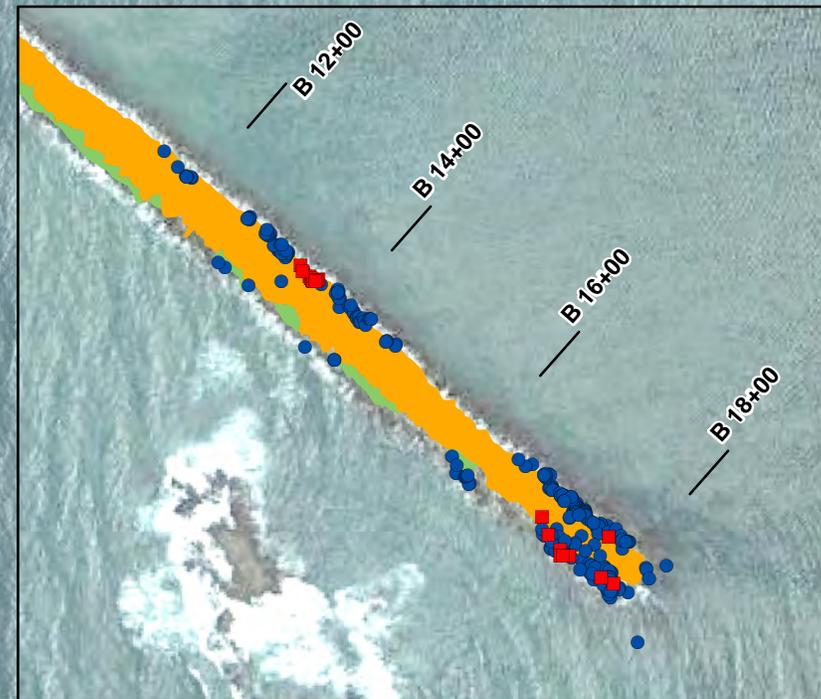
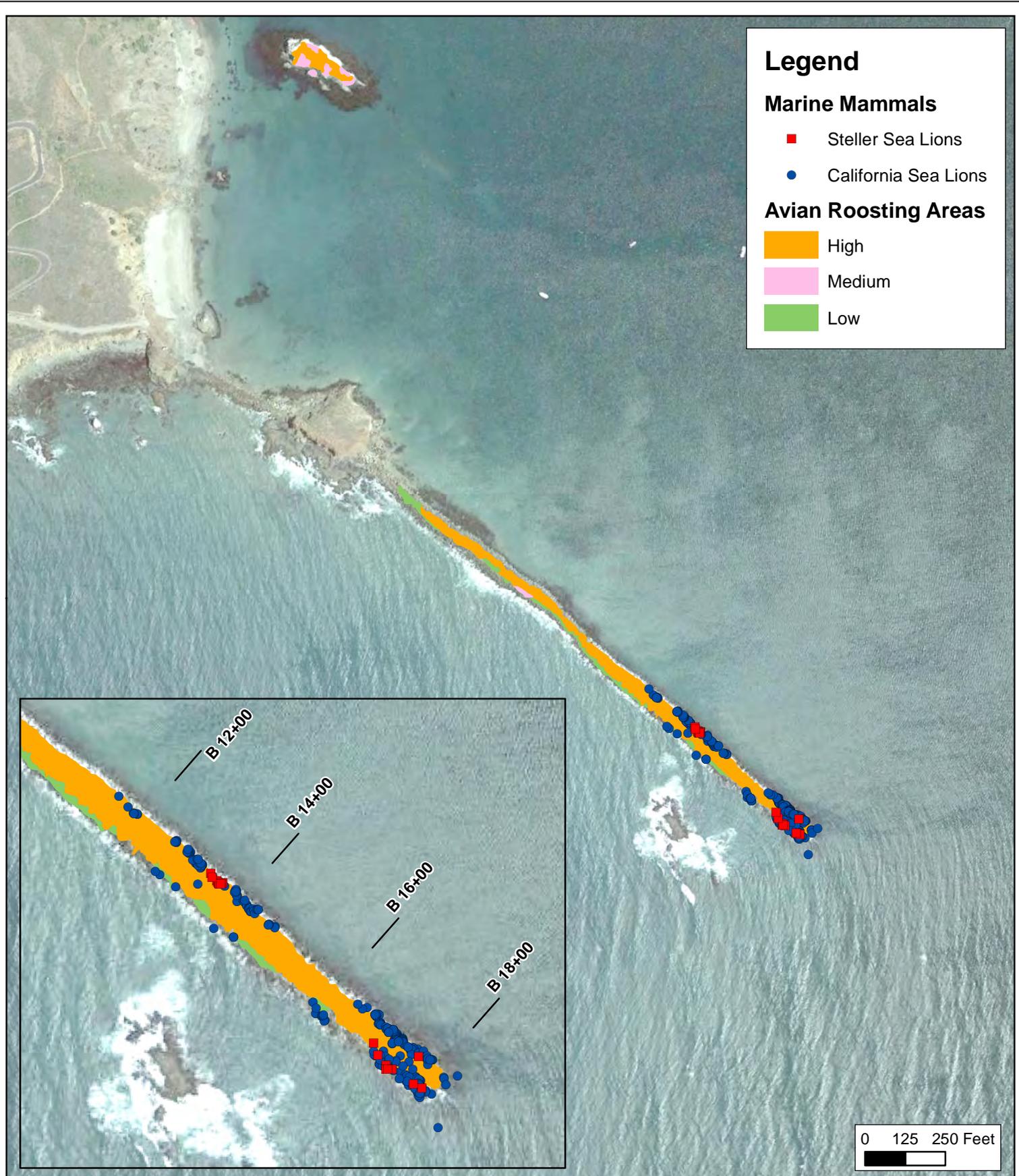


Population demographics of sea lions hauled out on Port San Luis Breakwater June 30, 2018

Further from the breakwater, California sea lions were also observed resting on a floating barge just east of the fishing pier. California sea lions, sea otters, and harbor seals were observed transiting / foraging and resting in the water around the fishing pier and boat moorings in the harbor and were even noted to enter the boat hoist launch basin.

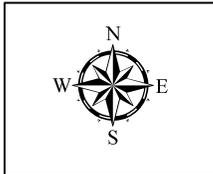
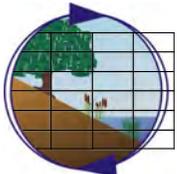
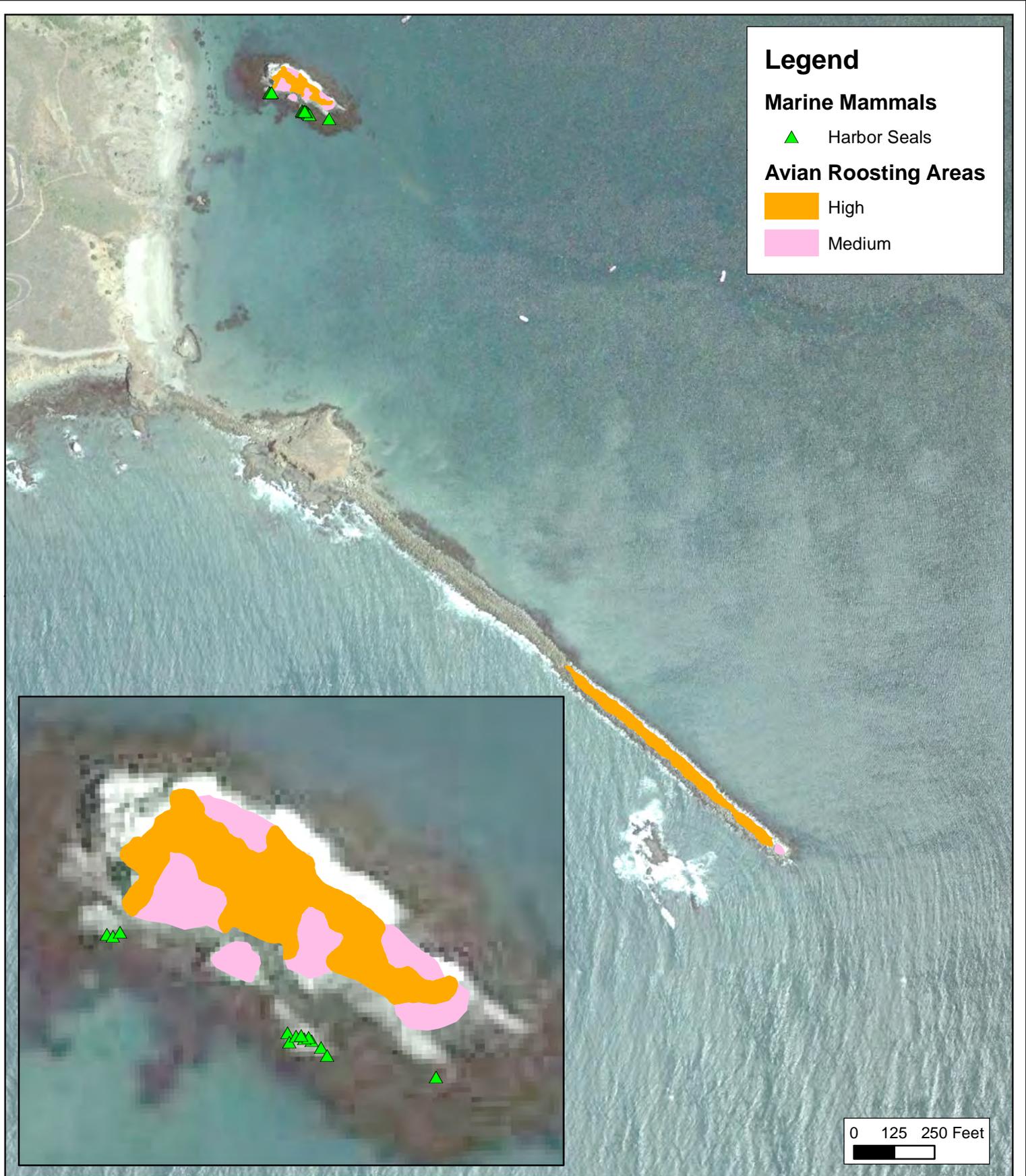
During the January and February 2019 surveys, there were no marine mammals observed on the breakwater or within the immediate project area. A total of 13 Pacific harbor seal were found hauled out on and nearby Smith Island (Figure 8). As was the prior case with sea lions, several additional harbor seals were noted in the water around Smith Island, but were not counted. Smith Island has low lying bedrock benches that are better suited as haul-outs for seals than is the steep boulder rock of the breakwater. Noting that seals haul out on Smith Island, it would not be unexpected to see seals similarly haul out on the sand beach near Point San Luis in the lee of the breakwater, or under calm sea states, on the rocky terraces of Whaler’s Island or Point San Luis on the seaward side of the breakwater.

While sea lions were notably absent from the breakwater during the winter months, a small number of California sea lions were noted hauled out on the purpose placed sea lion float near the fishing pier. Other sea lions as well as sea otters and harbor seals were noted in the protected waters of Port San Luis during transiting trips back and forth from moorings and launch facilities to the breakwater.



Marine Mammal Haul Out Use/Avian Roosting - June 2018
Port San Luis Breakwater Repair Sections
Stations B 6+00 to Station B 13+00
San Luis Obispo County, California

Figure 7



Marine Mammal Haul Out Use/Avian Roosting - February 2019
Port San Luis Breakwater Repair Sections
Stations B 6+00 to Station B 13+00
San Luis Obispo County, California

Figure 8

From: [Keith Merkel](#)
To: [Martinez-Takeshita, Natalie M CIV USARMY CESPL \(USA\)](#)
Subject: [Non-DoD Source] California sea lion pupping at Port San Luis Breakwater
Date: Monday, November 30, 2020 10:16:54 AM

Hi Natalie,

Thanks for your inquiry a week or so ago regarding the survey results of our June 2018 marine mammal surveys on the Port San Luis breakwater. You had asked about the breakdown of our pup-yearling classification for sea lions. Specifically, how many pups and how many yearlings. There were no pup-yearlings of Steller sea lions and a total of 57 pup-yearlings of California sea lions observed.

We did not split this class to pups and yearlings due to the fact that there were many small yearlings that could be confused with young pups. However, we understand the context of the question to be whether the area is a pupping area or just a haul out. In our report (Merkel & Associates 2019.

Biological Investigations of the Port San Luis Breakwater In Support of the Port San Luis Breakwater Repair Sections Station B 6+00 to Station B 13+00, San Luis Obispo County, California) we noted the following:

“A total of 282 California sea lions and 19 Steller sea lions were observed occupying areas on the breakwater. The survey divided observed marine mammals first by species then by age class. The most abundant age class was the sub-adult-juvenile class followed by pup-yearling and leaving an almost equal amount of both the adult male and adult female classes in both California sea lion and Steller sea lion. Also notable during the surveys were four dead young pup carcasses on the breakwater rocks. No very young live pups were noted during either the on-water surveys or within the aerial survey photographs.”

Note that we opted not to consider the area a pupping site or rookery as we believe that pupping on the site has been incidental, if not accidental. The four dead pup carcasses were located on high rocks of the breakwater and the chances for these pups to make it to the water would have been extremely low given the large voids between breakwater rocks and the expectation that pups would fall into the interior of the breakwater rather than reaching the water. It is not a suitable pupping area and it is possible that the pups expired on the rocks rather than attempting to traverse the distance to the water. As noted, no very young live pups were noted. This suggests that smaller pup-yearlings may have been born elsewhere and not on the breakwater.

It should be noted that over the past decade shortages of food and crowding at established Channel Island rookeries have resulted an expansion of occurrence of births of sea lions on mainland habitual haul out sites. These have rarely ended well with high incidents of pup mortality. We believe the observed pupping at Port San Luis breakwater to be a similar condition and not evidence of a rookery or even early establishment of pupping location.

Please let me know if you need further clarification.

Thanks,
Keith

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