

**Request for Marine Mammal Protection Act
Incidental Harassment Authorization**

Rocky Intertidal Monitoring

Submitted by:

**Partnership for Interdisciplinary Studies of Coastal Oceans
University of California Santa Cruz
Center for Ocean Health
100 Shaffer Road
Santa Cruz, CA 95060**



To:

**Permits, Conservation, and Education Division
National Marine Fisheries Service (NMFS)
Office of Protected Resources
1315 East-West Highway
Silver Spring, MD 20910**

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

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September 20, 2016

Permits, Conservation, and Education Division
National Marine Fisheries Service (NMFS)
Office of Protected Resources
1315 East-West Highway
Silver Spring, MD 20910

Dear Permits, Conservation, and Education Division,

Our research group at the University of California, Santa Cruz is requesting a renewal of our 2016 Incidental Harassment Authorization (IHA) (expires Feb. 2, 2017) for harassment of a small number of pinnipeds incidental to rocky intertidal monitoring surveys from February 3, 2017 to February 2, 2018.

Our research takes place at rocky intertidal sites ranging from Alaska to Mexico. We are requesting that this IHA cover our research activities in Oregon and California. Although rare, hauled-out pinnipeds are encountered by researchers at some monitoring sites. This IHA is being requested to allow our researchers to continue to conduct rocky intertidal monitoring at sites where pinnipeds are present. Every effort will still be made to avoid disturbing pinnipeds when possible.

All research is conducted under the direction of Dr. Pete Raimondi- Professor and Chair of Ecology and Evolutionary Biology Department, UC Santa Cruz.

Sincerely,

A handwritten signature in black ink, appearing to read "N. Fletcher".

Nathaniel Fletcher
Assistant Research Specialist
UC Santa Cruz

A handwritten signature in black ink, appearing to read "P. Raimondi".

Pete Raimondi
Professor and Chair
Department of Ecology and Evolutionary Biology
UC Santa Cruz

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1. Detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals

Our research group at UC Santa Cruz operates in collaboration with two large-scale marine research programs: the Multi-Agency Rocky Intertidal Network (MARINE, www.marine.gov, www.pacificrockyintertidal.org) and the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO, www.piscoweb.org).

MARINE is a consortium of multiple agencies, universities, and private organizations conducting long-term rocky intertidal monitoring at more than 200 sites along the west coast of North America. This program uses a set of standardized monitoring protocols that allows for comparisons of data over space and time.

The PISCO project is comprised of researchers from the University of California Santa Cruz and Santa Barbara campuses, Oregon State University, and Stanford University Hopkins Marine Station. This program focuses on understanding the near-shore ecosystems of the U.S. West Coast through a number of interdisciplinary collaborations. PISCO integrates long-term monitoring of ecological and oceanographic processes at dozens of sites with experimental work in the lab and field.

Data from these long-term research programs have been used to inform marine policy including the design and evaluation of marine protected areas (MPAs), natural resource damage assessments (NRDA), and critical habitat designations. Research findings are also made available to the public through websites, outreach, and educational programs.

Our research group at UC Santa Cruz is responsible for much of these programs' ongoing rocky intertidal monitoring along the Pacific coast. Monitoring occurs at rocky intertidal sites, often large bedrock benches, from the high intertidal to the water's edge. Our long-term monitoring projects, carried out under the direction of principal investigator Dr. Pete Raimondi, include the following:

Community Structure Monitoring

The community structure monitoring approach is based largely on surveys that quantify the cover and distribution of algae and invertebrates in intertidal communities. This approach allows us to quantify the patterns of abundance of targeted species and characterize changes within the communities in which they reside. Such information provides resource managers with insight into the causes and consequences of changes in community structure and forms the basis of "ecosystem-based management" of rocky intertidal communities.

Community structure monitoring involves the use of permanent photoplot quadrats which target specific algal and invertebrate assemblages (e.g. mussels, rockweeds, barnacles). Each photoplot is photographed and scored for percent cover. In addition, permanent plots and transects are sampled to determine patterns of abundance of targeted species including ochre sea stars (*Pisaster ochraceus*), owl limpets (*Lottia gigantea*), abalone

(*Haliotis* spp.), surfgrass (*Phyllospadix* spp.), and sea palms (*Postelsia palmaeformis*). Barnacle recruitment and sea surface temperature data are also collected. Community structure monitoring follows the established protocols of MARINE. For more information please visit www.marine.gov and www.pacificrockyintertidal.org.

Each community structure site is surveyed over a one day period during a low tide series one to two times a year. Sites, location, number of times sampled per year, and typical sampling months for each site are presented in Table 1.

Biodiversity Surveys

Biodiversity surveys are complimentary with the community structure monitoring approach and provide greater information on species richness at a site and biogeographic patterns across regions. These surveys involve point contact identification along permanent transects, mobile invertebrate quadrat counts, sea star band counts, and tidal height topographic measurements. Biodiversity surveys are conducted every 3-5 years at established sites. Biodiversity surveys typically require one to two days to complete. Table 2 lists established biodiversity sites in Oregon and California. Highlighted sites are those that are likely to be sampled in 2017. For more information on sites and protocols please visit www.pacificrockyintertidal.org.

Site	Latitude (dd)	Longitude (dd)	Samples/year	Sampling seasons
Ecola (Oregon)	45.91809	-123.98031	1	July
Fogarty Creek (Oregon)	44.83684	-124.05875	1	July
Bob Creek (Oregon)	44.24456	-124.11443	1	July
Cape Arago (Oregon)	43.30894	-124.40077	1	July
Burnt Hill (Oregon)	42.22814	-124.38786	1	July
Enderts	41.69	-124.14257	2	May/June, November/December
Damnation Creek	41.65249	-124.12784	2	May/June, November/December
False Klamath Cove	41.59476	-124.10643	2	May/June, November/December
Cape Mendocino	40.341	-124.36317	1	June
Shelter Cove	40.02254	-124.07366	1	June
Kibesillah Hill	39.60412	-123.78887	1	June
Stornetta	38.93787	-123.7288	1	June
Sea Ranch	38.7305	-123.48864	1	June
Bodega	38.3182	-123.07365	1	June
Pebble Beach	37.23263	-122.41607	1	May/June
Pigeon Point	37.18361	-122.39529	1	May/June
Franklin Point	37.1495	-122.36101	1	May/June
Scott Creek	37.04425	-122.23493	2	March/April, October/November
Sandhill Bluff	36.98017	-122.15503	2	March/April, October/November
Terrace Point	36.94841	-122.06457	2	March/April, October/November
Hopkins	36.6212	-121.9073	2	March/April, October/November
Point Piños	36.63796	-121.93758	1	May
China Rocks	36.60616	-121.95939	1	May
Pescadero Point	36.56109	-121.95436	1	May
Stillwater	36.56087	-121.94053	2	March/April, October/November
Carmel Point	36.54376	-121.93412	1	May/June
Point Lobos	36.51366	-121.94688	2	March/April, October/November
Mal Paso	36.47994	-121.93913	2	March/April, October/November
Garrapata	36.46904	-121.93444	1	May
Soberanes	36.44787	-121.92874	1	May/June
Andrew Molera	36.28061	-121.86317	2	March/April, October/November
Partington Cove	36.17376	-121.69653	1	May/June
Mill Creek	35.97965	-121.49034	2	March/April, October/November
Pacific Valley	35.94705	-121.48053	1	May/June
Point Sierra Nevada	35.72883	-121.31866	2	March/April, October/November
Piedras Blancas Lighthouse	35.66493	-121.28699	2	March/April, October/November
Vista Del Mar	35.60414	-121.14232	2	March/April, October/November
Rancho Marino Reserve	35.52244	-121.073	2	March/April, October/November
Harmony Headlands	35.47448	-121.01707	2	March/April, October/November
Cayucos	35.44739	-120.94982	2	March/April, October/November
Hazard's	35.28966	-120.88325	2	March/April, October/November
Shell Beach	35.16881	-120.69668	2	March/April, October/November
Occulto	34.88122	-120.63954	2	March/April, October/November
Purisima	34.7556	-120.64076	2	February, October/November
Stairs	34.73038	-120.61546	2	March/April, October/November
Boathouse	34.55388	-120.61167	2	March/April, October/November
Government Point	34.44334	-120.45655	2	March/April, October/November

Table 1. UCSC Community Structure Monitoring Sites

Site	Latitude (dd)	Longitude (dd)	Site	Latitude (dd)	Longitude (dd)
Ecola (Oregon)	45.91809	-123.98031	Rancho Marino	35.54028	-121.09283
Cape Meares (Oregon)	45.47179	-123.97204	Cayucos	35.44748	-120.95010
Roads End (Oregon)	45.02575	-124.01265	Hazards	35.28966	-120.88325
Otter Rock (Oregon)	44.75272	-124.06606	Diablo	35.22665	-120.87367
Fogarty Creek (Oregon)	44.83684	-124.05875	Shell Beach	35.16917	-120.69639
Seal Rock (Oregon)	44.49994	-124.08437	Stairs	34.73056	-120.61528
Bob Creek (Oregon)	44.24456	-124.11443	Lompoc Landing	34.71880	-120.60880
Cape Arago (Oregon)	43.30894	-124.40077	Boat House	34.55417	-120.61139
Coquille Point (Oregon)	43.11472	-124.43851	Government Point	34.44334	-120.45655
Burnt Hill (Oregon)	42.22814	-124.38786	Alegria	34.46722	-120.27806
Pyramid Point	41.98984	-124.20930	Arroyo Hondo	34.47361	-120.14444
Point Saint George	41.78464	-124.25513	Ellwood	34.43470	-119.94900
Enderts	41.69568	-124.14362	Coal Oil Point	34.40667	-119.87750
Damnation Creek	41.65300	-124.12983	Carpinteria	34.38703	-119.51407
False Klamath Cove	41.59426	-124.10533	Mussel Shoals	34.35528	-119.44028
Palmers Point	41.13121	-124.16330	Old Stairs	34.06626	-118.99805
Launcher Beach	41.05715	-124.14532	Deer Creek	34.06069	-118.98221
Old Home Beach	41.05527	-124.13683	Sequit Point	34.04324	-118.93700
Cape Mendocino	40.34083	-124.36306	Lechuzza Point	34.03446	-118.86179
Shelter Cove	40.03056	-124.07917	Point Dume	34.00036	-118.80703
Mal Coombs	40.02170	-124.06825	Paradise Cove	34.01222	-118.79250
Kibesillah	39.60401	-123.78871	Point Vicente	33.74100	-118.41150
Abalobadiah Creek	39.56906	-123.77182	Abalone Cove	33.73790	-118.37580
MacKerricher	39.48260	-123.80359	Whites Point	33.71578	-118.31993
Fort Bragg	39.43920	-123.81841	Point Fermin	33.70694	-118.28611
Point Arena	38.94337	-123.73301	Buck Gully South	33.58825	-117.86736
Stornetta Ranch	38.93787	-123.72888	Crystal Cove	33.57083	-117.83778
Moat Creek	38.88092	-123.67475	Muddy Canyon	33.56576	-117.83314
Saunders Reef	38.86138	-123.65361	Shaw's Cove	33.54472	-117.79944
Del Mar Landing	38.74051	-123.51086	Heisler Park	33.54259	-117.78928
Sea Ranch	38.73028	-123.48750	Treasure Island	33.51335	-117.75793
Phillips Gulch	38.58585	-123.34147	Dana Point	33.46000	-117.71417
Gerstle Cove	38.56614	-123.32919	Cardiff Reef	32.84760	-117.27900
Windermere Point	38.52394	-123.26747	Scripps	32.87139	-117.25306
North Jenner Beach	38.45618	-123.14244	La Jolla Caves	32.84861	-117.26535
Bodega	38.31750	-123.07278	Wind and Sea	32.81420	-117.27330
Horseshoe Cove	56.98661	-135.37755	Sea Ridge	32.68290	-117.24960
Bodega Head	38.30316	-123.05261	Navy North	32.68290	-117.24960
Chimney Rock	37.99383	-122.96729	Cabrillo Zone I	32.66917	-117.24528
Santa Maria Creek	38.01222	-122.84889	Cabrillo Zone III	32.66583	-117.24417
Bolinas Point	37.90453	-122.72733	Cuyler Harbor SMI	34.04833	-120.33556
Bolinas Point Wreck	37.90262	-122.72420	Crook Point SMI	34.02194	-120.37889
Alder Creek	37.89758	-122.71071	Fossil Reef SRI	33.99333	-120.23806
Mussel Flat Farallones	37.69590	-123.00290	NW Talcott SRI	34.00806	-120.21361
Alcatraz Island	37.82515	-122.42197	East Point SRI	33.94170	-119.96790
Fitzgerald Marine Reserve	37.52167	-122.51667	Ford Point SRI	33.91472	-120.05056
Pigeon Point	37.18528	-122.39694	Johnsons Lee SRI	33.90889	-120.08667
Año Nuevo	37.11260	-122.32957	Trailer SCI	34.05194	-119.90306
Scott Creek	37.04528	-122.23694	Fraser SCI	34.06250	-119.91944
Davenport Landing	37.02230	-122.21537	Forney SCI	34.05639	-119.92222
Sandhill Bluff	36.98056	-122.15500	Prisoners SCI	34.02000	-119.68694
Wilder Ranch	36.95608	-122.10405	Willows SCI	33.96194	-119.75500
Terrace Point	36.94778	-122.06472	Valley SCI	33.98389	-119.66583
Natural Bridges	36.94903	-122.06113	Cat Rock AI	34.01000	-119.41870
Hopkins	36.62111	-121.90694	Middle AI	34.00593	-119.39648
Point Piños	36.63796	-121.93758	Frenchys Cove AI	34.00660	-119.41090
Asilomar	36.62960	-121.93852	Thousand Springs SNI	33.28505	-119.52983
China Rocks	36.60567	-121.95975	Tranquility Beach SNI	33.26567	-119.49210
Stillwater Cove	36.56111	-121.94028	Marker Poles SNI	33.21868	-119.49562
Point Lobos	36.51320	-121.94433	Landing Cove SBI	33.48167	-119.02944
Garrapata	36.46890	-121.93434	Sea Lion Rookery SBI	33.47194	-119.03083
Andrew Molera	36.28056	-121.86306	Bird Rock CI	33.45167	-118.48750
Partington Cove	36.17383	-121.69660	Big Fisherman Cove CI	33.44645	-118.48526
Lucia	36.01438	-121.54050	Goat Harbor CI	33.41680	-118.39407
Mill Creek	35.97972	-121.49056	Little Harbor CI	33.38500	-118.47528
Duck Pond	35.85942	-121.42263	North Head SCLI	33.03287	-118.60057
Point Sierra Nevada	35.73083	-121.32389	Graduation Point SCLI	33.03327	-118.57560
Piedras Blancas	35.66568	-121.28653	Boy Scout Camp SCLI	33.00112	-118.54832
San Simeon Point	35.63485	-121.19577	Eel Point SCLI	32.91801	-118.54668
Vista del Mar	35.60434	-121.14227	West Cove, SCLI	33.01494	-118.60614

Table 2. UCSC Biodiversity Sites in Oregon and California

2. Date(s) and duration of such activity and the specific geographical region where it will occur

Our research is conducted throughout the year along the California and Oregon coasts. Most sites are sampled one to two times per year over a one day period (4-6 hours) during a negative low tide series. Details for site locations and sampling seasons are described in Tables 1 and 2. Maps with site locations are shown in Figures 1-4. Due to the large number of research sites, scheduling constraints, and the necessity for negative low tides and favorable weather/ocean conditions, exact survey dates are variable.

3. Species and numbers of marine mammals likely to be found within the activity area

Research activities take place in the rocky intertidal zone at sites ranging from northern Oregon to the California/Mexico border. Within this area the following marine mammals may be found hauled-out at, or adjacent to, research sites:

- Harbor seal (*Phoca vitulina richardii*), California and Oregon/Washington stocks.
- California sea lion (*Zalophus californianus*), U.S. stock.
- Northern elephant seal (*Mirounga angustirostris*), California stock.
- Steller sea lion (*Eumetopias jubatus*), Eastern U.S. stock.

Harbor seal (*Phoca vitulina richardii*)

The most recent census of the California stock of harbor seals occurred in 2012 during which 20,109 hauled-out harbor seals were counted. A 1999 census of the Oregon/Washington harbor seal stock found 16,165 individuals, of which 5,735 were in Oregon (Carretta et al. 2016). The population is estimated to number 30,968 individuals in California and 24,732 individuals in Oregon/Washington (Carretta et al. 2016). At several sites harbor seals are often observed and have the potential to be disturbed by researchers accessing or sampling the site. The largest number of harbor seals occurs at Hopkins in Monterey, CA where often 20-30 adults and occasionally 10-15 pups are hauled-out on a small beach adjacent to the site. Table 3 lists additional sites where harbor seals are often present.

California sea lion (*Zalophus californianus*)

The most recent census of California sea lions occurred in July 2007 between Pt. Reyes, CA and Point Conception, CA and in the California Channel Islands. The census found 153,337 individuals but additional animals were likely outside of the census area or were at sea during the time of the survey. The population is estimated to number 296,750 individuals (Carretta et al. 2016). The number of sea lions found at any one of our study sites is variable and often no California sea lions are observed during field surveys. Table 4 lists sites where sea lions are often present.

Northern elephant seal (*Mirounga angustirostris*)

The estimated population size of northern elephant seals along the California coast is 179,000 individuals, which is based on 2010 pup-counts of 40,684 (Lowry et al. 2014). During our research activities, the maximum number of Northern elephant seals observed at a single site was at least 10 adults plus 20 weaned pups. These were observed off-shore and in the vicinity of our site at Piedras Blancas. At other sites elephant seals are very rarely observed during research activities.

Steller sea lion (*Eumetopias jubatus*)

Counts at rookery and haul-out sites in 2011 found a total of 2,781 Steller sea lions (673 pups and 2,108 adults) in California. Counts in Oregon in 2009 and 2013 found 4,761 adults and 1,418 pups (Muto et al. 2016). The population of the Eastern U.S. stock is estimated to be between 60,131 and 74,480 individuals (Muto et al. 2016). During our research activities, the maximum number of Steller sea lions observed at a single site was five. These were observed hauled-out at Cape Arago, Oregon. Steller sea lions are very rarely observed during research activities and therefore they do not pose an issue for site access and sampling. In the case that Steller sea lions are present at a site, sampling will be abandoned and rescheduled for a later date. Prior to accessing a site, researchers will observe the site from a distance to insure that no Steller sea lions are present. At Cape Arago, the site is easily observable from a vista point on a bluff overlooking the site.

4. Description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities

Harbor seal (*Phoca vitulina richardii*)

Harbor seals range widely along coastal areas of the North Pacific and North Atlantic. There are five subspecies based on geographic ranges, with *Phoca vitulina richardii* ranging along the west coast of North America from the Aleutian Islands to Baja California. For management purposes there are three recognized harbor seal stocks along the west coast of the continental United States: California, Oregon and Washington outer coast, and Washington inland coast. Only the California and the Oregon/Washington outer coast stocks are found in the activity area considered under this application.

This species was hunted by indigenous peoples and early hunters for several thousand years. In the 1800s and early 1900s, harbor seals were killed during commercial hunting and in attempts to reduce competition with commercial fisheries. The population was eventually reduced to a few hundred individuals (Bonnet 1928). Since the passage of the MMPA, the population has increased dramatically (Carretta et al. 2010).

According to the 2015 Pacific Marine Mammal Stock Assessment, the minimum population size of the California stock is 27,348 individuals and the population is estimated to number 30,968. Based on 1999 aerial surveys, the Oregon/Washington outer

coast stock is estimated to number 24,732 (Carretta et al. 2016). Due to outdated survey data, there is no current minimum population size available for the Oregon/Washington stock (Carretta et al. 2016). This species is not listed under the ESA and is not a strategic species or considered depleted under the MMPA.

California sea lion (*Zalophus californianus*)

California sea lions are distributed along the west coast of North America from British Columbia to Baja California and throughout the Gulf of California. Breeding occurs on offshore islands along the west coast of Baja California and the Gulf of California as well as on the California Channel Islands. There are three recognized California sea lion 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. Although there is some movement between stocks, U.S. rookeries are considered to be isolated from rookeries off of Baja California (Barlow et al. 1995).

California sea lions were hunted for several thousand years by indigenous peoples and early hunters. In the early 1900s, sea lions were killed in an effort to reduce competition with commercial fisheries. They were also hunted commercially from the 1920-1940s. Following the passage of the Marine Mammal Protection Act (MMPA) in 1972, as well as limits on killing and harassment in Mexico, the population has rapidly increased (Reeves et al. 2002). Declines in pup production did occur during the 1983-84, 1992-93, 1997-98, and 2003 El Niño events, but production returned to pre- El Niño levels within 2-5 years (Carretta et al. 2016). In 2013, NOAA declared an Unusual Mortality Event (UME) due to the elevated number of sea lion pup strandings in southern California. The cause of this event is thought to be nutritional stress related to declines in prey availability. This UME has continued through 2016 (NMFS 2016).

According to the 2015 Pacific Marine Mammal Stock Assessment, California sea lions have a minimum population size of 153,337 individuals and the population is estimated to number 296,750 (Carretta et al. 2016). This species is not listed under the Endangered Species Act (ESA) and is not a strategic species nor considered depleted under the MMPA.

Northern elephant seal (*Mirounga angustirostris*)

Northern elephant seals range widely throughout the eastern Pacific for most of the year to forage. They return to haul-out locations along the west coast of the continental United States including the Channel Islands, the central California coast, and islands off of Baja California to breed and molt. Breeding occurs from December through early spring, with males returning to haul-out locations earlier than females to establish dominance hierarchies. Molting occurs from late April to August, with juveniles and adult females returning earlier than adult males (Reeves et al. 2002). Due to very little movement between colonies in Mexico and those in California, the California population is considered to be a separate stock (Carretta et al. 2010).

This species was hunted by indigenous peoples for several thousand years and by commercial sealers in the 1800s. By the late 1800s the species was thought to be extinct, although several were seen on Guadalupe Island in the 1880s and a few dozen to several hundred survived off of Mexico (Stewart et al. 1994). The population began increasing in the early 1900s and progressively colonized southern and central California through the 1980s (Reeves et al. 2002).

According to the 2015 Pacific Marine Mammal Stock Assessment, the minimum population size of the California stock is 81,368 individuals and the estimated population size is 179,000 (Carretta et al. 2016, Lowry et al. 2014). This species has grown at 3.8% annually since 1988 (Lowry et al. 2014). Northern elephant seals are not listed under the ESA and are not a strategic species nor considered depleted under the MMPA.

Steller sea lion (*Eumetopias jubatus*)

Steller sea lions range throughout the north Pacific from Japan to the Kamchatka Peninsula, along the Aleutian Islands, into the Gulf of Alaska, and down the west coast of North America to central California. 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). Breeding of the eastern stock occurs in rookeries in Alaska, British Columbia, Oregon, and California.

This species was hunted by indigenous peoples for several thousand years throughout its range and as recently as the 1990s in the Aleutian Islands. Individuals from British Columbia to California were also killed in the early 1900s to reduce competition with commercial fisheries. The species dramatically declined from the 1970s to 1990s due to competition with commercial fishing and long-term environmental changes (Reeves et al. 2002). There has also been a continued decrease in population numbers along the southern and central California coast possibly due to a northward shift, and subsequent southern contraction in breeding locations (Pitcher et al. 2007). In 1990, due to accelerating declines across its range, the species was listed as threatened under the ESA.

According to the 2015 Alaska Marine Mammal Stock Assessment, the minimum population size of the eastern U.S stock is 59,968 and the estimated population size is between 60,131 and 74,480 individuals (Muto et al. 2016). In 2013, the eastern U.S. stock was determined to be recovered and was delisted from the ESA (NMFS 2013) and is therefore no longer a strategic species under the MMPA.

5. Type of incidental taking authorization that is being requested and the method of incidental taking

An Incidental Harassment Authorization (IHA) is being requested. Research activities may result in the disturbance of pinnipeds by the presence of humans in haul-out habitats only. Any incidental take will be Level B Harassment only (take by incidental harassment).

6. Number, by age, sex, and reproductive condition (if possible), of marine mammals (by species) that may be taken and the number of times such takings by each type of taking are likely to occur

For the purpose of this IHA, only Oregon and California sites that are frequently sampled and have a marine mammal presence that poses a problem for site access and/or surveys were used for take estimates. Steller sea lions are not included in take estimates as they will not be disturbed by researchers or research activities.

Take estimates were based on marine mammal observations from each site. Marine mammal observations are conducted as part of general site observations which include notes on physical and biological conditions at the site. The maximum number of marine mammals, by species, seen at any given time throughout the sampling day is recorded at the conclusion of sampling. Any other relevant information including the location of a marine mammal relevant to the site, any unusual behavior, and the presence of pups is also noted.

These observations formed the basis from which researchers with extensive knowledge and experience at each site estimated the maximum number of marine mammals that may be subject to take (Tables 3-5).

harbor seal						
Site	adults			pups (weaned*)		
	# takes/event	# events/year	total takes	# takes/event	# events/year	total takes
Fogarty Creek	20	1	20	2	1	2
Shelter Cove	5	1	5			
Kibesillah Hill	5	1	5			
Sea Ranch	5	1	5			
Bodega	10	1	10			
Fitzgerald	20	1	20			
Pebble Beach	25	1	25	5	1	5
Franklin Point	5	1	5			
Hopkins	10	2	20			
Stillwater	5	2	10	2	1	2
Point Piños	10	1	10	2	1	2
Carmel Point	5	1	5	2	1	2
Piedras Blancas	5	2	10			
Cayucos	5	2	10			
Occulto	5	2	10			
Government Point	20	2	40			
Totals			210			13

Table 3. Anticipated number of harbor seal takes at sites where incidental takes are most likely to occur. *Weaned pups are >1 month old

California sea lion						
Site	adults			pups		
	# takes/event	# events/year	total takes	# takes/event	# events/year	total takes
Cape Arago	20	1	20			
Sea Ranch	5	1	5			
Stillwater	5	2	10			
Piedras Blancas	5	2	10			
Government Point	20	2	40	5	1	5
Totals			85			5

Table 4. Anticipated number of sea lion takes where incidental takes are most likely to occur

Northern elephant seal						
Site	adults			pups (weaned*)		
	# takes/event	# events/year	total takes	# takes/event	# events/year	total takes
Piedras Blancas	10	2	10	20	2	40
Totals			20			40

Table 5. Anticipated number of elephant seal takes at sites where incidental takes are most likely to occur. *Weaned pups are >1 month old

Species	Requested number of takes
Harbor seal (<i>Phoca vitulina richardii</i>)	223
California sea lion (<i>Zalophus californianus</i>)	90
Northern elephant seal (<i>Mirounga angustirostris</i>)	60
Stellar sea lion (<i>Eumetopias jubatus</i>)	0

Table 6. Number of takes being requested by species

Fogarty Creek (44.83684, -124.05875): This site is visited once per year in July for community structure monitoring. There is often a small group of adult harbor seals along with several pups in the vicinity of, and hauled-out at, the site that may be disturbed by the presence of researchers.

Cape Arago (43.30894, -124.40077): This site is visited once per year in July for community structure monitoring. In 2009 there was a large group of California sea lions in the vicinity of, and hauled-out, at this site. Since then, only a small group of sea lions has been observed in the area. This group may be disturbed by the presence of researchers in the area. Some of these individuals may also need to be flushed to gain access to the plots at the site.

Shelter Cove (40.030556, -124.07366): This site is visited once per year in June for community structure monitoring. A small group of adult harbor seals is often hauled-out at this site and may be disturbed by the presence of researchers.

Kibesillah Hill (39.60412, -123.78887): This site is visited once per year in June for community structure monitoring. A small group of adult harbor seals is often hauled-out at this site and may be disturbed by the presence of researchers.

Sea Ranch (38.7305, -123.48864): This site is visited once per year in June for community structure monitoring. A small group of adult harbor seals and adult California sea lions is often hauled-out at this site and may be disturbed by the presence of researchers.

Bodega (38.3182, -123.07365): This site is visited once per year in June for community structure monitoring. A small group of adult harbor seals is often observed hauled-out at

this site and may be disturbed by the presence of researchers. Some of these individuals may also need to be flushed to gain access to the plots within the site.

Fitzgerald Marine Reserve (37.52167, -122.51667): This is a Biodiversity site that is likely to be visited during 2017. A large group of adult harbor seals hauled-out on the beach adjacent to the site has been observed during previous surveys. This group may be disturbed by researchers accessing the site.

Pebble Beach (37.23263, -122.41607): This site is visited once per year in the spring for community structure monitoring. A group of adult harbor seals and pups is often hauled-out at this site and may be disturbed by the presence of researchers. Some of these individuals may also need to be flushed to gain access to the plots within the site.

Franklin Point (37.1495, -122.36101): This site is visited once per year in the spring for community structure monitoring. A small group of adult harbor seals is often hauled-out at this site and may be disturbed by the presence of researchers.

Hopkins (36.6212, -121.9073): This site is visited twice per year, in the spring and fall, for community structure monitoring. A group of adult harbor seals is often hauled-out adjacent to and on this site. This group may be disturbed by the presence of researchers sampling the site. Recent changes to site access have reduced the likelihood of disturbing this group of harbor seals.

Point Piños (36.63796, -121.93758): This site is visited once per year in the spring for community structure monitoring. There is often a small group of adult harbor seals along with several pups in the vicinity of, and hauled-out at, the site that may be disturbed by the presence of researchers.

Stillwater (36.56087, -121.94053): This site is visited twice per year in the spring and fall for community structure monitoring. A small group of adult harbor seals is often hauled-out at this site and may be disturbed by the presence of researchers. During the spring survey, a small group of pups may also be present. Occasionally, several California sea lions are also hauled-out in the vicinity of the site.

Carmel Point (36.54376, -121.93412): This site is visited once per year in the spring for community structure monitoring. There is often a small group of adult harbor seals along with several pups in the vicinity of, and hauled-out at, the site that may be disturbed by the presence of researchers.

Piedras Blancas (35.66493, -121.28699): This site is visited twice per year in the spring and fall for community structure monitoring. There is often a large group of adult elephant seals offshore of the site. A small group of adults and weaned pups is occasionally hauled-out adjacent to the site and may be disturbed by the presence of researchers. A small group of adult harbor seals and California sea lions are also present at this site and may be disturbed by the presence of researchers.

Cayucos (35.44739, -120.94982): This site is visited twice per year for community structure monitoring. A group of adult harbor seals is often hauled-out adjacent to and on this site. This group may be disturbed by the presence of researchers sampling the site.

Occulto (34.88122, -120.63954): This site is visited twice per year in the spring and fall for community structure monitoring. Recently there has been a small group of adult harbor seals hauled-out on rocks just offshore of the site. This group may be disturbed by the presence of researchers.

Government Point (34.44334, -120.45655): This site is visited twice per year in the spring and fall for community structure monitoring. There is often a large group of adult harbor seals and adult sea lions hauled-out on and adjacent to the site. These groups may be disturbed by the presence of researchers accessing and sampling the site.

7. Anticipated impact of the activity upon the species or stock

Pinnipeds would only be disturbed by the presence of researchers in the rocky intertidal or along access ways to rocky intertidal sites. Research activities at regularly sampled sites do not take place at any major marine mammal rookeries. Therefore, very few breeding individuals or pups are likely to be impacted. Efforts will be made to approach any site where marine mammals may be present with caution in an attempt to avoid the stampeding of hauled-out individuals towards the water. Hauled-out pinnipeds may still be flushed to the water and may avoid the area while researchers are present. This type of disturbance will likely have only minimal short-term effects on the animals affected. No long-term effects on disturbed individuals are expected as they may return to the site from which they were disturbed within 30 minutes of the departure of researchers (Allen et al. 1985) or are likely to haul-out in a non-disturbed area (Schneider and Payne 1983).

Only a small number of pinnipeds have been encountered at our research sites and most sites are only visited for a one day period, one to two times per year. Therefore, it is unlikely that an individual pinniped will be taken repeatedly in a given year. Additionally, only a very small percentage of each population is likely to be affected by research activities (Table 7). For these reasons, there is no anticipated long-term impact on affected marine mammal stocks.

Species	Abundance (Carretta et al. 2016)	Requested number of takes	Percentage of population affected
Harbor seal (<i>Phoca vitulina richardii</i>)	55,700*	223	0.40
California sea lion (<i>Zalophus californianus</i>)	296,750	90	0.03
Northern elephant seal (<i>Mirounga angustirostris</i>)	179,000	60	0.03

Table 7. Percentage of population affected by level B harassment incidental to rocky intertidal research activities. *Abundance of both California and Oregon/Washington stocks combined

8. Anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses

There is no impact on subsistence uses as activities will not take place in areas where subsistence hunting occurs.

9. Anticipated impact of the activity upon the habitat of the marine mammal populations and the likelihood of restoration of the affected habitat

Our research activities take place in the rocky intertidal, which can be used as a haul-out site for pinnipeds. The only potential adverse impact to this habitat would be due to the placement of permanent bolts and other sampling equipment in the intertidal zone. Bolts are installed during the set-up of a site. In some instances, bolts will need to be replaced or installed for new plots. Bolts are 2" to 5" long, stainless steel 3/8" Hex or Carriage bolts. They are installed by drilling a hole with a battery powered DeWalt 24v rotary hammer drill with a 3/8" bit. The bolts protrude 1/2"-3" above the rock surface and are held in place with marine epoxy. Although the drill does produce noticeable noise, we have never observed an instance where nearby marine mammals were disturbed by it. Any marine mammal at the site would likely be disturbed by the presence of researchers and retreat to a distance where the noise of the drill would not increase the disturbance. The installation of bolts and other sampling equipment is conducted under the appropriate permits (Monterey Bay National Marine Sanctuary, California State Parks). Once a particular study has ended, the respective sampling equipment is removed. No trash or field gear is left at a site.

10. Anticipated impact of the loss or modification of the habitat on the marine mammal populations involved

There is no anticipated impact of the loss or modification of marine mammal habitat.

11. 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 on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance

In order to reduce the impact of research activities on affected marine mammal species and stocks, researchers will abide by the following mitigation measures. When possible, researchers will observe a site from a distance to detect any marine mammals prior to approaching the site. Researchers will approach a site with caution (slowly and quietly) to avoid surprising any hauled-out individuals and to reduce stampeding of individuals towards the water. If it is possible to avoid pinnipeds along access ways to sites, by locating and taking a different access way, researchers will do so. Researchers will maintain the minimum legal distance from any marine mammal while conducting research, unless it is absolutely necessary to flush a marine mammal in order to continue conducting research (i.e. if a site cannot be accessed or sampled due to the presence of pinnipeds). It may be unavoidable to flush hauled-out pinnipeds if they are hauled-out within plots or sampling areas. Researchers will observe offshore waters for predators

prior to flushing any marine mammal and flushing will be avoided if predators are observed. In addition, intentional flushing will be avoided if pups are present and we will continue to not disturb nursing pups. Any site where Steller sea lions are present will not be approached and will be sampled at a later date. Researchers will promptly vacate a site at the conclusion of sampling.

It should be noted that our research group, in collaboration with MARINe and PISCO, has been conducting rocky intertidal research for over 20 years and during this time very few sites have been unsamplable due to the presence of pinnipeds and encountering pinnipeds at sites is rare. Due to the increasingly large number and extensive geographic range of sites, as well as scheduling constraints (sites can only be sampled during negative low tides), it has become economically and logistically difficult to reschedule sampling due to marine mammal presence. Researchers will continue to avoid marine mammals whenever feasible.

12. 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, the applicant must submit either a plan of cooperation 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

Not applicable. No activities will take place in or near subsistence hunting areas, nor will they affect the availability of species or stocks for subsistence uses.

13. 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

Species and numbers, by age and sex when possible, of any marine mammals subjected to incidental take, along with the location, date, and time of the event, will be recorded and reported to NMFS. For consistency, any reactions by pinnipeds to researchers will be recorded according to a three point scale: 1= reaction not considered harassment; 2 = moving greater than 1 meter or a behavior considered harassment, but not flushing; 3 = flushing. In addition, observations regarding the number and species of any marine mammals observed, either in the water or hauled-out, at or adjacent to a site, are recorded as part of field observations during research activities. Information regarding physical and biological conditions pertaining to a site, as well as the date and time that research was conducted are also noted. This information will be incorporated into a monitoring report for NMFS.

14. Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects

At most sites, research activities will occur for a single day, one to two times per year, unless otherwise necessary, reducing the likelihood of disturbing the same individual more than once. In the case that a particular site becomes problematic due to a large number of marine mammals, researchers will attempt to coordinate sampling with any other research group using the site. Any future research occurring on the Channel Islands, Farrallon Islands, or Año Nuevo Island will be coordinated with researchers who regularly work in these areas in order to both gain access and reduce the amount of disturbance to marine mammals, birds, and sensitive habitat. In the case that a new site or sampling area falls within a known marine mammal haul-out, researchers will attempt to conduct sampling during a time of year when marine mammals are least likely to be present.

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Figures

Maps of UC Santa Cruz intertidal monitoring sites



Figure 1. UCSC intertidal monitoring sites in Oregon



Figure 2. UCSC intertidal monitoring sites in Northern California (Oregon border to San Francisco Bay)



Figure 3. UCSC intertidal monitoring sites in Central California (San Francisco to Point Conception)

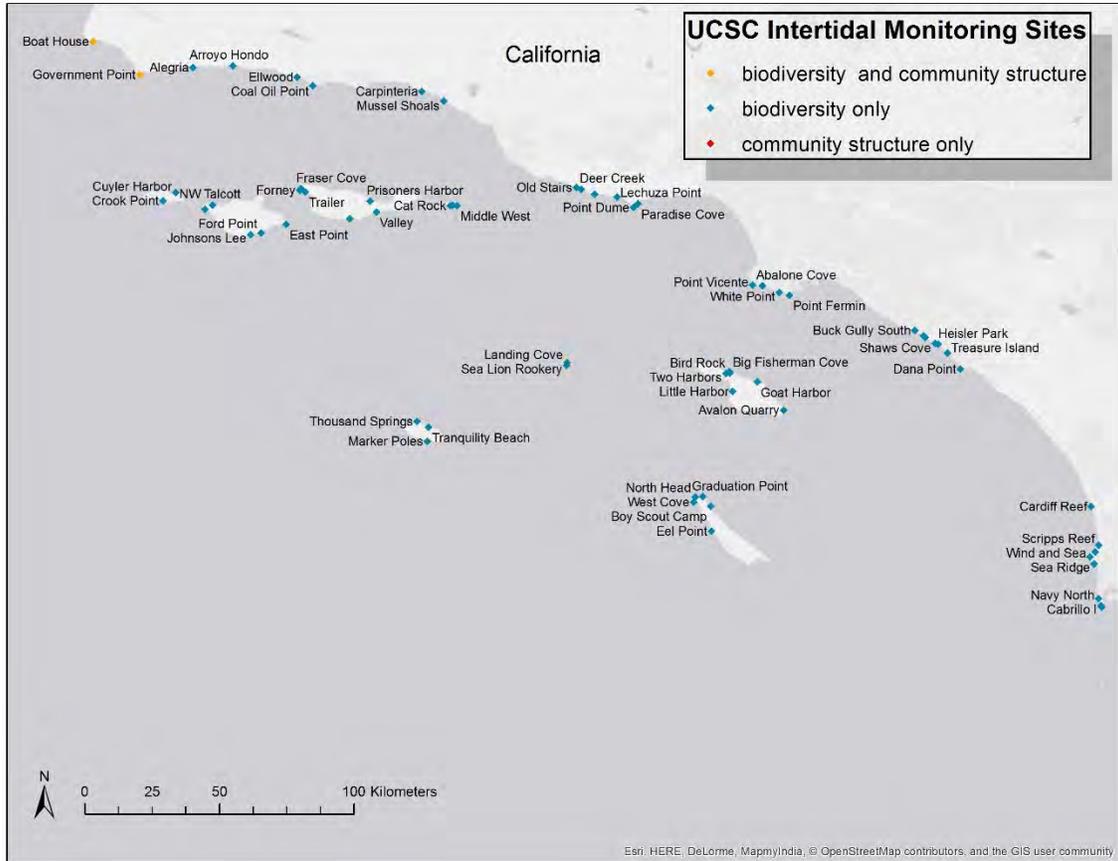


Figure 4. UCSC intertidal monitoring sites in Southern California (Point Conception to Mexico border including the Channel Islands)