Marine Mammal Protection Act

Incidental Harassment Authorization

Draft Monitoring Report

Submitted by:

Partnership for Interdisciplinary Studies of Coastal Oceans
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To:

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

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This draft monitoring report covers research activities related to rocky intertidal monitoring along the Oregon and California coasts for the period of December 17, 2014 to September 30, 2015.

Summary of Research Activities:

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. MARINe is committed to making its findings accessible to the public.

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. The 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. Information from PISCO's research is used to inform marine policy and is also made available to the public through 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:

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.

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

Biodiversity Surveys:

Biodiversity surveys involve point contact identification along permanent transects, mobile invertebrate quadrat counts, sea star band counts, and tidal height topographic measurements. These surveys are complimentary with the community structure monitoring approach and provide greater information on species richness and diversity at a site. Biodiversity surveys are conducted every 3-5 years at established sites. Table 2 lists established biodiversity sites in Oregon and California. For more information on sites and protocols please visit www.pacificrockyintertidal.org.

Marine Protected Area Baseline Monitoring

In September 2007, the state of California began establishing a network of Marine Protected Areas along the California coast as part of the Marine Life Protection Act (MLPA). Under baseline monitoring programs funded by Sea Grant and the Ocean Protection Council, additional intertidal monitoring sites were established within the Central Coast, North Central Coast, and South Coast study regions. Six additional sites were established and sampled in the North Coast study region in 2014-2015 (Table 3). Baseline characterization of MPAs involves sampling of sites both within and outside of MPAs. These sites are sampled using existing community structure and biodiversity survey protocols for consistency.

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	Lechuza 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	Treasue 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 Survey sites in Oregon and California

Site	Latitude (dd)	Longitude (dd)
Pyramid Point (new 2014)	41.98984	-124.20930
Point St George (new 2014)	41.78464	-124.25513
Palmer's Point (new 2015)	41.1309	-124.1635
Abalobadiah Creek (new 2015)	39.56906	-123.77182
MacKerricher (new 2015)	39.48260	-123.80359
Fort Bragg (new 2015)	39.43920	-123.81841

Table 3. North Coast MPA Baseline Monitoring Program sites

Summary of Incidental Take Authorization

Research activities take place in the rocky intertidal throughout the year. Surveys occur over a one day (2-6 hours) period during a low tide series. Sites range 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:

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

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).

According to the 2014 Pacific Marine Mammal Draft 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. 2015). This species is not listed under the Endangered Species Act (ESA) and is not a strategic species nor considered depleted under the MMPA.

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 ricchardii* 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 report.

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 2014 Pacific Marine Mammal Draft Stock Assessment, the minimum population size of the California stock is 27,348 individuals and population is estimated to number 30, 968 (Carretta et al. 2015). Based on 1999 aerial surveys, the Oregon/Washington outer coast stock is estimated to number 24,732. Due to outdated survey data, there is no current minimum population size available for the Oregon/Washington stock (Carretta et al. 2010). This species is not listed under the ESA and is not a strategic species or 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 and the central California coast, and the 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 2014 Pacific Marine Mammal Draft 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. 2015). 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 populations 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 2013 Alaska Marine Mammal Stock Assessment, the minimum population size of the eastern Steller sea lion stock is 57,966 and the estimated population size is 63,160 to 78,198 individuals (Allen and Angliss 2014). 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.

Incidental Harassment Authorization:

Although rare, hauled-out pinnipeds are occasionally encountered by researchers accessing and sampling monitoring sites. In some occasions pinnipeds may need to be flushed in order for researchers to gain access to a site or conduct sampling.

For the period of December 17, 2014 to December 16, 2015 UCSC-PISCO was issued Incidental Harassment Authorization under Section 101(a)(5)(D) of the Marine Mammal Protection Act for take, by level B harassment only, of a small number of pinnipeds incidental to rocky intertidal monitoring and research. The issued IHA allows for the following take:

Species	Authorized Take
California sea lion (*Zalophus californianus*)	60
Pacific harbor seal (*Phoca vitulina richardii*)	183
Northern elephant seal (*Mirounga angustirostris*)	30

Monitoring Methods

Prior to approaching research sites, researchers observed the site from a distance and recorded any pinnipeds by species, and sex/age when possible, present at or near the site. Any pinnipeds observed during sampling were also recorded. Number of disturbances from researchers accessing the site or conducting sampling were recorded by species, and sex/age when possible.

Observations and disturbances were recorded on a four-point scale:

- 0 = observation by researchers from a distance, no reaction by pinniped
- 1 = pinniped reacted to presence of researchers with movement <1 meter
- 2 = pinniped reacted to presence of researchers with short movement of 1-3 meters
- 3 = pinniped flushed to the water or moved >3 meters in retreat

Monitoring Results

For the period of December 17, 2014 to September 30, 2015 our research group conducted rocky intertidal surveys at 61 sites over 48 days (Table 6). During this period there were 37 takes of harbor seals. Another 14 harbor seals were observed at research sites. Takes occurred at Occulto, Stillwater Cove, Cayucos, Point Pinos, Hopkins, Mackerricher, Partington, and Fogarty when harbor seals were hauled-out on or adjacent to the site or were swimming just offshore of the site (Table 7).

There were 19 takes of California sea lions and another 8 sea lions were observed at research sites. All takes occurred at Government Point when a group of adults and pups hauled-out near the site responded to the presence of researchers but did not fully flush (Table 8). One emancipated pup was also observed at Government Point.

During this period, there were four takes of northern elephant seals and another 22 elephant seals were observed near research sites. All takes occurred at Piedras Blancas, when a group of weaned pups approached and observed researchers but did not flush (Table 9).

All takes were Level B harassment only. No injured, stranded, or dead pinnipeds were observed, nor were there any unusual behaviors prior to or following any takes. Surrounding waters were scanned for predators prior to any intentional flushing and no predators were observed. There were no observations or takes of Steller sea lions.

Date	Site	Time	Swell	Wind	Rain	Date	Site	Time	Swell	Wind	Rain
1/3/2015	Santa Maria Creek	1420-1714	ND	ND	ND	5/18/2015	Damnation Creek	0545-1005	L	L	L
1/16/2015	Cuyler Harbor	1100-1630	M	M	0	5/19/2015	Pescadero Point	0520-0715	L	L	0
1/17/2015	Otter Harbor	1215-1630	M	0	0	5/19/2015	Soberanes	0745-0850	L	0	L
1/18/2015	Harris Point	1230-1600	M	L	0	5/19/2015	Damnation Creek	0545-1100	ND	ND	ND
1/19/2015	Crook Point	1245-1630	M	M	0	5/20/2015	Palmers Point	0600-1200	ND	ND	ND
3/16/2015	Boathouse	1145-1710	L	L	0	5/21/2015	Sand Hill	0930-1000	L	L	0
3/17/2015	Occulto	1230-1510	M	L	0	5/21/2015	Pebble Beach	0700-0900	L	L	L
3/17/2015	Purisima	1615-1715	M	L	0	5/21/2015	Palmers Point	0530-1010	ND	ND	ND
3/18/2015	Government Point	1215-1745	M	H	0	5/22/2015	Hopkins	0640-1030	L	L	L
3/18/2015	East Point	1300-1730	L	L	0	5/22/2015	Burnt Hill	0645-1045	L	L	0
3/19/2015	Stairs	1230-1800	M	L	0	6/2/2015	Abalobadiah	0545-0935	ND	ND	ND
3/20/2015	Shell Beach	1300-1730	L	L	0	6/3/2015	Garrapata	0530-0815	M	L	0
3/23/2015	Pigeon Point	0645-0730	L	L	0	6/3/2015	Abalobadiah	0530-0930	ND	ND	ND
3/23/2015	Sand Hill	0830-0930	M	L	0	6/4/2015	Fort Bragg	0615-1010	ND	ND	ND
4/13/2015	Scott Creek	1045-1300	M	L	0	6/5/2015	Partington	0630-0830	M	M	L
4/14/2015	Terrace Point	1200-1415	L	L	0	6/5/2015	Fort Bragg	0545-0915	ND	ND	ND
4/19/2015	Piedras Blancas	0610-0820	L	0	0	6/6/2015	Mackerricher	0600-1115	ND	ND	ND
4/19/2015	Vista del Mar	0425-0530	L	0	0	6/15/2015	Sea Ranch	0415-0930	L	L	0
4/20/2015	Stillwater	0600-0830	L	L	0	6/15/2015	Bodega	0420-0945	M	L	0
4/20/2015	Point Sierra Nevada	0515-1055	L	L	0	6/16/2015	Stornetta	0430-0830	L	M	0
4/21/2015	Mill Creek	0600-0900	L	L	0	6/17/2015	Cape Mendocino	0515-1145	ND	ND	ND
4/21/2015	Rancho Marino	0500-0620	L	0	0	6/18/2015	Cape Mendocino	0530-1015	L	H	0
4/21/2015	Cayucos	0700-1040	L	0	0	6/19/2015	Shelter Cove	0530-1000	L	L	0
4/22/2015	Andrew Molera	0600-0930	M	L	0	6/20/2015	Kibesillah Hill	0600-1100	L	L	0
4/22/2015	Hazards	0445-1020	M	L	0	7/3/2015	Partington	0520-0620	L	0	0
4/24/2015	Hopkins	1100-1145	M	L	0	7/3/2015	Pacific Valley	0735-0845	L	L	0
4/24/2015	Point Lobos	815-1015	L	L	0	7/3/2015	Trailer	0530-0930	L	M	0
5/5/2015	China Rocks	0615-0715	H	L	0	7/4/2015	Fraser	0530-1000	L	L	0
5/7/2015	Asilomar	0700-0820	H	M	L	7/5/2015	Forney	0530-1015	L	L	0
5/7/2015	Carmel Point	0705-0900	H	L	L	7/6/2015	Prisoners	0610-1000	L	L	0
5/8/2015	Point Pinos	0640-0830	M	L	0	7/14/2015	Bob Creek	0445-0935	L	L	0
5/8/2015	Carmel Point	0915-1000	M	L	0	7/15/2015	Fogarty Creek	0445-1000	L	L	0
5/9/2015	Franklin Point	0815-1040	L	L	0	7/15/2015	Otter Rock	0530-1000	L	L	0
5/16/2015	False Klamath Cove	0430-0915	L	L	0	7/16/2015	Cape Arago	0450-1030	L	M	0
5/17/2015	Enderts	0430-0915	L	L	0	7/16/2015	Otter Rock	0600-0930	L	L	0
5/18/2015	Scott Creek	0520-0740	L	L	L	7/17/2015	Roads End	0530-1030	L	L	0

Table 6. Field sampling dates, sites, times, and physical conditions noted during sampling (0-none, L-low, M-moderate, H-high, ND-no data) for the period of Dec. 17, 2014 to Sept. 30, 2015

			harbor seal								
			adults				pups				
Site	**Date**	**Time**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**Notes**
Occulto	3/17/2015	12:30		2							In water, observed reseachers.
Point Sierra Nevada	04/20/2015	7:00	1								In water offshore of site.
Stillwater Cove	4/20/2015	6:00		10				1			Hauled-out downcoast of site, observed researchers.
Cayucos	04/21/2015	8:00	2					1			In water offshore, pup observed researchers.
Hopkins	4/24/2015	11:00	1								In water offshore of site.
Pebble Beach	5/2/2015	7:00	6								Hauled-out downcoast of site.
Point Pinos	5/8/2015	6:40			1	5			1		Hauled-out on reef. Flushed.
Soberanes	5/19/2015	7:45	2								Hauled-out on offshore rocks.
Hopkins	5/22/2015	6:40		1							Hauled-out on offshore rocks.
Mackerricher	6/6/2015	6:00				1				1	Hauled-out on reef. Flushed.
Bodega	6/15/2015	4:20				2					Hauled-out on reef. Flushed.
Stornetta	6/16/2015	4:30	2								In water offshore of site.
Partington	7/3/2015	5:20		2							In water, observed reseachers.
Fogarty	07/15/2015	10:00				9					Hauled-out on reef. Flushed.
Totals			**14**	**15**	**1**	**17**	**0**	**2**	**1**	**1**	
Total Takes	**37**										

Table 7. Observations and takes of harbor seals (0-observation by researchers only, 1- reacted to presence of researchers with movement <1m, 2- reacted to presence of researchers with short movement of 1-3m, 3- flushed to the water or moved >3m in retreat)

			California sea lion								
			adults				pups				
Site	**Date**	**Time**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**Notes**
Purisima	3/17/2015	16:15					1				Hauled-out upcoast of site.
Government Point	3/18/2015	15:30		15			1	4			Hauled-on on reef, observed researchers. One pup was emaciated.
Stairs	3/19/2015	14:30					1				Hauled-out on reef, sleeping.
Point Pinos	5/8/2015	6:40	1								Hauled-out on reef.
Bodega	6/15/2015	4:20	5								In water offshore of site.
Stornetta	6/16/2015	4:30	2								In water offshore of site.
Totals			**8**	**15**	**0**	**0**	**3**	**4**	**0**	**0**	
Total Takes	**19**										

Table 8. Observations and takes of California sea lions (0-observation by researchers only, 1- reacted to presence of researchers with movement <1m, 2- reacted to presence of researchers with short movement of 1-3m, 3- flushed to the water or moved >3m in retreat)

			Northern elephant seal								
			adults				pups (weaned)				
Site	**Date**	**Time**	**0**	**1**	**2**	**3**	**0**	**1**	**2**	**3**	**Notes**
Piedras Blancas	4/19/2015	7:00					22	4			In water and hauled-out on offshore rocks. Four weaned pups approached and observed researchers
Totals							**22**	**4**			
Total Takes	**4**										

Table 9. Observations and takes of northern elephant seals (0-observation by researchers only, 1- reacted to presence of researchers with movement <1m, 2- reacted to presence of researchers with short movement of 1-3m, 3- flushed to the water or moved >3m in retreat)

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