

Request for Marine Mammal Protection Act

Letter of Authorization

for

Rocky Intertidal Monitoring

Submitted by:

**MARINe/Raimondi Lab
University of California Santa Cruz
Ocean Health Building
115 McAllister Way
Santa Cruz, CA 95060**



**UNIVERSITY OF CALIFORNIA
SANTA CRUZ**

To:

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



NATHANIEL FLETCHER
ASSOCIATE RESEARCH SPECIALIST
DEPARTMENT OF ECOLOGY AND EVOLUTIONARY BIOLOGY
UNIVERSITY OF CALIFORNIA, SANTA CRUZ
115 MCALLISTER WAY
SANTA CRUZ, CALIFORNIA 95060
OFFICE: (831) 459-4145
NFLETCH@UCSC.EDU

September 3, 2025

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 Letter of Authorization for harassment of a small number of pinnipeds incidental to rocky intertidal monitoring and research surveys. We possessed IHAs from 2013-2020 and held an LOA since May 3, 2020. This LOA will expire on April 11, 2025 and we are requesting a new LOA for another five-year period. We are requesting a LOA due to the ongoing and long-term nature of our research program and to reduce the administrative burden of applying for annual IHAs.

Our research takes place at rocky intertidal sites ranging from Alaska to Mexico. We are requesting that this LOA cover our research activities in Oregon and California. Although uncommon, hauled-out pinnipeds are encountered by researchers at some research sites. This LOA 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, Ecology and Evolutionary Biology Department, UC Santa Cruz.

Sincerely,

A handwritten signature in black ink, appearing to read 'N. Fletcher', with a long horizontal stroke extending to the right.

Nathaniel Fletcher
Associate Research Specialist
Department of Ecology and Evolutionary Biology
UC Santa Cruz

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1. Detailed Description of the Specific Activity

Our research group at UC Santa Cruz operates in collaboration with a large-scale marine research program: the Multi-Agency Rocky Intertidal Network (MARINe, marine.ucsc.edu). MARINe is a consortium of multiple agencies, universities, and private organizations conducting long-term rocky intertidal monitoring and research at more than 200 sites in Oregon and California along the west coast of North America. This program uses a set of standardized monitoring protocols that allow for comparisons of data over space and time. MARINe is committed to making its findings accessible to policymakers and the public.

Our research group at UC Santa Cruz is responsible for much of this program's ongoing rocky intertidal monitoring along the Pacific coast. Our monitoring projects, carried out under the direction of principal investigator Dr. Pete Raimondi, include the following:

Long-term Monitoring

The long-term monitoring (LTM, also referred to as Community Structure) 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 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.

LTM surveys involve the use of permanent photoplot quadrats which target specific algal and invertebrate assemblages (e.g. mussels, rockweeds, barnacles) (Figure 1). 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*). Sea surface temperature data are also collected. LTM follows the established protocols of MARINe (Engle et al. 2022) (for more information please visit marine.ucsc.edu/methods/). LTM surveys are conducted over a one-day period during a low tide series one to two times each year. There are 48 LTM sites in Oregon and California. Site locations, survey frequency, and survey seasons are shown in Table 1.

Biodiversity Surveys

Biodiversity surveys complement the LTM approach and provide greater information on species composition 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 (Figure 2). Biodiversity surveys typically require one to two days to complete and are usually conducted every 3-5 years at established sites. Current funding programs supporting biodiversity surveys include marine protected area (MPA) evaluation and MARINe. Table 1 lists the 150 biodiversity survey sites in Oregon and California. Note that many biodiversity sites are also LTM sites (for more information on sites and protocols please visit marine.ucsc.edu/methods/).

Research Activities

Data from these monitoring projects provides important information about the structure and dynamics of rocky intertidal communities. This information has been used for the design and evaluation of MPAs, listing and management of endangered species, natural resource damage assessments following oil spills (NRDA), fisheries management, and tracking and understanding marine disease events.

All research activities take place in the rocky intertidal, on large bedrock benches or boulders, from the high intertidal zone to the low intertidal zone. Surveys are typically done with 3-6 people over a 4-6-hour period during a negative low tide. Biodiversity surveys encompass 20 or 30 meters of shoreline and extend from the high intertidal to the water's edge (at low tide), a width that ranges from 5 to 100+ meters depending on the site (Figure 2). LTM plots are typically spread out over 50 to 100+ meters of shoreline and from the high intertidal to the low intertidal (Figure 1). LTM photoplots, plots, transects, and biodiversity survey grids are marked with permanent bolts. 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 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. Other sampling equipment, including temperature loggers, is attached to the rock with 1/4" stainless steel lag screws anchored with concrete wall anchor.

UAV Surveys

Recently our research group has incorporated unmanned aerial vehicle (UAV) surveys into our monitoring. UAVs are a powerful tool for mapping and imaging rocky intertidal communities at spatial scales that can't be achieved with traditional on-the-ground surveys. Products from UAV flights of rocky intertidal sites include raw imagery, georectified orthomosaics, and digital elevation models. These products can be used to classify and map species distributions, to document site conditions, and to assess community changes at larger spatial scales.

Our policy has been to not conduct UAV flights when marine mammals are present to avoid unauthorized incidental disturbance. But as our UAV program expands, there is increased potential of UAV flights impacting marine mammals at our sites as UAVs can cause behavioral response in pinnipeds from both visual and acoustic detection (Christiansen et al. 2016, Perez et al. 2016). We currently use two quadcopter UAV models: a DJI Mavic 2 Pro and a DJI Mavic 3 Enterprise and conduct flights from 10-30 meters Above Ground Level.

Table 1. UCSC rocky intertidal monitoring sites in Oregon and California with locations, survey type (LTM, biodiversity), LTM survey frequency, and survey seasons. Sample Season: SP=March, April, May; SU=June, July, August; FA= October, November, December.

Site	State	Latitude	Longitude	LTM	LTM Surveys/Year	LTM Survey Season	Biodiversity Survey
Ecola	OR	45.91809	-123.98031	X	1	SU	X
Cape Mearns	OR	45.471788	-123.97204				X
Roads End	OR	45.025747	-124.01265				X
Fogarty Creek	OR	44.83864	-124.05875	X	1	SU	X
Otter Rock	OR	44.752715	-124.06606				X
Seal Rock	OR	44.499939	-124.08437				X
Bob Creek	OR	44.24456	-124.11443	X	1	SU	X
Cape Arago	OR	43.30894	-124.40077	X	1	SU	X
Coquille Point	OR	43.114718	-124.43851				X
Burnt Hill	OR	42.22814	-124.38786	X	1	SU	X
Pyramid Point	CA	41.989841	-124.2093				X
Point Saint George	CA	41.784644	-124.25513				X
Enderts	CA	41.69	-124.14257	X	1	SP	X
Damnation Creek	CA	41.65249	-124.12784	X	1	SP	X
False Klamath Cove	CA	41.594264	-124.10533	X	1	SP	X
Launcher Beach	CA	41.057155	-124.14532				X
Old Home Beach	CA	41.055273	-124.13683				X
Cape Mendocino	CA	40.341	-124.36317	X	1	SU	X
Shelter Cove	CA	40.02254	-124.07366	X	1	SU	X
Mal Coombs	CA	40.021697	-124.06825				X
Kibesillah Hill	CA	39.60412	-123.78887	X	1	SU	X
Abalobadiah Creek	CA	39.56906	-123.77182				X
MacKerricher	CA	39.4826	-123.80359				X
Fort Bragg	CA	39.4392	-123.81841				X
Stornetta	CA	38.93787	-123.7288	X	1	SU	X
Moat Creek	CA	38.880915	-123.67475				X
Saunders Reef	CA	38.86138	-123.65361				X
Del Mar Landing	CA	38.740513	-123.51086				X
Sea Ranch	CA	38.7305	-123.48864	X	1	SU	X
Stewarts Point	CA	38.61364	-123.36753				X
Phillips Gulch	CA	38.585852	-123.34147				X
Gerstle Cove	CA	38.566136	-123.32919				X
Windermere Point	CA	38.523943	-123.26747				X
North Jenner Beach	CA	38.456176	-123.14244				X
Bodega	CA	38.3182	-123.07365	X	1	SU	X

Horseshoe Cove	CA	38.316439	-123.0721				X
Bodega Head	CA	38.3104	-123.0824				X
Santa Maria Creek	CA	38.012429	-122.84915				X
Chimney Rock	CA	37.99383	-122.96729				X
Bolinas Point	CA	37.903537	-122.72721				X
Bolinas Point Wreck	CA	37.902617	-122.7242				X
Alder Creek; Duxbury	CA	37.897426	-122.71069				X
Slide Ranch	CA	37.874061	-122.60094				X
Alcatraz	CA	37.825	-122.42194				X
Mussel Flat Farallones	CA	37.6959	-123.0029				X
Fitzgerald Marine Reserve	CA	37.521647	-122.51679				X
Pebble Beach	CA	37.23263	-122.41607	X	1	SP	
Pigeon Point	CA	37.18361	-122.39529	X	1	SP	X
Franklin Point	CA	37.1495	-122.36101	X	1	SP	
Ano Nuevo	CA	37.11257	-122.32956				X
Scott Creek	CA	37.04425	-122.23493	X	2	SP, FA	X
Davenport Landing	CA	37.02208	-122.21538				X
Sandhill Bluff	CA	36.98017	-122.15503	X	2	SP, FA	X
Wilder Ranch	CA	36.94915	-122.10383				X
Natural Bridges	CA	36.94915	-122.06107				X
Terrace Point	CA	36.94841	-122.06457	X	2	SP, FA	X
Point Pinos	CA	36.63796	-121.93758	X	2	SP, FA	X
Asilomar	CA	36.6296	-121.93852	X	1	SP	X
Hopkins	CA	36.6212	-121.9073	X	2	SP, FA	X
China Rocks	CA	36.60616	-121.95939	X	1	SP	X
Pescadero Point	CA	36.56109	-121.95436	X	1	SP	
Stillwater	CA	36.56087	-121.94053	X	2	SP, FA	X
Carmel Point	CA	36.54376	-121.93412	X	1	SP	
Point Lobos	CA	36.51366	-121.94688	X	2	SP, FA	X
Mal Paso	CA	36.47994	-121.93913	X	2	SP, FA	
Garrapata	CA	36.46904	-121.93444	X	1	SP	X
Soberanes	CA	36.44787	-121.92874	X	1	SP	
Andrew Molera	CA	36.28061	-121.86317	X	2	SP, FA	X
Partington Cove	CA	36.17376	-121.69653	X	1	SP	X
Lucia	CA	36.014383	-121.5405				X
Mill Creek	CA	35.97965	-121.49034	X	2	SP, FA	X
Pacific Valley	CA	35.94705	-121.48053	X	1	SP	
Duck Pond	CA	35.85918	-121.42249				X
Point Sierra Nevada	CA	35.72883	-121.31866	X	2	SP, FA	X
Piedras Blancas	CA	35.66493	-121.28699	X	2	SP, FA	X

San Simeon Point	CA	35.63455	-121.19562				X
Vista del Mar	CA	35.60414	-121.14232	X	2	SP, FA	X
Rancho Marino; Cambria	CA	35.52244	-121.073	X	2	SP, FA	X
Harmony Headlands	CA	35.47448	-121.01707	X	1	FA	
Cayucos	CA	35.44739	-120.94982	X	2	SP, FA	X
Hazards	CA	35.28966	-120.88325	X	2	SP, FA	X
Diablo	CA	35.22691	-120.87428				X
Shell Beach	CA	35.16881	-120.69668	X	2	SP, FA	X
Occulto	CA	34.88122	-120.63954	X	2	SP, FA	
Purisima	CA	34.7556	-120.64076	X	2	SP, FA	
Stairs	CA	34.73038	-120.61546	X	2	SP, FA	X
Lompoc Landing	CA	34.719057	-120.6088				X
Boat House	CA	34.55388	-120.61167	X	2	SP, FA	X
Tarantulas	CA	34.4946	-120.4956				X
Arroyo Hondo	CA	34.473308	-120.14539				X
Alegria	CA	34.467137	-120.27818				X
Point Conception	CA	34.44903	-120.46445				X
Government Point	CA	34.44334	-120.45655	X	2	SP, FA	X
Owl Bluff	CA	34.44257	-120.45350				X
Ellwood	CA	34.435194	-119.93078				X
Coal Oil Point	CA	34.40686	-119.87829				X
Carpinteria	CA	34.387037	-119.51408				X
Mussel Shoals	CA	34.355565	-119.44074				X
Old Stairs	CA	34.066224	-118.9981				X
Fraser Cove	CA	34.062645	-119.91905				X
Deer Creek	CA	34.060685	-118.98221				X
Forney	CA	34.056485	-119.92204				X
Trailer	CA	34.051821	-119.90344				X
Cuyler Harbor	CA	34.048612	-120.33642				X
Orizaba Cove	CA	34.0447521	-119.72299				X
Sequit Point	CA	34.043235	-118.937				X
Lechuza Point	CA	34.034458	-118.86179				X
Pelican Bay	CA	34.0312548	-119.69871				X
Crook Point	CA	34.022067	-120.37924				X
Prisoners Harbor	CA	34.020197	-119.68663				X
Paradise Cove	CA	34.012005	-118.79214				X
NW Talcott	CA	34.008386	-120.21368				X
S Frenchys Cove	CA	34.006553	-119.41104				X
Middle West	CA	34.005841	-119.39643				X
Cat Rock	CA	34.005599	-119.41941				X

Point Dume	CA	34.000357	-118.80703				X
Fossil Reef	CA	33.993295	-120.23813				X
Valley	CA	33.983724	-119.66588				X
Willows Anchorage	CA	33.961885	-119.75493				X
East Point	CA	33.9427	-119.96793				X
Ford Point	CA	33.91457	-120.0506				X
Johnsons Lee	CA	33.90883	-120.08691				X
Lunada Bay	CA	33.7680514	-118.42276				X
Point Vicente	CA	33.741014	-118.40947				X
Abalone Cove	CA	33.737777	-118.37612				X
Royal Palms	CA	33.7197434	-118.32857				X
White Point	CA	33.71573	-118.31999				X
Point Fermin	CA	33.70679	-118.28614				X
Buck Gully South	CA	33.588246	-117.86736				X
Crystal Cove	CA	33.570864	-117.83785				X
Muddy Canyon	CA	33.565763	-117.83314				X
Shaws Cove	CA	33.54473	-117.79974				X
Heisler Park	CA	33.542594	-117.78928				X
Treasure Island	CA	33.51335	-117.75793				X
Landing Cove	CA	33.481366	-119.0292				X
Sea Lion Rookery	CA	33.471738	-119.03075				X
Dana Point	CA	33.459941	-117.71461				X
Bird Rock	CA	33.451665	-118.48761				X
Big Fisherman Cove	CA	33.446447	-118.48526				X
Two Harbors	CA	33.444353	-118.49888				X
Goat Harbor	CA	33.416797	-118.39407				X
Little Harbor	CA	33.385025	-118.47524				X
Avalon Quarry	CA	33.322	-118.3052				X
Thousand Springs	CA	33.28491	-119.52972				X
Tranquility Beach	CA	33.265668	-119.4921				X
Marker Poles	CA	33.2187	-119.49575				X
Graduation Point	CA	33.033274	-118.5756				X
North Head	CA	33.032867	-118.60057				X
West Cove	CA	33.014938	-118.60614				X
Boy Scout Camp	CA	33.00112	-118.54832				X
Cardiff Reef	CA	32.99984	-117.27867				X
Eel Point	CA	32.918007	-118.54668				X
Scripps Reef	CA	32.871395	-117.25321				X
La Jolla Caves	CA	32.848614	-117.26535				X
Wind and Sea	CA	32.832849	-117.28231				X
Sea Ridge	CA	32.807987	-117.26793				X

Sunset Cliffs	CA	32.7191315	-117.25683				X
Navy North	CA	32.692784	-117.25306				X
Cabrillo I	CA	32.669434	-117.24541				X
Cabrillo III	CA	32.664899	-117.24282				X
Totals				48			150

2. Dates, Duration, and Geographical Region

Our research is conducted along the California and Oregon coasts. LTM surveys are conducted at each site 1-2 times per year in Spring, Summer, and Fall (Table 1). Biodiversity surveys are conducted every 3-5 years at established sites, as funding allows, and occur throughout the year.

Most sites are sampled over a one-day period (4-6 hours) during a negative low tide. Biodiversity surveys are more intensive than LTM surveys and occasionally take two days, depending on number of researchers and conditions. Details for site locations and sampling seasons are described in Table 1. Maps with site locations are shown in Figures 3-6. 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. We request a start date of April 1, 2025 through March 31, 2030 for this authorization.

3. Species and Numbers of Marine Mammals

Research activities take place in the rocky intertidal zone at sites ranging from northern Oregon to the California/Mexico border, including the California Channel Islands. 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. 2023). The population is estimated to be 30,968 in California and 27,348 in the Oregon/Washington outer coast (Carretta et al. 2023). However, because the most recent abundance estimate for the Oregon/Washington outer coast is >8 years old, there is no official NMFS current estimate of abundance available for this stock.

Harbor seals are the most common pinniped encountered at rocky intertidal research sites. At several sites harbor seals are often observed and have the potential to be disturbed by researchers accessing or surveying the site. From 2013-2024 we encountered an average of 217 harbor seals per year at research sites (Table 2). Of those, there was an average of 77 animals per year

subjected to incidental harassment (Takes; Table 2). The number of encounters by site from 2013-2024 is shown in Table 3. The maximum number of harbor seals encountered at a site on a single survey day was 75. These were observed hauled out at Government Point, CA in 2014 and all 75 were subjected to take.

California sea lion (*Zalophus californianus*)

The estimated population size of California sea lions is 257,606 which is based on a 2014 pup count of 47,691 (Carretta et al. 2023, Laake et al. 2018). 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. From 2013-2024 we encountered an average of 66 California sea lions per year at research sites and there was an average of 24 takes per year (Table 2). The number of encounters by site from 2013-2024 is shown in Table 4. The maximum number of California sea lions encountered at a single site was 200. These were observed hauled out near Marker Poles on San Nicolas Island in 2013. The maximum number of takes was 40 and these occurred at Bird Rock on Catalina Island in 2013.

Northern elephant seal (*Mirounga angustirostris*)

The estimated population size of northern elephant seals along the California coast is 187,386 individuals, which is based on 2013 pup-counts of 42,685 (Lowry et al. 2020, Carretta et al. 2023). Northern elephant seals are rarely encountered at most research sites. From 2013-2024 we observed an average of 49 elephant seals per year and there was an average of 7 takes per year (Table 2). The number of encounters by site from 2013-2024 is shown in Table 5. The maximum number of elephant seals encountered at a single site was 200. These were observed hauled out near Marker Poles on San Nicolas Island in 2013. The maximum number of takes was 19 and these occurred Piedras Blancas in 2013.

Steller sea lion (*Eumetopias jubatus*)

The estimated total count of the eastern U.S. stock of Steller sea lions is 77,149 (based on 2017 surveys 58,699 adults, 18,450 pups). The minimum population size of the eastern U.S. stock is estimated to be 43,201 (32,510 adults, 10,691 pups) (Young et al. 2023). 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 in 2009. No Steller sea lions we encountered from 2013-2024 and this species has very rarely been observed during research activities. In 2024, about 200 Steller sea lions were observed on rocks and islands offshore of Cape Arago, OR, but these animal were far offshore and there was no potential impact from research activities, therefore this observation is not used for take estimates.

Table 2. Monitoring results showing pinniped encounters at research sites from 2013-2024.

Species	Reporting Period	# Sites Surveyed	Total # Encountered	# Takes	Mean Encounters (CV)	Mean Takes (CV)
Harbor Seal	2013	82	429	37	217 (.49)	77 (.83)
	2014	91	373	256		
	2015	67	81	44		
	2016	66	196	96		
	2017	82	225	83		
	2018	63	226	87		
	2019-2020	72	226	78		
	2020-2021	71	249	55		
	2021-2022	67	105	17		
	2022-2023	73	159	50		
	2023-2024	74	123	44		
California Sea Lion	2013	82	294	64	66 (1.25)	24 (1.27)
	2014	91	43	29		
	2015	67	30	19		
	2016	66	7	1		
	2017	82	113	5		
	2018	63	9	1		
	2019-2020	72	73	63		
	2020-2021	71	81	80		
	2021-2022	67	5	0		
	2022-2023	73	24	1		
	2023-2024	74	51	1		
Northern Elephant Seal	2013	82	280	25	49 (1.62)	7 (1.49)
	2014	91	30	19		
	2015	67	26	4		
	2016	66	23	22		
	2017	82	9	0		
	2018	63	1	0		
	2019-2020	72	43	0		
	2020-2021	71	70	0		
	2021-2022	67	47	4		
	2022-2023	73	4	0		
	2023-2024	74	6	0		

4. Status and Distribution of the Affected Species

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 in 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 Marine Mammal Protection Act (MMPA), the population has increased dramatically (Carretta et al. 2010).

According to the 2022 Pacific Marine Mammal Stock Assessment, the minimum population size of the California stock is 27,348 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. 2023). Due to outdated survey data, there is no current minimum population size available for the Oregon/Washington stock (Carretta et al. 2023). 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 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. 2017). 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 continued through 2016 (NMFS 2016).

According to the 2022 Pacific Marine Mammal Stock Assessment, the U.S. stock of California sea lions has a minimum population size of 233,515 and the population is estimated to be 257,606 animals (Carretta et al. 2023, Laake et al. 2018). 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 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 2022 Pacific Marine Mammal Stock Assessment, the minimum population size of the California stock is 85,369, and the estimated population size is 187,386 (Carretta et al. 2023). 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 2022 Alaska Marine Mammal Stock Assessment, the minimum population size of the eastern U.S stock is estimated to be 43,201 (32,510 adults, 10,691 pups) (Young et al. 2023). 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 Requested

A Letter of Authorization (LOA) 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). A LOA is being requested in lieu of an IHA due to the ongoing and long-term nature of our research program and to reduce the administrative burden of applying for annual IHAs.

6. Estimated Number of Takes

To estimate our anticipated number of takes we used marine mammal monitoring data from research sites in Oregon and California visited from 2013 to 2024. 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 surveys. Takes are also defined and recorded as described in Section 13. 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. Steller sea lion observations are very rare, and none were encountered between 2013-2018. For Steller sea lion take estimates, we used one event in 2009 where five Steller sea lions were observed at Cape Arago, OR.

We summed the total number of marine mammals, by species, encountered at each research site during the period from 2013 to 2024. Encounters include any marine mammal observed or taken at or adjacent to the site. We then summed the number of sampling events where marine mammals were encountered at each site and calculated the average number of encounters per event. Next, we determined the maximum number of events that we expect to occur between 2025 and 2030 where marine mammals could be encountered at each site. For example, for sites visited twice per year, there can be a maximum of 10 events expected. We multiplied the maximum number of events by the mean number of encounters/event from 2013-2024, yielding the maximum number of expected encounters by site for 2025 through 2030. We summed all sites to calculate expected encounters by species.

Although only a portion of total encounters will be take (Level 2 or Level 3 interactions as described in Section 13), we use this final number as our anticipated and requested take by species (Table 7). From 2013-2024, the percentage of encounters that were Level 2 or Level 3 (Take) was 30% for harbor seals, 22% for sea lions, and 31% for elephant seals. We anticipate

that this ratio of take to total encounters will be similar for 2025-2030 and that actual take under this authorization will be less than requested take.

From 2013-2024 we encountered 2392 harbor seals across 64 sites, at an average of 217 encounters per year. For 2025-2030, we expect to survey 50 sites where harbor seals have been encountered, and expect there to be a maximum of 1,583 harbor seal encounters (Table 3). We are requesting 1,583 harbor seal takes during this LOA period, or 317 takes per year (Table 7).

From 2013-2024 we encountered 730 California sea lions across 41 sites, at an average of 66 encounters per year. For 2025-2030, we expect to survey 35 sites where sea lions have been encountered and expect there to be a maximum of 645 sea lion encounters (Table 4). We are requesting 645 sea lion takes during this LOA period, or 129 takes per year (Table 7).

From 2013-2024 we encountered 539 elephant seals across 14 sites, at an average of 49 encounters per year. For 2025-2030, we expect to survey nine sites where elephant seals have been encountered and expect there to be a maximum of 280 elephant seal encounters (Table 5). We are requesting 280 elephant seal takes during this LOA period, or 30 takes per year (Table 7).

In 2009, we encountered five Steller sea lions at Cape Arago, OR. For 2025-2030, we expect to survey Cape Arago five times and expect there to be a maximum of 25 Steller sea lion encounters (Table 6). We are requesting 25 Steller sea lion takes during this LOA period, or five takes per year (Table 7)

Table 3. Anticipated number of harbor seal encounters for 2020-2024.

Site	# Events (2013-2024)	Total Encounters (2013-2024)	Mean Encounters/ Event	Expected # Events (2025-2030)	Expected Maximum Encounters (2025-2030)
Andrew Molera	3	3	1.00	10	10
Big Creek	1	1	1.00	10	10
Boat House	5	19	3.80	10	38
Bob Creek	1	1	1.00	5	5
Bodega	21	223	10.62	5	53
Bolinas Point	1	5	5.00	1	5
Burnt Hill	4	24	6.00	5	30
Cape Arago	3	31	10.33	5	52
Cat Rock	1	2	2.00	0	0
Cayucos	10	41	4.10	5	21
Chimney Rock	1	1	1.00	5	5
Del Mar Landing	4	10	2.50	1	3
Enderts	2	2	1.00	5	5
False Klamath Cove	4	4	1.00	5	5
Fitzgerald	4	146	36.50	1	37
Fogarty Creek	14	175	12.50	5	63
Fort Ross	1	4	4.00	0	0
Franklin Point	5	23	4.60	5	23
Fraser Cove	2	4	2.00	1	2
Gerstle Cove	3	3	1.00	5	5
Government Point	18	320	17.78	25	444
Harmony Headlands	1	1	1.00	5	5
Harris Point	1	4	4.00	0	0
Hopkins	31	370	11.94	10	119
Horseshoe Cove	2	14	7.00	1	7
Kibesillah Hill	13	107	8.23	5	41
Launcher Beach	2	20	10.00	0	0
Lunada Bay	1	1	1.00	0	0
Mackerricher	2	3	1.50	0	0
Mal Coombs	1	5	5.00	0	0
Marker Poles	1	10	10.00	0	0
Middle West	1	2	2.00	1	2
Mill Creek	1	1	1.00	10	10
Occulto	10	33	3.30	5	17
Old Home	2	20	10.00	0	0

Otter Harbor	2	16	8.00	0	0
Partington Cove	2	3	1.50	5	8
Pebble Beach	13	189	14.54	5	73
Pescadero Point	2	2	1.00	5	5
Phillips Gulch	2	11	5.50	1	6
Piedras Blancas	2	6	3.00	5	15
Pigeon Point	1	1	1.00	5	5
Point Arena	7	116	16.57	5	83
Point Arena Field Station	1	33	33.00	1	33
Point Conception	1	27	27.00	1	27
Point Lobos	4	4	1.00	10	10
Point Pinos	11	56	5.09	10	51
Point Sierra Nevada	2	2	1.00	5	5
Punta Arena	1	36	36.00	0	0
Sandhill Bluff	4	4	1.00	10	10
Scott Creek	6	12	2.00	10	20
Sea Ranch	1	2	2.00	5	10
Sea Ridge	1	10	10.00	1	10
Shell Beach	3	3	1.00	5	5
Shelter Cove	11	33	3.00	5	15
Soberanes	5	8	1.60	5	8
Stewarts Point	1	5	5.00	0	0
Stillwater	11	80	7.27	10	73
Stornetta	11	32	2.91	5	15
Terrace Point	3	6	2.00	10	20
Treasure Island	2	8	4.00	1	4
Vista del Mar	4	47	11.75	5	59
Waddell	1	1	1.00	0	0
Willows	1	6	6.00	0	0
Total		2392			1583

Table 4. Anticipated number of California sea lion encounters for 2020-2024.

Site	# Events (2013-2024)	Total Encounters (2013-2024)	Mean Encounters/Event	Expected # Events (2025-2030)	Expected Maximum Encounters (2025-2030)
Alder Creek	1	1	1.00	0	0
Andrew Molera	1	1	1.00	10	10
Bird Rock	4	122	30.50	1	31
Bodega	4	11	2.75	5	14
Cape Arago	7	109	15.57	5	78
Cayucos	1	1	1.00	5	5
Crook Point	1	3	3.00	0	0
Cuyler Harbor	1	1	1.00	1	1
Del Mar Landing	2	13	6.50	1	7
Eel Point	2	3	1.50	2	3
Enderts	2	4	2.00	5	10
False Klamath Cove	3	7	2.33	5	12
Franklin Point	1	2	2.00	5	10
Fraser Cove	2	2	1.00	1	1
Gerstle Cove	1	1	1.00	5	5
Government Point	8	28	3.50	25	88
Kibesillah Hill	2	3	1.50	5	8
Marker Poles	1	200	200.00	0	0
Middle West	1	1	1.00	1	1
Old Stairs	2	3	1.50	1	2
Otter Harbor	2	26	13.00	0	0
Partington Cove	2	2	1.00	5	5
Piedras Blancas	2	55	27.50	5	138
Point Conception	1	1	1.00	1	1
Point Dume	1	4	4.00	0	0
Point Lobos	1	1	1.00	10	10
Point Pinos	2	2	1.00	5	5
Point Sierra Nevada	2	2	1.00	5	5
Punta Arena	1	1	1.00	0	0
Purisima	1	1	1.00	5	5
Sandhill Bluff	1	6	6.00	10	60
Scott Creek	1	1	1.00	10	10
Sea Lion Rookery	2	80	40.00	1	40
Sea Ranch	1	3	3.00	5	15
Shell Beach	1	1	1.00	5	5
Shelter Cove	4	6	1.50	5	8

Soberanes	2	5	2.50	5	13
Stairs	1	1	1.00	5	5
Stillwater	2	3	1.50	10	15
Stornetta	6	8	1.33	5	7
Terrace Point	3	5	1.67	10	17
Total		730			645

Table 5. Anticipated number of elephant seal encounters for 2020-2024.

Site	# Events (2013-2024)	Total Encounters (2013-2024)	Mean Encounters/ Event	Expected # Events (2025-2030)	Expected Maximum Encounters (2025-2030)
Ano Nuevo	1	5	5.00	5	25
Boat House	8	44	5.50	10	55
Chimney Rock	10	128	12.80	5	64
Coches Prietos	1	1	1.00	0	0
Crook Point	2	3	1.50	0	0
Cuyler Harbor	2	3	1.50	1	2
Government Point	2	6	3.00	25	75
Harmony Headlands	1	1	1.00	5	5
Marker Poles	1	200	200.00	0	0
Mill Creek	1	1	1.00	10	10
Otter Harbor	2	9	4.50	0	0
Piedras Blancas	11	86	7.82	5	39
Point Sierra Nevada	2	2	1.00	5	5
Tranquility Beach	1	50	50.00	0	0
Total		539			280

Table 6. Anticipated number of Steller sea lion encounters for 2020-2024.

Site	# Events	Total Encounters (2013-2024)	Mean Encounters/ Event	Expected # Events (2025-2030)	Expected Maximum Encounters (2025-2030)
Cape Arago	1	5	5.00	5	25
Total		5			25

Table 7. Number of takes being requested by species.

Species	Requested # of Takes (2025-2030)	Requested # of Takes/Year
Harbor seal (<i>Phoca vitulina richardii</i>)	1583	317
California sea lion (<i>Zalophus californianus</i>)	645	129
Northern elephant seal (<i>Mirounga angustirostris</i>)	280	56
Stellar sea lion (<i>Eumetopias jubatus</i>)	25	5

7. Anticipated Impact of the Activity on Affected Species

Pinnipeds would only be disturbed by the presence of researchers in the rocky intertidal or along access ways to research sites. All take will be Level B harassment involving disturbance, movement, and flushing of pinnipeds hauled out onshore or swimming just offshore. Pinnipeds haul out for several reasons including for rest, thermoregulation, predator avoidance, reproduction, and molting (Terhune and Brillant 1995). Efforts will be made to reduce the impact of disturbance on hauled out individuals as described in Section 11. These efforts including scanning the site for pinnipeds before approaching, approaching any site where marine mammals may be present with caution to avoid the stampeding of hauled out individuals towards the water, scanning the water for predators, avoiding the disturbance of pups and mother-pup pairs, and promptly vacating sites as soon as research activities are complete.

On occasion, hauled out pinnipeds may still be flushed to the water and may swim off or avoid the area while researchers are present. This type of disturbance will likely have only minimal short-term effects on the animals affected (Henry and Hammill 2001). No long-term effects on disturbed individuals are expected as they are likely to 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 nearby (Schneider and Payne 1983). In our experience, and based on our marine mammal observation data from 2013-2018, flushed pinnipeds often spend time in the water observing researchers and then haul out at a nearby location away from researchers and research activities. Those that are flushed during site access (i.e., pinnipeds hauled out adjacent to a research site), tend to haul out again in the same area once researchers have passed by.

The greatest impact of disturbance is to mother-pup pairs, as pups that are flushed may experience decreased growth or separation from the mother and mortality (Reijnders 1980). Our research activities do not take place at any major marine mammal rookeries, therefore very few breeding individuals or pups are likely to be impacted. Sites will be monitored prior to being accessed (as described in Section 11) to determine if pups are present and disturbance and flushing of pups and mother-pup pairs will always be avoided.

In addition to the presence of researchers, there is the potential that pinnipeds may be disturbed by research related noise including the use of power drills in the intertidal. Although the drill does produce noticeable noise, we have not 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.

Pinnipeds may also be disturbed by UAV surveys. UAVs can cause behavioral response in pinnipeds from both visual and acoustic detection. This response can range from alertness to flushing depending on factors such as UAV altitude, conditions such as ambient noise from swell and wind, and the pinniped’s level of habituation to disturbance (Christiansen et al. 2016, Perez et al. 2016). UAVs trigger a stronger response when hovering compared to when in motion (Perez et al. 2016). Our UAV flights typically occur at 10-30 meters altitude and are done autonomously (while under control of a licensed UAV pilot) to map the survey area and to achieve proper image overlap for photogrammetry processing. Flight speed is typically 1 to 2 meters/second. If pinnipeds are present during a UAV flight and a response is triggered by the UAV, the pilot will take control of the UAV and increase altitude before ending the flight to avoid flushing the animals.

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 8). As discussed above, pinnipeds that are flushed to the water (Level 3), tend to haul out once researchers have departed or at a nearby location. This type of disturbance is unlikely to affect behavior necessary for reproduction and survival. For these reasons, there is no anticipated long-term impact on affected marine mammal stocks.

Table 8. Percentage of population affected by level B harassment incidental to rocky intertidal research activities. *Abundance of both California and Oregon/Washington stocks combined, (based on unofficial, out of date Oregon/Washington abundance estimate).

Species	Abundance (Carretta et al. 2023, Young et al. 2023)	Requested # of takes/year	Percentage of Population Affected
Harbor seal (<i>Phoca vitulina richardii</i>)	55,700*	317	0.57
California sea lion (<i>Zalophus californianus</i>)	257,606	129	0.05
Northern elephant seal (<i>Mirounga angustirostris</i>)	187,386	56	0.03
Steller sea lion (<i>Eumetopias jubatus</i>)	43,201	5	0.01

8. Anticipated Impact of the Activity on 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 on Habitat

Our research activities take place in the rocky intertidal zone, 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. The installation of bolts and other sampling equipment is conducted under the appropriate permits (National Marine Sanctuary, California State Parks). Once a particular study has ended, the respective sampling equipment is removed, although bolts for permanent plots remain in place. We have not observed any impact to pinnipeds, nor any change in the distribution or abundance of pinnipeds due to the presence of bolts/sampling equipment. No trash or field gear is left at a site once researchers depart.

10. Anticipated Impact of the Loss or Modification of Habitat on Marine Mammals

There is no anticipated impact of the loss or modification of marine mammal habitat because there are minimal effects on habitat (see Section 9).

11. Mitigation Measures

Our research group, in collaboration with MARINe, has been conducting rocky intertidal research for over 25 years and during this time very few sites have not been accessible due to the presence of pinnipeds. But, 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.

In order to reduce the impact of research activities on affected marine mammal species and stocks, researchers will continue to abide by the following mitigation measures. When possible, researchers will observe a site for 5 minutes from a distance to detect any marine mammals prior to approaching the site (using binoculars to detect pinnipeds before close approach to avoid being seen by animals, where possible). Researchers will arrive before low tide, which will encourage pinnipeds to move to other areas for the day before they haul out and settle onto rocks at low tide. 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 a safe distance from any marine mammal while conducting research, unless it is absolutely necessary to approach 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 approach hauled out pinnipeds if they are hauled out within plots or sampling areas. Researchers will observe offshore waters for predators prior to approaching any marine mammal and approaching will be avoided if predators are observed. In addition, intentional approach that may result in flushing will be avoided if pups are present and we will continue to not disturb nursing pups and mother-

pup pairs. Researchers will stay inshore of pinnipeds whenever possible to allow maximum escape to the ocean. Researchers will promptly vacate a site at the conclusion of sampling.

12. Mitigation Measure 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. Monitoring and Reporting

Species and numbers, by age and sex when possible, of any marine mammals subjected to incidental harassment, along with the location, date, and time of the event, will be recorded and reported annually to NMFS. 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. For consistency, interactions with pinnipeds will be recorded according to a four-point scale (Table)

Table 9. Levels of pinniped disturbance response recorded during monitoring.

Disturbance Level	Type of Response	Description
0	Observation	Observation by researchers from a distance; no disturbance to pinniped
1	Alert	Head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length.
2	Movement	Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees.
3	Flush	All retreats (flushes) to the water.

Level 2 and 3 interactions are considered Take. Level 0 through Level 3 are considered an "encounter".

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 an annual monitoring report for NMFS.

Note that for monitoring for previous IHAs (2013-2018), which forms the basis for our expected take under this authorization, interactions were defined as:

- 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

All levels are considered an “encounter”. Level 2 and 3 are considered Take. Although the scale definitions for previous years differ slightly from those that will be used under this authorization, we do not anticipate a significant change to our expected take. If anything, expected take may decrease as the previous definition of Level 2 Take is more conservative and includes movements of one meter as take, which, in most cases, would be considered Level 1 (non-take) under the new scale.

14. Means of Coordinating Activities to Reduce Incidental Taking

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 to sample 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, Farallon 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



Figure 1. Long-term monitoring photoplot quadrats at Enderts, CA.



Figure 2. Biodiversity survey transects at Cambria, CA.

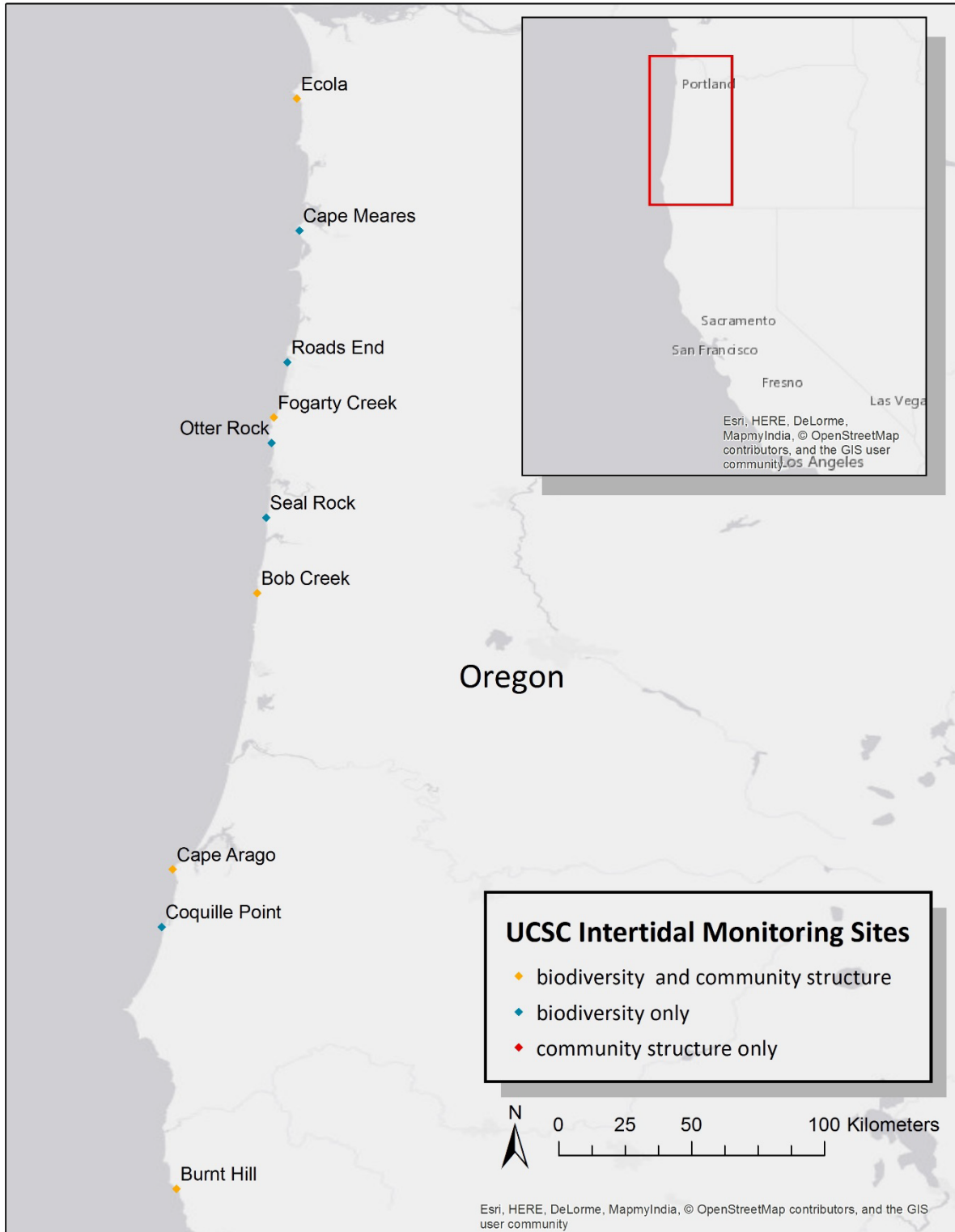


Figure 3. UCSC intertidal monitoring sites in Oregon.

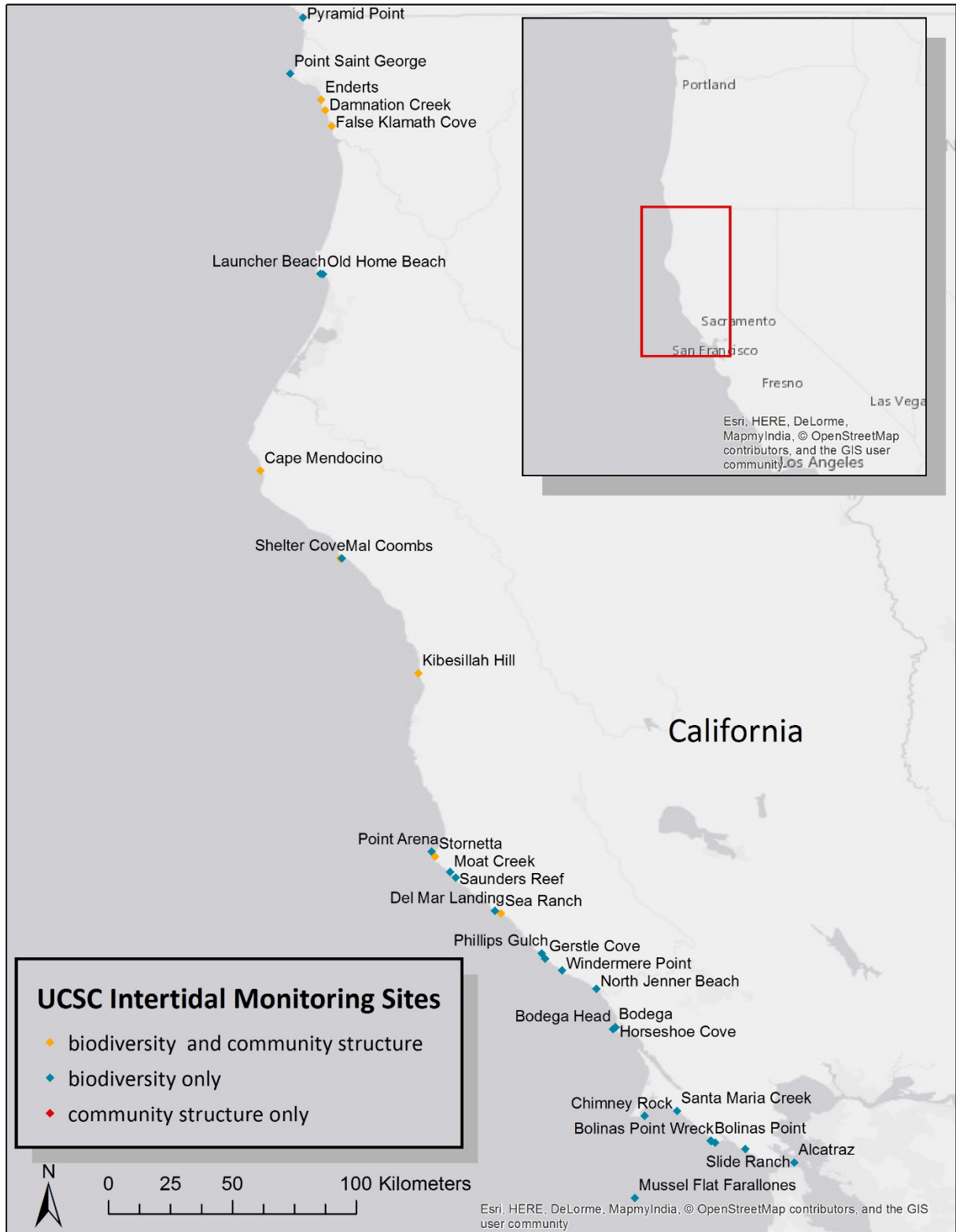


Figure 4. UCSC intertidal monitoring sites in Northern California (Oregon border to San Francisco Bay).

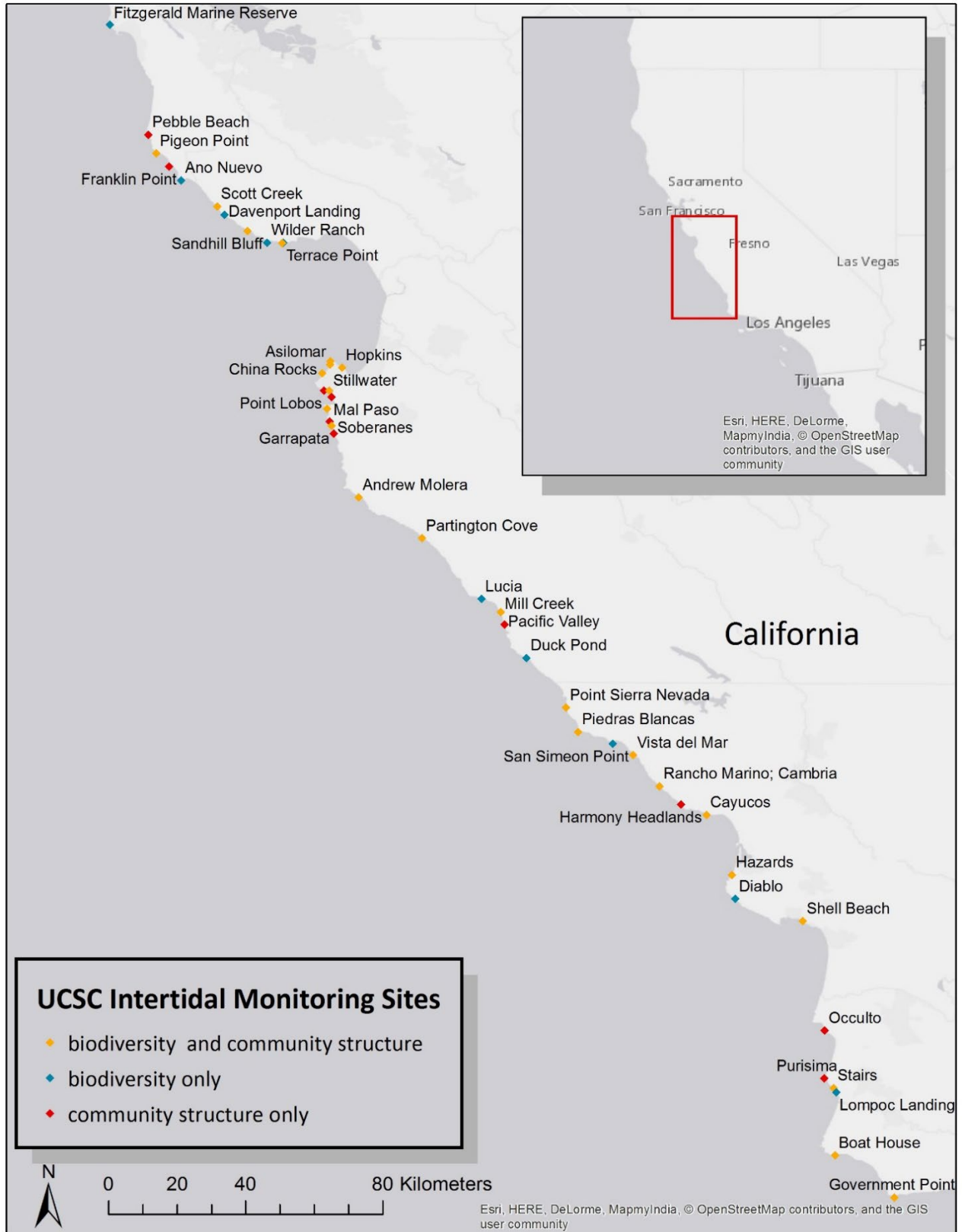


Figure 5. UCSC intertidal monitoring sites in Central California (San Francisco to Point Conception).



Figure 6. UCSC intertidal monitoring sites in Southern California (Point Conception to Mexico border including the Channel Islands).