



# Pinniped Management Plan

## Technical Study

*Prepared for*

County of Los Angeles  
Department of Beaches and Harbor  
13483 Fiji Way  
Marina del Rey, California 90292  
Contact: Jennifer Mongolo, Planner

*Prepared with the assistance of*

**Rincon Consultants, Inc.**  
250 East 1st Street, Suite 1400  
Los Angeles, California 90012

**July 2019**



**RINCON CONSULTANTS, INC.**

Environmental Scientists | Planners | Engineers

[rinconconsultants.com](http://rinconconsultants.com)



*This report prepared on 50% recycled paper with 50% post-consumer content.*



**RINCON CONSULTANTS, INC.**  
Environmental Scientists | Planners | Engineers  
[rinconconsultants.com](http://rinconconsultants.com)



# Table of Contents

---

1	Introduction .....	1
2	Pinniped Natural History .....	4
3	Pinniped Management .....	9
4	Deterrent Measures .....	11
4.1	Evaluation of Measures .....	11
4.2	Barriers and Exclusion Devices.....	11
4.2.1	Fences .....	11
4.2.2	Posts and Lines .....	12
4.2.3	Bull Rails.....	15
4.2.4	Spiked Mats and Irregular Surfaces.....	17
4.2.5	Low Voltage Electrodes and Polyvinyl Chloride (PVC) Mats.....	18
4.3	Noise Maker Deterrents.....	19
4.4	Visual Deterrents .....	19
4.5	Physical Contact Deterrents.....	22
4.6	Sanctuary and Public Outreach.....	24
5	Pinniped Deterrent Measure Recommendations and Sanctuary Alternative Approach .....	27
5.1	Transient (Guest) Docks .....	27
5.2	Dock 55 .....	28
5.3	Anchorage 47 .....	28
5.4	Boat Launch Docks .....	28
6	References .....	30

## Figures

Figure 1	Regional Location.....	2
Figure 2	Marina del Rey Harbor and Incorporated Land Use Plan Area.....	3
Figure 3	Pacific harbor seal ( <i>Phoca vitulina richardii</i> ).....	5
Figure 4	California sea lion ( <i>Zalophus californianus</i> ) .....	6
Figure 5	Main Channel of Marina del Rey Harbor including County-operated Docks.....	10
Figure 6	Fencing Pinniped Deterrent .....	12
Figure 7	Fiberglass Pole with Lines and Spiked Mat Pinniped Deterrent .....	13
Figure 8	Polyvinyl chloride (PVC) posts and Lines.....	13
Figure 9	Polyvinyl chloride (PVC) posts and Lines.....	14
Figure 10	Bull Rails .....	16
Figure 11	Spiked or Irregular Surface Pinniped Deterrent.....	17

Figure 12 Low Voltage Electrode or PVC Mat Pinniped Deterrent ..... 18

Figure 13a Visual Pinniped Deterrents ..... 20

Figure 13b Visual Pinniped Deterrent ..... 21

Figure 14 Physical Contact Pinniped Deterrents ..... 23

Figure 15 Pinniped Sanctuary ..... 24

Figure 16 Outer portion of Marina del Rey Harbor Entrance Channel ..... 25

Figure 17 Marina del Rey Harbor with Proposed Pinniped Sanctuary Locations ..... 26

## Appendices

Appendix A Pinniped Deterrent Measures Table

# 1 Introduction

---

California's small craft harbors provide enormous economic and recreational benefit to residents and visitors by offering coastal access and expansive infrastructure. Harbor facilities are designed to serve a diversity of uses and industries that allow users easy access to navigational waters of the United States and the abundant natural resources in California's nearshore waters. Harbor facilities are proximate to valuable natural resources and contribute economically and intrinsically to adjacent communities by facilitating outdoor recreation, commercial fishing, tourism, education, ocean research, service industries and commerce. California's port and harbor system includes twenty-five shallow-draft harbors at decentralized coast and estuary sites as well as small craft facilities in all the deep-draft harbors (CMANC 2018). The development, growth, and sustainment of California's ports and harbors have transformed once natural tidal lagoons and estuaries into protected water ways serving as venues for community development and economic opportunity. Recently the expansion and redevelopment of California's ports and harbors has occurred as California continues to grow in population and as a national leader in commerce and tourism. California's population grew by 49 percent between 1970 and 1990 and again by nearly 14 percent, adding over 4 million residents, between 1990 and 2000 (CDOF 2005). The advancement of California's small craft harbors comes with increasing needs for housing, services, transportation, and other infrastructure placing ever greater demands on the state's land, water, and other natural resources. Balancing growth and development with the communities identity and associated natural resources requires cognitive urban and conservation planning.

Marina del Rey Harbor (MdrH) is located in the community of Marina del Rey in northern Los Angeles County, south and west of the cities of Santa Monica, Culver City, and the community of Venice (Figure 1). Marina del Rey Harbor represents one of two small craft harbors in Los Angeles County outside of the larger Port of Los Angeles/Port of Long Beach complex and located within a highly urbanized area adjacent to Ballona Creek and Ballona Wetlands Ecological Reserve (Figure 2). To balance the growth and redevelopment of MdrH the County of Los Angeles (LA County) has adopted the Marina del Rey Land Use Plan (LUP) that was established to steer future land use, new access, recreation, resource protection, and improvement of existing facilities in MdrH. The LUP is a component of the Marina del Rey Local Coastal Program, which was adopted in 1996, and amended in 2012. The LUP guides development of the 804-acre County-owned marina (Figure 2). The Los Angeles Department of Beaches and Harbors is entrusted with the management of MdrH, including the various LA County docks and MdrH facilities.

In the last twenty years pinniped marine mammals (seals and sea lions) have become increasingly abundant throughout their range and specifically in California. The California sea lion (*Zalophus californianus*) population, under the protection of the Marine Mammal Protection Act (MMPA), has increased to its carrying capacity as recently as 2008, based on the reporting of annual stock assessments conducted by the National Oceanographic Atmospheric Administration (NOAA) (NOAA 2018a). California sea lion (CASL) have in turn become progressively abundant in MdrH, as well as other California harbors, increasing the number of interactions with humans and causing damage to public and private property. To effectively manage pinniped populations in MdrH in balance with other MdrH uses the Los Angeles County Department of Beaches and Harbors (LACDBH) developed this Pinniped Management Plan (Plan). The purpose of the Plan is to assess the local and regional

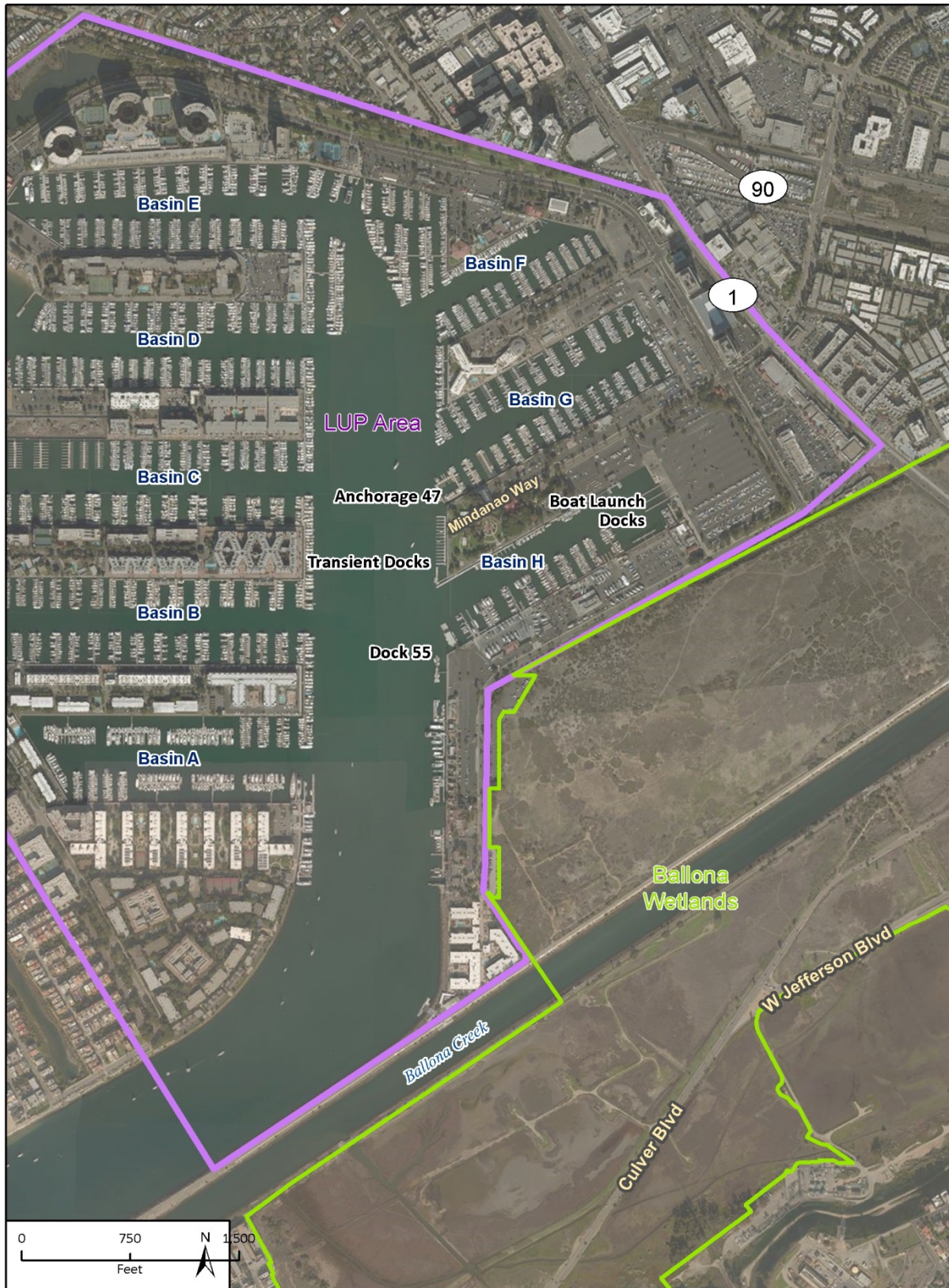
pinniped populations, identify and evaluate a variety of pinniped deterrent measures, and develop recommendations for implementation of deterrent measures focused on preventing and minimizing damage to County-operated docks while maintaining boater access and preventing conflicts between users and pinnipeds.

Figure 1 Regional Location





Figure 2 Marina del Rey Harbor and Incorporated Land Use Plan Area



Imagery provided by Microsoft Bing and its licensors © 2019.

Fig. 2. MDR Harbor\_v2

## 2 Pinniped Natural History

---

The marine waters of the Southern California (SoCal) Bight represent an area from Point Conception, north of Santa Barbara, to the Mexican border that is a source of abundant biological productivity that benefits multiple trophic levels. Due to its productivity and central location, the waters of the SoCal Bight support an abundant variety of plankton, motile and benthic invertebrates, fishes, birds and marine mammals. The SoCal Bight also contains eight islands (Channel Islands) located various distances from the mainland that serve as relatively isolated foraging and breeding habitat for pinniped marine mammals and other species. Six species of pinnipeds utilize the waters of the SoCal Bight with some species residing in the area regularly and some passing through on migratory routes. Of the six species of pinnipeds occurring in California, only the Pacific harbor seal (*Phoca vitulina*) and the California sea lion are considered common in the SoCal Bight. Although the other four pinnipeds: 1) Northern elephant seal (*Mirounga angustirostris*), 2) Steller sea lion (*Eumetopias jubatus*), 3) Northern fur seal (*Callorhinus ursinus*) and 4) Gaudalupe fur seal (*Arctocephalus townsendi*) do pass through on migratory routes, they spend the majority of their lives outside of the SoCal Bight, are relatively uncommon, and, most notably, have not been documented to haul out in SoCal ports and harbors.

All pinnipeds must come ashore to breed, give birth and nurse their young making shoreline habitat a critical need for pinniped species. Some species are at sea for several months at a time, while others return to the shore every day. In nearly all cases, pinnipeds have been shown to display high site fidelity with respect to seasonal haul outs and foraging locations, meaning they come back to the same places over time.

Pacific harbor seals are a member of the Phocids family of pinnipeds (earless seals) and are found throughout the northeast Pacific from Alaska to Baja California, Mexico, and favor near-shore coastal waters (NOAA 2018b). Harbor seals have spotted coats in a variety of shades from white or silver-gray to black or dark brown. They range in size from four to six feet in length and weigh up to 300 pounds. Harbor seals have no ear flaps, a blunt nose, and broad whiskers (Figure 3, Photographs 1 and 2). Harbor seals haul-out on land year-round (Watts 1996) and use haul-outs to molt, give birth, nurse, socialize, and rest. While hauled-out, harbor seals remain vigilant of potential threats and predators by continually scanning their environment. They are relatively easily disturbed and displaced from their haul-outs when a potential predator or threat is present. For this fact Pacific harbor seals are not typically observed in populated shoreline areas where high vessel or human traffic is persistent, unless the location is isolated from the shoreline, like in the case of an offshore rock or bait barge. Pacific harbor seals are commonly observed foraging or sometimes hauled out near the entrances of California ports and harbors but are rarely observed on docks or vessels. Pacific harbor seals form aggregations in secluded haul-out locations but are not known to cause damage to public or private property or limit recreational use of port or harbor facilities. Pacific harbor seals are curious but typically avoid human interaction and areas of significant public use. Harbor seal vocalizations sound like a congested wheeze or exhalation and are most commonly heard at haul outs during pupping season.



**Figure 3** Pacific harbor seal (*Phoca vitulina*)



**Photograph 1.** Pacific harbor seal with light coloration and spotting (Source The Marine Mammal Center).



**Photograph 2.** Pacific harbor seals with a diversity of coloration (Source NOAA).

California sea lions are a member of the Otariids family of pinnipeds (eared seals) and are found in the eastern North Pacific Ocean. The species generally ranges from the U.S./Mexico border to Canada, although males may be found foraging during the winter as far north as southern Alaska (NatureServe 2018, NOAA Fisheries 2018c). California sea lions range in color from chocolate brown in males to lighter golden brown in females and range in length from three to seven feet in length depending on age and sex. Male CASL's can reach up to about 800 pounds with females much smaller reaching only about 200 pounds. Males and females look similar up to the sub-adult phase (5 years) and their faces are similar to dogs with an angled pointed nose and very small external

ears. (Figure 4, Photographs 3 and 4). Male CASL become significantly larger than females and are distinct once their sagittal crest forms on the top of their head. They breed on the Channel Islands off California, and on islands on both coasts of Baja California in Mexico. Male CASL migrate during the winter to feeding areas off California, Oregon, Washington and British Columbia, Canada, but females and pups remain at the breeding colonies until pups are weaned. Juvenile and non-breeding (sub-adult) animals typically occupy regional areas adjacent to breeding colonies, which includes SoCal Bight harbors, taking advantage of opportunistic foraging and haul-out options. The breeding season occurs in summer and early fall, and pups are born in spring and summer (NatureServe 2018, NOAA Fisheries 2018c). The largest breeding colonies are found on offshore islands from the Channel Islands in California south to Baja. California sea lions breed on sandy beaches or in rocky coves. They also commonly “haul out” on jetties, ocean buoys, and on marina docks (NOAA Fisheries 2018c). California sea lions are capable of exiting the water to access haul-out areas up to or greater than four feet above the water surface and are common throughout the SoCal Bight with aggregations commonly observed swimming nearshore in coastal waters and bays or hauled-out on jetties, docks, and private vessels within the array of California ports, harbors, and shoreline habitat. They have become an increasing problem for coastal municipalities and private property owners due to their propensity to gather and haul-out on docks and boats.

Figure 4 California sea lion (*Zalophus californianus*)



**Photograph 3.** Female CASL during breeding season with light coloration, pointed nose, and external ears.





**Photograph 4.** Male CASL with sagittal crest.

The estimated annual population of CASL is approximately 290,000 and has ranged from 250,000 to 310,000 individuals between 2007 and 2014 based on Laake et. al. 2018. The population is determined by counting the total number of CASL pups from rookeries and applying a multiplier derived from a population reconstruction model developed by NOAA. The CASL pup count in the United States population has increased steadily since 1975 except for abrupt significant declines associated with El Niño events and recent declines in 2009, 2010, 2013, and 2014 (Laake et al. 2018). Based on analysis by NOAA the carrying capacity for the population is estimated to be 275,000 and the maximum net productivity level is approximately 175,000.

California sea lions are extremely gregarious and form large aggregations when hauled-out on land and rafts when in the water. As part of their natural history they gather seasonally at island and coastal rookeries for pupping and breeding, further reinforcing their social interactions and organization. Territorial behavior shown by male CASLs includes dominance behavior displayed by opening their mouth, vocalizations, and physical displacement of other CASL individuals. Large males are often observed singularly or with a harem of females. Females display no territorial nature but can display aggression towards other CASL when a pup is present. Juvenile and non-breeding (sub-adult) CASLs display playful interactions within groups, mimicking breeding or territorial actions. Like most pinnipeds CASL have relatively high site fidelity, meaning that they return to the same areas to forage or haul-out. Additionally, CASLs are recognized as highly intelligent and adaptive pinnipeds that learn from repeated interactions.

The yearly and seasonal CASL population observed in MdrH over the past twenty years appears to track with the general population and seasonal movement patterns of CASL with more individuals observed during the highest population years and increased numbers documented outside the breeding and pupping season. Generally CASL are less abundant in SoCAL Bight harbors and shorelines during the breeding and pupping seasons. Surveys conducted in MdrH in April, May, and June 2019 recorded between 45 and 95 CASL per day, composed predominately of sub-adult or

young adult individuals, nearly 80 percent. Large males were documented to account for about five to ten percent of the individuals, and no pups were observed during the limited surveys conducted in 2019. Annual changes in the number, age, and gender of CASL occupying MdRH is likely dependent on the status of the population and the availability of foraging resources in the nearshore waters. Observations are consistent with similar observations and surveys conducted in Newport Beach Harbor, Oceanside Harbor, Redondo Beach Harbor and San Diego Bay (Harbor Master pers com 2019).

### 3 Pinniped Management

---

The California sea lion population along the West Coast is no longer considered at risk and has likely reached its optimum sustainable population (OSP) based on recent studies. Examination of recent population trends documented over the last twenty years have shown that environmental variables including sea surface temperature and food availability are the cause for the notable changes to the CASL population. The increase in the CASL population regionally has resulted in a variety of resource conflicts, including predation impacts on federally listed salmonids in Oregon and Washington, negative recreational fishing interactions throughout California, and growing aggregations of CASLs in a variety of California ports and harbors causing damage to docks and vessels, as well as public health and safety issues related to human interactions and fecal material.

The MMPA outlines that once a marine mammal species reaches its OSP then states are provided options to take over management of the species to balance other resource impacts. While the MMPA prohibits harassment, hunting, capturing, or killing (or any attempt to engage in such activities) of marine mammals (50 CFR 216), Section 101(a)(4) enables government employees to use non-lethal measures to deter marine mammals from damaging public property, so long as such measures do not result in serious injury of an animal. In most cases non-lethal deterrence measures include barriers and exclusion devices, visual repellents, noise makers, and/or physical interactions. These deterrent measures have been and are currently being utilized by various government agencies throughout California to manage resource conflicts between pinnipeds, primarily CASL, and government-owned or operated property.

Based on recent survey results and information obtained from LACDBH planning and maintenance staff, LA County lifeguards, and law enforcement agencies, the majority of pinnipeds, exclusively CASLs, primarily utilize docks, vessels and adjacent waters along the main channel and the areas near the head of each of the basins (A-G) in MdrH (Figure 2). The majority of the CASLs occupy the County-operated transient (guest) docks, Dock 55, Anchorage 47, and to a lesser degree the boat ramp docks (Figure 5).

This Plan was developed to address management of pinnipeds in MdrH and more precisely the docks owned and operated by LACDBH (County-operated docks). While this Plan focuses on preventing and minimizing pinniped use of County-operated docks, many of the deterrent and management recommendations address MdrH as an inclusive management area with proposed deterrents or alternatives potentially applicable and beneficial for the entire MdrH LUP area.

Figure 5 Main Channel of Marina del Rey Harbor including County-operated Docks



Imagery provided by Microsoft Bing and its licensors © 2019.

Fig 3 MDR Harbor Zoom\_v3



## 4 Deterrent Measures

---

Pinnipeds haul-out to rest, avoid predation, breed, or give birth with aggregations providing safety in numbers and social interaction. The CASLs that reside or visit MdrRH and haul-out on County-operated docks are taking advantage of an opportunistic situation to rest close to foraging habitat and socialize with other CASLs. In their typical natural habitat, on sandy beaches of the Channel Islands or on offshore rocks, they are easily disturbed by movements or sound sources including those generated by humans walking or operating boats, kayaks, or aircraft. The CASL has excellent hearing, communicates, and gathers active and vocal cues from other individuals and even other species (birds) when hauled-out or in the water. Deterrent measures use the CASLs acute awareness and sensitivity to elicit a flight response or exclude them from accessing haul-out locations in areas with little or no activity. This technical study conducted comprehensive research of potential deterrent measures to safely and effectively deter pinnipeds, particularly CASLs, from hauling out and resting on County-operated docks through the evaluation of potential deterrence methods outlined by NOAA Fisheries (NOAA, 2018d), employed in other California harbors, as well as methods and alternatives identified by Rincon Consultants. Deterrent measures are highly diverse but are typically classified as barriers and exclusion devices, visual repellents, noise makers, and or physical methods of touching or interfacing with the pinnipeds (Appendix A). In nearly all cases the deterrent measure(s) exclude or displace the CASL individual(s) from its current location, prompting it to relocate to a new area. Establishing a dedicated pinniped sanctuary that provides adequate space for displaced CASL individuals to haul-out, socialize, and rest away from private anchorages and boats could help reduce negative impacts to public and private property and reduce concerns about public safety.

### 4.1 Evaluation of Measures

Evaluation of each deterrent measure's suitability is based on its potential to safely and effectively deter CASLs from hauling out and resting on County-operated docks, as well as its efficacy, cost, maintenance requirements, and public safety considerations. Managing public access and use of the County-operated docks is a critical component of LACDBH operations in MdrRH, making safety a highly weighted metric when evaluating potential deterrent measures. A broad diversity of individuals, both age and capability, visit and utilize County-operated docks regularly. Additionally, each site has a unique set of constraints and opportunities, such as availability of infrastructure (water or power) to facilitate implementation of specific deterrent measures.

### 4.2 Barriers and Exclusion Devices

#### 4.2.1 Fences

Pinniped deterrent barriers are commonly used by a variety of California ports, harbors and private property owners to exclude CASLs from accessing docks, wharfs and vessels. Fencing comes in a variety of forms and is highly effective and cost efficient at deterring pinnipeds from hauling out and resting (Figure 6, Photograph 5). The physical barrier can be compromised by an aggressive CASL but the potential for entanglement and complications involved in exiting and entering the water

typically deters CASLs from repetitively accessing fenced areas. The color of the fencing is not important as CASL have dichromatic color vision which allows them to discriminate colors in the blue-green part of the spectrum not in the bright color portion of the spectrum. The height of the fencing should be approximately one foot or greater to act as a visual barrier. Fencing is low in cost and consistent with the MMPA, but creates significant limitations in terms of safety and access for boaters and dock users. Similar benefits and detractors are relevant for all types of fencing, be it chain link or any other type of material or height. Maintenance is typically low once established but adequate attachment locations and height need to be considered and fine mesh netting should never be used.

**Figure 6 Fencing Pinniped Deterrent**



**Photograph 5.** Orange snow fencing erected by a private boater at Anchorage 47 immediately adjacent to the guest docks in Marina del Rey Harbor.

#### 4.2.2 Posts and Lines

Other barriers or exclusion devices include polyvinyl chloride (PVC) or fiberglass posts with lines and streamers. This deterrent measure has been implemented to varying degrees of success by the United States Navy in San Diego and to lesser degree in MdrH (Figure 7, Photograph 6). The individual posts can be affixed at the end of docks to prevent CASL from hauling on the dock ends. Polyvinyl chloride or fiberglass posts can be outfitted with light lines and flagging acting as streamers that can be constructed to be permanent or removable, to serve as a deterrent measure. The PVC posts can be placed adjacent to each other to serve as a fence or be fitted with a line to serve more as a visual deterrent (Figure 8, Photographs 7 and 8). The PVC poles can be constructed with various pieces to allow for removal, bending, and replacement of parts. Additionally, lines attached to the PVC posts can be attached using snap swivels to allow lines and flagging to be easily removed or consolidated. All the materials should be composed of corrosive resistant materials, to the extent feasible. (Figure 9, Photographs 9 and 10).

Figure 7 Fiberglass Pole with Lines and Spiked Mat Pinniped Deterrent



Photograph 6. Fiberglass pole fitted with a light line and flagging on the Loyola Marymount University crew facility dock just north of Dock 55 in Marina del Rey Harbor.

Figure 8 Polyvinyl chloride (PVC) posts and Lines



Photograph 7. PVC posts and lines mock up





**Photograph 8.** PVC posts showing construction and individual pieces

**Figure 9** Polyvinyl chloride (PVC) posts and Lines



**Photograph 9.** Lines attached to PVC poles using zip ties and swivels



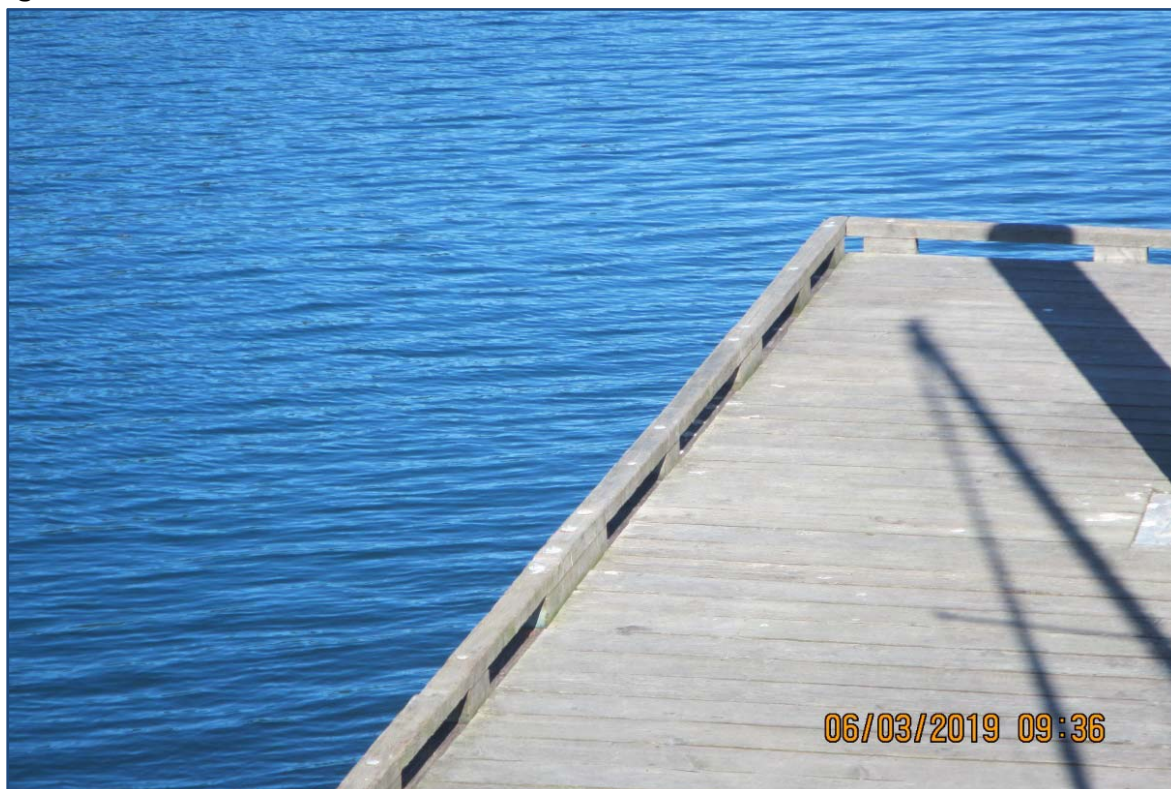
**Photograph 10.** PVC posts with flagging lines in storage position

Permanently affixed PVC poles at the end of dock heads are an easy and cost effective solution to reducing CASL use of dock heads but in most cases the animal just moves to an adjacent dock head to utilize the same space. The CASLs like the dock heads because they give the animals clear access and unobstructed view of the water when hauled out. The PVC dock head poles cause limited access or public safety concerns for users and are best implemented for problematic areas where CASLs frequently haul-out and cause disturbance to long term or visiting boaters moored in marina facilities. The use of PVC or fiberglass poles with light lines and flagging are relatively effective as a deterrent measure but require at least weekly maintenance to ensure effectiveness and address problem areas. The cost of the pole and line deterrent is very low and is consistent with MMPA policies. The PVC poles and lines can be set up to be removable by LACDBH staff or even boaters prior to or during entry to open dock slips.

#### 4.2.3 Bull Rails

Another pinniped deterrent frequently used on docks throughout California and the Pacific Northwest is the bull rail. Bull rails are typically constructed of wood or metal and create a raised area at the edge of the dock (Figure 10, Photographs 11 and 12). They provide a slightly raised barrier and are constructed to eliminate the buildup of water or debris. The height of the bull rail should be at least four to six inches to reduce the ability of CASLs from efficiently exiting and entering the water. Bull rails can be easily constructed by LACDBH maintenance crews at a cost of approximately two dollars per linear foot in materials, and they can serve the dual purpose of providing fixtures that small to medium sized vessels (< 40 feet typically) can use as tie off structures. The bull rails are relatively effective though large male CASL will not likely see them as a deterrent and groups of CASL have been documented to acclimate to them when used as a sole deterrent measure.

**Figure 10 Bull Rails**



**Photograph 11.** Wood bull rail on dock in Salt Spring Island, British Columbia, Canada.



**Photograph 12.** Wood bull rail on dock in Port of Long Beach.



#### 4.2.4 Spiked Mats and Irregular Surfaces

Spiked mats and elevated irregular surfaces include a variety of homemade and commercial alternatives used to deter CASLs from hauling-out and resting on docks and vessels. Homemade alternatives using nails, spikes, or other materials capable of puncturing the skin of marine mammals were excluded from consideration in compliance with MMPA policies and to avoid public safety concerns. Spiked surfaces or mats are typically constructed of hardened plastic or wood and consist of linear strips of varying lengths and widths of between one and six inches wide (Figure 11, Photograph 13). The purpose of spiked or irregular surface mats or strips is to create an uncomfortable surface near the edge of docks or other haul-out locations. Spiked mats or irregular surface deterrents have been proven to be relatively effective in most instances but are a concern with respect to areas of heavy public use. The various products or constructed options provide a cost effective and long-term solution for areas used mostly by experienced boaters or maintenance personnel as the surfaces can be somewhat easily avoided during docking or working. Small gaps between linear strips can be established to allow for stepping down or off the dock while maintaining functionality. Depending on if the deterrent is purchased or constructed by LACDBH personnel, the cost ranges between three and ten dollars per linear foot, and it is easily installed or removed from a variety of locations including concrete, wooden, or plastic concrete dock surfaces.

**Figure 11 Spiked or Irregular Surface Pinniped Deterrent**



**Photograph 13.** Wood exclusion barrier and wood spike strips on a dock in Newport Beach (Source: The Log).

#### 4.2.5 Low Voltage Electrodes and Polyvinyl Chloride (PVC) Mats

Low voltage metal and PVC mats or strips are highly effective pinniped deterrent measures typically used for high pinniped use areas or when other alternatives have failed. They have proven to be effective in Astoria, Oregon, San Francisco, California and on several offshore oil rigs throughout California (Figure 12, Photographs 14 and 15). The low voltage does not injure or shock the animals and does not pose public safety concerns. The system generates electronic pulses that annoy the pinnipeds and discourages repeated haul-out attempts and resting. The systems have been developed in collaboration with conservation and regulatory agencies and cost between \$25,000 and \$35,000 dollars to cover an area of approximately 400-square-feet and require professional installation by the maker and some degree of maintenance in terms of the power source (direct power or solar). Low voltage mats or strips are best suited for high public use areas where pinnipeds are a significant problem that cannot be mitigated by other lower cost alternatives.

**Figure 12** Low Voltage Electrode or PVC Mat Pinniped Deterrent



**Photograph 14.** Smith-Root’s Pinniped Deterrence System in Pier 39, San Francisco, California  
(Source: Smith-Root’s website 2019)



**Photograph 15.** Smith-Root’s perforated plastic mat with electrodes that can be secured to docks  
(Source: Smith-Root’s website 2019)



### 4.3 Noise Maker Deterrents

Noise making deterrents suitable for use around County-operated docks excluded firecrackers and other pyrotechnic alternatives and focused on evaluating the use of noise-making devices both above and below the water. Noise deterrent options assume that the noise stimuli (horns, whistles, music, acoustic devices, and predator sounds) startles, warns, scares, or causes physical distress to pinnipeds moving them out of targeted area. The United States Fish and Wildlife Service has evaluated a multitude of noise making alternatives to reduce the interaction of pinnipeds with various fisheries and has determined there is little evidence of the effectiveness of such methods in solving marine mammal-fishery conflicts (Jefferson and Curry 1996). In nearly all cases pinnipeds, primarily CASLs, habituate to noise sources and continue to occupy or forage in problem areas. For this study noise deterrents were determined to be ineffective and any specialized technical solutions or advancements would need to be proven effective prior to consideration and implementation. No specific costs, implementation or maintenance considerations were evaluated or considered based on the results of noise making deterrent research.

### 4.4 Visual Deterrents

Visual deterrents include a broad array of devices including flags, pin wheels, streamers, air dancers, flashing lights, human attendants, animal statues, five-gallon buckets and floating beach balls. Various visual deterrents have been proven to be a low-cost and effective deterrent measure that works on the principle that unfamiliar or unexpected movement causes a startle reflex or startle response to an intense or strange sight. However, CASL have displayed an ability to habituate or adapt to various types of stimuli thus decreasing their flight response over time. The behavioral tendencies of CASLs and their ability to habituate to specific activities or deterrent measures prioritizes the use of visual deterrents that make irregular and unexpected movements like flagging and air dancers (Figure 13a, Photograph 16 and 17). In the case of animal statues and five gallon buckets, the CASLs typically habituate to their presence over time and have been observed hauled-out next to such visual deterrents (Figure 13b, Photograph 18 and 19). Alternatively, suspended flagging, beach balls, air dancers and human attendants move unpredictably causing CASL to remain attentive and propagating a flight response. Streamers, flagging, and beach balls are low-cost, long term alternatives that range in cost from two to ten dollars per 30-foot-dock and are easy to implement, maintain, or replace. Air dancers are an effective deterrent measure that provides unexpected and random movements, similar to flagging and streamers, that disturb CASL but have several limitations. Air dancers cost between \$200 and \$300 dollars each, require electrical power, are susceptible to theft and provide deterrence for only about 20 to 30 linear feet of dock, assuming a six to eight-foot dock width, per unit. Human attendants are the most effective visual deterrent but are cost-prohibitive for around-the-clock CASL deterrence, are a short-term solution, and need to move regularly to be most effective.

Figure 13a Visual Pinniped Deterrents



**Photograph 16.** Wooden poles and lines used to suspend flagging in Basin G in Marina del Rey Harbor.



**Photograph 17.** Air dancers deployed on Dana Point Harbor fuel dock (Source: The Log).



Figure 13b Visual Pinniped Deterrents



Photograph 18. Wolverine statue on Navy Base Point Loma Pier 22, Point Loma, California.



Photograph 19. Five gallon buckets used on vessel swim step to visually deter pinniped haul-out Ventura California

## 4.5 Physical Contact Deterrents

Physical contact deterrents require that a human engage individual or groups of CASLs using a hose, crowder board, broom or water gun to actively displace the animals from specific docks or vessels. Other physical deterrent measures utilize motion detectors or automated systems to disperse water or some other type of material in the direction of hauled-out CASLs to displace them from problem areas. Los Angeles County Department Beaches and Harbors maintenance personnel already physically deter CASLs on a weekly basis from haul-out areas at the guest docks and Dock 55 during cleaning and maintenance activities, typically using hoses directed at the animals on the docks to illicit movement back into the water. The act of physically interacting with CASLs as a deterrent measure is neither cost-effective nor a long-term solution to pinniped deterrence and was not further assessed as a feasible option. The use of motion detectors or automated devices to trigger the dispersal of water from sprinklers has been an efficient and cost-effective way of deterring CASLs from docks in San Diego Bay at Naval Base Point Loma (Figure 14, Photographs 20 and 21). The docks at that location cover expansive surface areas needed for staging and training of Navy personnel and the sprinklers provide a 24-hour deterrent alternative that is activated only when motion is detected on the docks. The motion detectors, sprinklers and hoses cost about \$80 per 400-square-foot of dock, are easy to implement and maintain, and provide a long-term solution to vacant docks or landings. The sprinkler system can be set up without the motion detector but consistent deterrence caused by the motion detection system has been proven most effective. Water is needed at the docks to operate the system and some inconvenience to the public or users may occur if they approach the docks or areas without turning the water off. Additional remote options could be integrated that would allow approaching boaters to turn the sprinkler system on and off from a phone.



Figure 14 Physical Contact Pinniped Deterrents



**Photograph 20.** Sprinkler with motion detector deployed on floating docks at Navy Base Point Loma, Point Loma, California.



**Photograph 21.** Sprinkler with motion detector in operation at Navy Base Point Loma, Point Loma, California.

## 4.6 Sanctuary and Public Outreach

California sea lions occupy County-operated docks to varying degrees on a seasonal and annual basis, and regardless of the implemented deterrent measures the majority of CASLs will likely remain in MdrH moving from one location to the next. Los Angeles County Department of Beaches and Harbors may effectively mitigate pinniped issues on County-operated docks only to have the pinniped issues migrate to other MdrH residents and stakeholders. The CASL population is likely to continue to oscillate near its OSP, resulting in the continued presence of CASLs in MdrH. Several California harbors have employed a sanctuary method to managing pinniped populations (Figure 15, Photograph 22). The sanctuary method establishes a dedicated floating dock/haul-out location for pinnipeds in an area that provides adequate space for individuals to haul-out, socialize, and rest without causing negative impact to public or private property or concerns about public safety. The pinniped sanctuary serves not only to provide a safe and dedicated location for pinnipeds to reside but also a location for the public to view the animals in a somewhat natural setting that provides intrinsic and educational benefits to the community.

**Figure 15** Pinniped Sanctuary



**Photograph 22.** Pinniped sanctuary in the form of a dedicated floating dock near the entrance of King Harbor, Redondo Beach, California.



The sanctuary alternative requires balancing the location of the floating dock with a multitude of other MdrRH uses, navigation, residents, land owners, and regulatory constraints. Understanding that the sanctuary would likely need to be established within the LUP boundary, several locations are provided for consideration (Figure 16, Photograph 23). Considering the noise and smell that aggregating pinnipeds typically generate, locations were selected based on: 1) Location is within the LUP, 2) avoids areas in close proximity to residences and businesses, 3) provides an area where the general public can view and observe pinnipeds. Pinnipeds are notably social and tend to aggregate at suitable haul-out areas when deterrent measures are in place at similar locations. Locating the sanctuary in close proximity to existing pinniped use areas increases the likelihood that the pinnipeds use the sanctuary versus moving to other MdrRH docks or facilities.

Public outreach and education are important aspects of effectively mitigating pinniped issues on County-operated docks and MdrRH as a whole. Both commercial and recreational fisherman must be educated and informed that feeding or cleaning fish in MdrRH increases CASL presence in the harbor and perpetuates their association of food with transiting fishing vessels.

**Figure 16** Outer portion of Marina del Rey Harbor Entrance Channel



**Photograph 23.** View of Marina del Rey Harbor entrance looking northeast incorporating a large area suitable for placement of a Pinniped sanctuary, in the form of a dedicated floating dock



Figure 17 Marina del Rey Harbor with Proposed Pinniped Sanctuary Locations



Imagery provided by Microsoft Bing and its licensors © 2019.

Fig 4 MDR Harbor Zoom2\_x5



## 5 Pinniped Deterrent Measure Recommendations and Sanctuary Alternative Approach

---

Marina del Rey Harbor is highly urbanized and encompasses seven large basins that are lined with private and public boat docks and marinas. The majority of CASL haul-out and resting occurs adjacent to the main channel at the heads of the basins and is even more concentrated near the confluence of the main channel and Basin H, based on survey observations and communications with LACDBH staff. Considering the CASL population in MdrH is estimated to be 50 to 100 individuals at any one time and composed of primarily sub adults, various deterrent measures are recommended to be implemented at each of the County-operated guest docks and expanded to other locations as needed. Overall pinniped deterrence measures recommended to mitigate or minimize negative interactions or impacts resulting from CASLs should be approached with a harbor-wide solution in mind.

### 5.1 Transient (Guest) Docks

Considering the cost of implementing and maintaining the various deterrent measures LACDBH should first deploy one of two deterrent options: 1) fiberglass or PVC poles fitted with lines and flagging (Figure 7, Photograph 6 and Figure 8, Photograph 7) along either side of vacant guest docks and potentially along the unoccupied portions of occupied docks (boat in the slip) to deter CASLs from haul-out and aggregating, or 2) motion-activated sprinklers affixed to concrete blocks (Figure 14, Photographs 20 and 21) placed on the guest docks with at least two and possibly three sprinklers per dock. Seasonal use considerations should be balanced with either option or potentially all deterrent measures removed during the summer season when nearly all the transient docks are occupied.

Option 1 would be the most affordable, easy to deploy, and require the least maintenance. Implementation on the guest docks would take approximately two days, after materials have been obtained, and materials would cost about \$300 to \$400, not including labor. The benefit of using fiberglass poles or PVC poles with flexible hose sections is they are flexible and allow for both CASLs and the public (boaters) to come into contact with the poles and not break or displace them. The fiberglass or PVC poles can be placed inside pre-drilled holes in the edge of the wood dock fascias or placed inside small PVC receivers attached to the dock surface using screws or glue. The poles can be removeable or fixed in place. Lines should be parachute cord or similar material, and flagging tied in double knots to avoid detachment, extending a minimum of 18 inches from the attachment points to facilitate active movement from the wind. Flagging should be placed approximately every three to four feet along lines and poles located at least every 15 to 20 feet along the dock to maintain adequate height and support for the lines and flagging.

Option 2 (motion activated sprinklers) has been proven to be effective at deterring pinnipeds, relatively cost-effective, and easy to implement and maintain. The implementation phase would take about one day after acquiring all the necessary components. Cost for implementation would be

approximately \$150 to \$200 per dock (assuming two sprinklers). It's possible that one setup may adequately cover three docks but that would have to be tested. Access to water and effective water conservation measures should be assessed and signage warning users that automated sprinklers are in use to deter pinnipeds is suggested. Additionally a shut-off timer or remote phone activated code could be integrated into the system to provide users a mechanism to disable the system in order to access the dock or other areas for some short time at which point the system would be reactivated.

## 5.2 Dock 55

Dock 55 is primarily used to board fisherman or sightseeing visitors onto commercial charter boats and already has bull rails affixed to the inside edge of the dock. It is recommended that LACDBH add similar bull rails to the outer section of the dock and assess them as a viable pinniped deterrent measure. Poles and lines can be easily added to the dock as an additional deterrent measure by simply drilling holes in the bull rails to accommodate PVC poles and attached lines. Additional site specific alternatives recommended for implementation at Dock 55 include the placement of spiked matting (<http://www.sealstop.com>) (Figure 11, Photograph 13) at the end of dock heads or other similar areas throughout MDRH. Bull rails require through bolts be secured to the edge of the docks to adequately attach the bull rails sufficient to allow for tying up vessels in lieu of cleats. Securing the bull rails to the dock may require significant labor, and materials depending on the dock material and condition. Material costs are approximately \$150 per 100 linear feet of bull rail, excluding labor, accounting for treated lumber and stainless hardware. Individual PVC poles and spiked matting are effective at deterring pinnipeds from haul-out and resting and can be installed in less than one hour. Costs range from \$5 to \$200 depending the on the type and number of installed deterrents. Dock 55 does not currently have a water supply but automated sprinklers could also be installed similar to those suggested for the guest docks.

## 5.3 Anchorage 47

Anchorage 47 experiences a diversity of pinniped use in terms of frequency and numbers that likely fluctuates spatially depending on the proximity of Anchorage 47 docks to the County-operated guest docks and temporally during breeding season. Based on observations recorded during site specific surveys conducted in the spring of this year (2019) pinniped use of Anchorage 47 docks was most prominent at the dock ends along Basin G and the docks accessed from the main channel. Considering that Anchorage 47 has maintenance staff and use is limited to individual boat owners accessing vessels from docks it is recommended that fencing be used in areas where boats are not expected to dock or PVC poles and lines. Additionally, single PVC poles could be affixed to the dock ends along Basin G as needed. Cost and maintenance of the recommended deterrents are similar to those presented in the previous subsections.

## 5.4 Boat Launch Docks

Pinniped use at the boat launch docks was not documented during site specific surveys but has been observed by LACDBH staff occasionally in 2019 and during previous years. Considering the high level of public use launching and boarding boats it is recommended that bull rails be installed once they have been adequately evaluated in terms of efficiency at Dock 55. Cost and maintenance of bull rails are the same as presented in the subsection 5.2 Dock 55.

Understanding that pinniped deterrent measures potentially implemented on County-operated docks may displace pinnipeds to adjacent private property docks or vessels, LACDBH should examine the feasibility of planning, permitting, and constructing a pinniped sanctuary similar to the one currently deployed at King Harbor in Redondo Beach, California (Figure 15, Photograph 22). A floating dock provides a water level platform for pinnipeds to haul-out that is even lower than the majority of MDRH docks. Ideally the floating dock would be sized to accommodate 60-80 individuals measuring approximately 25 feet by 25 feet or larger. Identified potential locations shown on Figure 17 are based on very preliminary site visits and potential sites proposed for implementation would require a more comprehensive evaluation process to adequately identify local area constraints and estimate implementation costs and timelines. The sanctuary floating dock would be required to be anchored to the bottom and accompanied by a lighted buoy that could be serviced annually by LACDBH maintenance staff. The overall cost of planning, permitting, constructing and maintaining the sanctuary floating dock is estimated to be approximately \$30,000 for the first year, Annual maintenance costs are expected to be less than \$1,000 not including labor and then cyclical replacement of the entire dock and buoy system, approximately \$5,000, every seven to ten years

## 6 References

---

- CDOF (California Department of Finance). 2000. E-5 city/county population and housing estimates, 1991–2000, with 1990 census counts. Sacramento.  
<http://www.dof.ca.gov/HTML/DEMOGRAP/E-5text.htm>.
- CMANC (California Marine Affairs and Navigation Conference) 2018,  
<http://cmanc.com/web/phei.htm>
- Harbor Masters pers. Com. 2019, Derek Lerma (Rincon Consultants) contacted harbor masters and harbor patrol offices at a variety of California Harbors in May 2019 regarding pinniped populations, issues, and implemented deterrents.
- Hawes, S.D. 1983. An evaluation of California sea lion scat samples as indicators of prey importance. Master's Thesis. San Francisco State University.
- Laake JL, Lowry MS, DeLong RL, Melin SR and Carretta JV (2018). Population growth and status of California sea lions. *Journal of Wildlife Management* 82(3): 583-595.
- Jefferson, T.A. and Curry B.E. 1996. Acoustic methods of reducing or eliminating marine mammal fishery interactions: do they work? *Ocean & Coastal Management*, Vol. 31 NO. 1 pp. 41-70
- Smith Root 2019, Images of Pinniped deterrent systems obtained from website. <https://www.smith-root.com/sealions>
- NatureServe. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available at: <http://explorer.natureserve.org>
- NOAA (National Oceanic and Atmospheric Administration) Fisheries. 2018a. NOAA Fisheries Marine Mammal Stock Assessment Reports by Species/Stock. Available at:  
<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock>.
- \_\_\_\_\_. 2018b. NOAA Fisheries Protected Species. Available at:  
[https://www.westcoast.fisheries.noaa.gov/protected\\_species/marine\\_mammals/pinnipeds/harbor\\_seals.html](https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/pinnipeds/harbor_seals.html)
- \_\_\_\_\_. 2018c. NOAA Fisheries Protected Species. Available at:  
[https://www.westcoast.fisheries.noaa.gov/protected\\_species/marine\\_mammals/pinnipeds/california\\_sea\\_lions.html](https://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/pinnipeds/california_sea_lions.html)
- \_\_\_\_\_. 2018d. Species Directory. Available at:  
[https://www.westcoast.fisheries.noaa.gov/publications/protected\\_species/marine\\_mammals/pinnipeds/sea\\_lion\\_removals/potential-deterrence-methods-10-2018.pdf](https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/pinnipeds/sea_lion_removals/potential-deterrence-methods-10-2018.pdf)
- The Log, 2019. Images of pinniped deterrent measures from various monthly publications.  
<https://www.thelog.com/archives/>
- Watts, P. 1996. The Diel Hauling-Out Cycle of Harbour Seals in an Open Marine Environment: Correlates and Constraints. *Journal of Zoology* 240: 175- 200.

# Appendix A

---

Pinniped Deterrent Measures Table



<b>Deterrent</b>	<b>MMPA compliant</b>	<b>Comments</b>	<b>Reference/Location of Use</b>
<b>Barriers &amp; Exclusion Devices</b>			
Fencing (snow fencing, plastic construction, chain link, etc.)	Yes	Could be effective but nuisance for public access	NOAA Fisheries West Coast Region (2018), MdrH observed
PVC posts	Yes	Effective at the ends of docks or if closely spaced	Naval Base San Diego
PVC Posts (removable) with lines and streamers	Yes	Effective on docks, cheap, can be constructed to be flexible, can be removed and replaced by boaters or marina attendants	Naval Base San Diego
Electrodes laid on top of docks	Yes	Could be very effective but also very costly	<a href="https://www.smith-root.com/sealions">https://www.smith-root.com/sealions</a> , Navy Base Point Loma
Low voltage PVC or polyethylene mats	Yes	Could be very effective but also very costly	<a href="https://www.smith-root.com/feature/exxonmobil-sea-lion-deterrence/">https://www.smith-root.com/feature/exxonmobil-sea-lion-deterrence/</a>
Bull rails	Yes	Can be effective but nuisance to public, best suited for private docks	NOAA Fisheries West Coast Region (2018), Astoria, Oregon, Long Beach, CA
Spiked mats or surfaces	Some	Not effective in public use areas	Newport Harbor, Astoria, Oregon, Navy Base Point Loma <a href="http://www.sealstop.com/introduction.html">http://www.sealstop.com/introduction.html</a>
Netting (similar to fencing)	Yes/No	Can't be loose to avoid entanglement	NOAA Fisheries West Coast Region (2018), Oceanside Harbor
Swim step protector (tight line with buoy, kayak, many options)	Yes	Good for private use and public education to boaters in problem areas	NOAA Fisheries West Coast Region (2018), MdrH, Oceanside harbor, Newport Beach Harbor

Note: Orange Highlighted Deterrent Measures are for consideration by private property owners only

<b>Deterrent</b>	<b>MMPA compliant</b>	<b>Comments</b>	<b>Reference/Location of Use</b>
<b>Noise Makers</b>			
Horns, whistles, bells	Yes	Cheap and can be effective	NOAA Fisheries West Coast Region (2018), General use
Music	Yes	May not be very effective as animals habituate	NOAA Fisheries West Coast Region (2018)
Clapping, banging pots, pans, drums	Yes	Effective but humans but some animals may not respond after persistent use	NOAA Fisheries West Coast Region (2018), general use
Electronic acoustic devices	Yes	Motion-activated devices can be effective especially with integrated flashers or things that move, California sea lion specific options should be tested	NOAA Fisheries West Coast Region (2018)
Starter pistols	Yes	Not appropriate in highly populated areas	NOAA Fisheries West Coast Region (2018)
Pyrotechnics (bird screamers, bangers, firecrackers, propane canons, cracker shells fired from gun)	Yes	Not appropriate in highly populated locations, fire danger, etc.	NOAA Fisheries West Coast Region (2018)
<b>Visual</b>			
Flags, pin wheels, streamers	Yes	Cost effective	NOAA Fisheries West Coast Region (2018), MdrH, Oceanside, Navy Base Point Loma
Air Dancers	Yes	Initially effective but requires power and may be less effective over time	Dana Point Harbor

Note: Orange Highlighted Deterrent Measures are for consideration by private property owners only



<b>Deterrent</b>	<b>MMPA compliant</b>	<b>Comments</b>	<b>Reference/Location of Use</b>
<b>Visual (Continued)</b>			
Flashing lights, strobes	Yes	May be costly and typically only temporally effective, best when activated by motion detectors.	NOAA Fisheries West Coast Region (2018), Navy Base San Diego
Human attendants/monitors	Yes	Costly	NOAA Fisheries West Coast Region (2018)
Animal statue (coyote, dog etc.)	Yes	May be effective though should be moved occasionally, most effective if it moves or changes position	Navy Base Point Loma, MdrH, Newport Beach Harbor, Oceanside Harbor
Scare crows	Yes	Same as previous	MdrH, Newport, Oceanside
PVC posts with attached lines with streamers hanging along its length	Yes	Can be effective and cost efficient, maybe only temporally or partially effective	MdrH, Navy Base Point Loma, general use
5-gallon buckets	Yes	Fall in water, ineffective, trash	MdrH, Oceanside, Newport
Floating beach balls	Yes	Cheap, potential trash issue	Astoria, OR
<b>Physical Contact</b>			
Hoses	Yes	Very effective on moving animals away from problem areas, safe	NOAA Fisheries West Coast Region (2018)
Sprinklers, sprayers, motion activated	Yes	Very effective when docks are vacant, low cost, bi-weekly maintenance needed	NOAA Fisheries West Coast Region (2018), Navy Base Point Loma
Crowder boards	Yes	Requires labor and animals typically move to adjacent docks	NOAA Fisheries West Coast Region (2018)

Deterrent	MMPA compliant	Comments	Reference/Location of Use
<b>Physical Contact (Continued)</b>			
Brooms	Yes	Requires labor and animals typically move to adjacent docks	NOAA Fisheries West Coast Region (2018)
Water guns	Yes	Cheap and easy to use by boaters or marina managers, typically plastic so breakage is an issue	NOAA Fisheries West Coast Region (2018)
Paintball or air soft guns	Yes	Effective but trash an issue and public safety a concern	NOAA Fisheries West Coast Region (2018)
Slingshot	Yes	Simple but accuracy is an issue, damage to adjacent boats or public safety a concern	NOAA Fisheries West Coast Region (2018)
Chemical irritants such as mace, pepper spray	Yes	Not appropriate for large scale application, most applicable when a single animal is belligerent or aggressive	NOAA Fisheries West Coast Region (2018)
Capture and relocation	Yes	Costly and required to be conducted by professionals. Not appropriate for large scale application, most applicable when a single animal is belligerent or aggressive	Astoria, Oregon, Dana Point, CA, San Francisco Bay, CA
Throwing items or tennis balls not capable of injuring the animal	Yes	Simple but accuracy is an issue, damage to adjacent boats or public safety a concern	NOAA Fisheries West Coast Region (2018)

Note: Orange Highlighted Deterrent Measures are for consideration by private property owners only

Deterrent	MMPA compliant	Comments	Reference/Location of Use
<b>Sanctuary</b>			
Floating docks or barges	Yes	Provides defined area for animals to reside while allowing for public viewing. Issues remain with noise, smell and potential use of adjacent areas. Best located in area agreed upon by stakeholders or occasionally moved to established locations within a general area.	Astoria, OR Oceanside Harbor, San Diego Bay, King Harbor, CA

MMPA deterrence reference information:

- <https://www.federalregister.gov/documents/2010/10/06/2010-25044/marine-mammal-protection-act-deterrence-guidelines>
- [https://www.westcoast.fisheries.noaa.gov/publications/protected\\_species/marine\\_mammals/pinnipeds/sea\\_lion\\_removals/potential-deterrence-methods-10-2018.pdf](https://www.westcoast.fisheries.noaa.gov/publications/protected_species/marine_mammals/pinnipeds/sea_lion_removals/potential-deterrence-methods-10-2018.pdf)
- [http://dev.psmfc.org/wp-content/uploads/2012/01/expand\\_pinniped\\_report\\_2010.pdf](http://dev.psmfc.org/wp-content/uploads/2012/01/expand_pinniped_report_2010.pdf)
- <https://www.smith-root.com/sealions>
- <https://www.thelog.com/local/socal-harbors-get-creative-when-it-comes-to-sea-lion-abatement/>
- [https://www.dailyastorian.com/news/local/can-beach-balls-banish-sea-lions/article\\_82461308-af44-5ea7-a54d-e47e96f03131.html](https://www.dailyastorian.com/news/local/can-beach-balls-banish-sea-lions/article_82461308-af44-5ea7-a54d-e47e96f03131.html)