MPA Baseline Program

Annual Progress Report

Principal Investigators - please use this form to submit your MPA Baseline Program project annual report, including an update on activities completed over the past year and those planned for the upcoming year. This information will be used by the MPA Baseline Program Management Team to track the progress of individual projects, and will be provided to all MPA Baseline Program PIs and co-PIs prior to the Annual PIs workshop to facilitate discussion of project integration. Please submit this form to California Sea Grant when complete (sgreport@ucsd.edu, Subject [Award Number, project number, PI, "Annual Report"].)

Project Information

Project Year	Year 1; 2/1/2014—1/31/2015	**MLPA Region**	North Coast
Project Title & Number	The Ecological State of Northern California's Sandy Beaches and Surf Zones: A Baseline Characterization for MPA Assessment		

PI name	Karina J Nielsen	**Co-PI name**	Tim Mulligan

PI Contact Info **Co- PI Contact Info**

(please list additional PIs and contact info in the "Project Personnel" section if necessary)

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Project Goals & Objectives

The goal of this project is to provide a comprehensive, regional characterization of sandy beach and surf zone ecosystems in northern California. This will serve as a baseline of regional ecosystem state at the time of MPA implementation and allow for interpretation of changes in key metrics over time that may be associated with the MPA status of beaches and/or linked ecosystems, or environmental changes in the future. We will collect data on a variety of quantitative and qualitative metrics (see below) to describe these sandy beach and surf zone ecosystem features both inside and outside of MPAs. The metrics we have chosen to focus on describe the abundance and diversity of macroinvertebrates, fishes and birds that use or inhabit sandy beaches and their adjacent surf zones, characterization of physical and biological elements of the ecosystem, and the consumptive and non-consumptive activities of people on the beaches and in the surf zone. We will analyze and interpret the data we collect with reference to known trophic relationships and ecosystem processes for these ecosystems, as well as more recent understandings gained by members of this team in the process of leading baseline monitoring efforts in California's North-Central and South Coast MPA regions. To the extent possible, we will incorporate any historic data that may be available to interpret how these ecosystems have changed over time prior to MPA implementation in 2012. However, to our knowledge, this will be the first comprehensive and synthetic ecological study of sandy beach ecosystems in northern California. Our specific project objectives include the following:

1. Quantify the diversity and abundance (biomass and numerical) of macroinvertebrates in sandy beach ecosystems for a regional, baseline characterization at the point of implementation of new MPAs in the region.
2. Survey the seasonal abundance and diversity of birds that forage on sandy beaches and in adjacent surf zones in northern California, including shorebirds, seabirds and terrestrial birds.
3. Quantitatively describe the seasonal deposition, abundance and composition of macrophyte wrack cast onto northern California's beaches from adjacent intertidal, subtidal and wetland ecosystems that provide food and habitat for a variety of sandy beach organisms.
5. Produce a quantitative baseline characterization of the ecologically and culturally important surf zone fishes: surfperch (especially redtail surfperch and calico surfperch) and night smelt including data on their abundance, size structure, sex ratios, feeding habits and movement patterns.
6. Conduct targeted sampling of sand crabs, *Emerita analoga*, in conjunction with surfperch sampling to assess spatial and temporal correlations and investigate trophic connectivity.
7. Collect quantitative and qualitative observational data on human activities (including consumptive and non-consumptive activities) in sandy beach ecosystems of the region through monthly surveys.
8. Describe the dynamic physical characteristics of regional sandy beaches and adjacent surf zones in the region over an annual cycle.
9. Collaborate with local tribal communities in monitoring activities to help build scientific monitoring capacity within their communities and support development of long-term monitoring and co-management strategies for regional marine resources.
10. Engage local fishing communities in the MPA baseline survey, thus providing a foundation for long-term monitoring of North Coast MPAs using collaborative fisheries research techniques and fostering community support for MPA related management.
11. Continue to develop and strengthen collaborative working relationships among fishermen, academic researchers, and state agencies (via workshops, reports, publications) in order to conduct effective fisheries research and management along the North Coast.
12. Complete a synthetic analysis of the key ecosystem metrics that describe the trophic and habitat relationships among species, as well as seasonal dynamics, and their relationship, if any, to human activities or MPA status during the time frame of the project.

Summary of Project Activities Completed to Date

Overview of Project Year _1_ Activities, including progress towards meeting goals & objectives

In the first year of this project we have made excellent progress toward meeting our goals and completing specific objectives. PI Nielsen led the sandy beach monitoring team in collaboration with co-PIs Dugan and Craig and research associate Hubbard to sample 12 beaches while PI Mulligan led the surfzone fishing and night smelt sampling team on eight of these beaches, excluding the pocket beaches. PI Laucci joined both teams on the two northernmost beaches included in our study.

PIs Nielsen, Dugan, Craig and Laucci conducted comprehensive macroinvertebrate biodiversity surveys at 12 beaches over July and August of 2014 with the help of graduate and undergraduate research assistants, and members of the Smith River Rancheria on the two northernmost beaches. Sample sorting, processing and quantification from the biodiversity samples were initiated in June and are still in progress in co-PI Nielsen and Dugan's labs. Laboratory processing of the sticky trap and insect net samples are in progress in Dugan's lab. Data entry and QA/QC for the results of the laboratory sample processing is in progress in both the Nielsen and Dugan labs. We initiated surveys of macrophyte wrack, beach profile, birds, people and dogs in September 2014 with graduate students and research technicians from the labs of co-PI Nielsen and Craig and from Smith River Rancheria with co-PI Laucci. The monthly surveys will continue through Spring 2015. All data are entered into spreadsheet templates stored on google docs. Data from paper field survey forms are entered immediately after each field survey and then archived in the Nielsen lab each month. No formal data analysis of the sandy beach data sets has been done yet as most are still incomplete, however we present a preliminary summary on birds observed to date in Tables 1-4.

During Year I, a total of 305 redtail surfperch were sampled from MPA and paired reference sites by PI Mulligan's team (Table 5). Catches ranged from a high of 96, at the Kellogg Beach reference site, to a low of seven, at the Gold Bluffs Beach, reference site. Average surfperch size ranged from a high of 290 mm (TL) at the Pyramid Point SMCA to a low of 250 mm (TL) at the Mad River Beach reference site. Surfperch sex ratios (M:F) ranged from 1:1 at the Pyramid Point SMCA and the Gold Bluffs Beach reference site, to 1:2 at the Mad River Beach reference site. Three perch tag returns were reported, each from its initial tagging site; one from the Kellogg Beach reference site and two from the Samoa SMCA. Members of the California Commercial Beach Fisherman's Association (CCBFA) made monthly sampling trips to 2 MPAs (Reading Rock SMCA, Samoa SMCA) and 3 reference sites (Kellogg Beach, Gold Bluffs Beach, Mad River Beach) during the months of March-August. Relative abundance of the spawning population of night smelt was measured using the Walker Scale (http://grunion.pepperdine.edu/sighting.asp) and fish samples were collected for size composition and sex ratio characterization. Spawning aggregations of night smelt were observed during 19 of the 30 sampling trips and on all beaches visited except Mad River Beach. Walker Scale values ranged between 0 and 5, with level 5 spawning events documented on Kellogg Beach, Gold Bluff Beach, and within the Samoa SMCA.

Smith River Rancheria (SRR) collaborators worked alongside with the teams from PI Nielsen, Dugan and Mulligan's labs. Co-PI Laucci, together with research assistant Jaytuk Steinruck have been taught all protocols and procedures and have fully participated in all field work. They helped complete macroinvertebrate biodiversity sampling at Pyramid Point and Kellogg Beach in August 2014, and have completed each monthly survey of birds, wrack, etc. at these two beaches, beginning in September 2014. Additionally they completed four successful surf perch fishing expeditions with HSU faculty and students, CDFW representative and Tolowa and Yurok Tribal Member volunteers at Pyramid Point and Kellogg Beach.

Table 1. Total birds identified during 1km surveys. Surveys were conducted monthly at MPA and reference sites during low tides.

Site	Site Code	September (# ind.)	October (# ind.)	November (# ind.)	December (# ind.)	January (# ind.)	Total (# ind.)
MacKerricher SMCA	McK SMCA	118	648	146	155	450	1507
Ten Mile Dunes Beach	TMD	19	403	541	137	136	1236
Pyramid Point SMCA	PP SMCA	37	119	131	140	9	436
Kellogg Beach	KB	62	274	82	33	11	462
Reading Rock SMCA	RR SMCA	1798	169	276	29	43	2315
Gold Bluffs Beach	GBB	528	45	37	13	72	695
Samoa SMCA	Sam SMCA	40	315	119	119	267	860
Mad River Beach	MRB	489	185	279	136	757	1846
Total		**3091**	**2158**	**1611**	**762**	**1745**	**9367**

Table 2. Total birds identified during surveys of pocket beaches (<1km). Surveys were conducted monthly at MPA and reference sites during low tides.

Site	September (# ind.)	October (# ind.)	November (# ind.)	December (# ind.)	January (# ind.)	Total (# ind.)
Jughandle SNR	5	1	1	3	3	13
Caspar Headlands SB	8	31	34	20	21	114
Russian Gulch SMCA	5	1	3	4	1	14
Van Damme SMCA	64	244	165	101	153	727
Total	**82**	**277**	**203**	**128**	**178**	**868**

Table 3. Species of birds identified during 1km surveys. Surveys were conducted monthly at MPA and reference sites during low tides (see Table 1 for site codes). *Unidentified gulls were not added to the count of total number of species for each site.

Bird Species	McK SMCA	TMD	PP SMCA	KB	RR SMCA	GBB	Sam SMCA	MRB	Total (# ind.)
American Coot	2	-	-	-	-	-	-	-	2
American Crow	10	18	2	-	-	-	-	1	3
Black Phoebe	2	1	-	-	1	-	-	-	1
Black Turnstone	54	4	-	-	-	-	-	-	58
Black-bellied Plover	82	78	-	-	-	-	-	-	160
Bonaparte's Gull	16	1	-	-	-	-	-	-	17
Brandt's Cormorant	3	-	3	29	72	1	-	1	106
Brown Pelican	-	-	38	77	36	100	12	23	286
Bufflehead	17	-	-	-	-	-	-	-	17
California Gull	33	1	6	6	71	2	4	4	93
Canada Goose	30	-	-	-	-	-	-	-	30
Cliff Swallow	-	-	-	-	-	-	-	1	1
Common Loon	-	-	-	3	-	-	-	1	4
Common Raven	2	9	-	-	-	23	-	9	32
Double-crested Cormorant	2	-	-	2	-	-	-	-	2
Dowitcher	72	-	-	-	-	-	-	-	72
Dunlin	-	36	-	-	-	-	-	-	36
Eared grebe	4	-	-	-	-	-	-	-	4
Great Egret	1	14	-	-	-	-	-	-	15
Harlequin Duck	13	-	-	-	-	-	-	-	13
Heerman's Gull	1	80	8	2	10	3	1	-	24
Killdeer	17	8	-	-	-	-	-	-	25
Least Sandpiper	2	-	-	71	-	-	130	1	202
Marbled Godwit	1	-	-	-	4	-	37	130	167
Mew Gull	2	8	60	6	22	15	8	26	137
Osprey	-	-	-	-	-	-	1	8	9
Oystercatcher	13	-	13	-	-	-	-	-	13
Pelagic Cormorant	7	-	-	7	10	-	-	-	17
Pigeon Guillemot	-	-	-	-	5	-	-	-	5
Ring-Billed Gull	2	7	-	-	1	-	-	-	1
Sanderling	629	380	-	-	-	-	-	-	1006
Western Snowy Plover	-	149	-	-	-	-	-	1	1
Surf Scoter	19	67	14	2	1575	469	43	193	2296
Surfbird	18	-	-	-	-	-	-	-	18
Turkey Vulture	3	2	-	2	-	-	-	2	4
Unidentified Gull	188	234	158	142	229	55	371	510	1466
Western Grebe	-	-	-	-	3	-	2	2	7
Western Gull	256	28	28	92	276	23	9	108	536
Western Sandpiper	6	111	106	21	-	2	242	825	1196
Willet	3	-	-	-	-	-	-	-	3
Total	1507	1236	436	462	2315	695	860	1846	**8085**
Total # Species*	31	19	10	13	13	9	11	17	

Table 4. Species of birds identified during surveys of pocket beaches (<1km). Surveys were conducted monthly at MPA and reference sites during low tides. *Unidentified gulls were not added to the count of total number of species for each site.

Bird Species	Caspar Headlands SB	Jughandle SNR	Russian Gulch SMCA	Van Damme SMCA	Total (# ind.)
American Coot	3	-	-	1	4
American Crow	-	1	-	1	2
Belted Kingfisher	3	-	-	-	3
Black Phoebe	1	2	2	2	7
Black Turnstone	6	-	-	29	35
Brandt's Cormorant	3	-	2	9	14
Brown Pelican	-	-	2	7	9
Bufflehead	1	-	-	1	2
California Gull	-	-	-	15	15
Common Loon	2	-	-	3	5
Double-crested Cormorant	1	-	-	7	8
Eared grebe	4	-	1	10	15
Goldeneye	-	-	-	3	3
Great Blue Heron	-	-	-	1	1
Great Egret	-	-	-	2	2
Heerman's Gull	1	-	-	2	3
Killdeer	14	-	-	-	14
Least Sandpiper	18	-	-	-	18
Mallard	8	-	-	-	8
Mew Gull	-	-	-	14	14
Osprey	-	-	1	-	1
Oystercatcher	-	1	-	12	13
Pelagic Cormorant	1	-	-	18	19
Red-breasted Merganser	1	-	-	5	6
Ring-Billed Gull	-	-	-	11	11
Snowy Egret	1	-	-	-	1
Surf Scoter	1	-	-	3	4
Surfbird	1	-	-	21	22
Turkey Vulture	-	1	1	24	26
Unidentified Gull	22	3	-	268	293
Western Grebe	13	-	-	34	47
Western Gull	9	5	5	224	243
Total	114	13	14	727	**868**
Total # Species*	20	5	7	25	

Table 5. Abundances, sizes and sex ratios of redtail surfperch caught at MPAs and paired reference sites during Year 1, North Coast MPA Baseline Program: Sandy Beach Project. Each reference site is listed immediately below the corresponding MPA site. *See section on "Description of any unforeseen events…."

Site	Total Caught	Size Range TL (mm)	Average Size TL (mm)	Sex Ratio (M:F)
Pyramid Point SMCA	49	208-408	290	1:1
Kellogg Beach	96	173-379	280	1: 1.5
Reading Rock SMCA	39	162-342	277	1: 1.5
Gold Bluffs Beach	7	240-335	278	1:1
Samoa SMCA	85	170-450	251	1.2 :1
Mad River Beach	29	130-351	250	1:2
MacKerricher SMCA*				
Ten Mile Beach South *				
Total	305	130-450	-	-

Highlights from project progress so far, such as successes achieved, new collaborations or partnerships, or interesting stories from the past year that may be suitable for a blog post or other media venue

A major highlight of our project is the unprecedented collaboration reflected not only in the organizational affiliations of the PIs, but also in the community collaborations we're building. For example, a major part of our first year was the cross-training we did to build capacity in natural history and sampling methods for monitoring sandy beaches among the participating institutions including Humboldt State University (HSU) PI Sean Craig and his students and Smith River Rancheria (SRR) personnel, including PI Rosa Laucci and between these two institutional teams as well. Scientific capacity and training in the field of beach ecology is, surprisingly, extremely limited not only in the US, but also in California. SRR and HSU are collaborating to execute our monthly beach monitoring of birds, wrack, people and physical characteristics in Humboldt and Del Norte Counties, collaborated with the teams led by PIs Nielsen and Dugan in the biodiversity sampling of 12 beaches and the surfzone fish sampling led by PI Mulligan during summer 2014. In the 2015 sampling season SRR will be responsible for all surfperch and night smelt sampling to be done at the Pyramid Point SMCA and its paired Kellogg Beach reference site. Another highlight of our project is the unprecedented collaboration among the Commercial Beach Fisherman's Association (CCBFA), CDFW staff, tribal representatives, university scientists, private scientists, and citizen volunteers in sampling of night smelt. Through our first year efforts we also developed new techniques/approaches to improve data collection in the 2015 sampling season.

One of the most striking observations across almost all the beaches we sampled this summer was what appeared to be an unusually strong recruitment event of juvenile sand crabs, *Emerita analoga,* throughout California. This was especially striking to see on north coast beaches where sand crab settlement is known to be more patchy and episodic than in central and southern California. The most abundant organisms by weight on the California beaches that have been previously sampled are sand crabs. They are a critically important trophic resource for shorebirds that feed on sandy beaches.

We identified the most productive surfperch and night smelt fishing areas along 10s of miles of sandy beaches in Humboldt and Del Norte Counties. For example, on Kellogg Beach one team reported catching 75 fish in one day (a record for the study).

Our initial analysis of surfperch gut contents has yielded new insights into their diet. Surfperch may be opportunistic foragers; in areas where rocky outcrops are common (i.e. Pyramid Point SMCA and Kellogg Beach) they appear to feed preferentially on barnacles, while over strictly sandy beaches (i.e. Samoa SMCA and Mad River Beach) they appear to feed predominantly on sand crabs and other epifauna.

During the fall 2014 beach surveys, the HSU team observed several Western Grebes being rolled around in the waves, resting on the beach (which is unusual behavior for them, usually they prefer to stay in the water because they are not agile on land), and generally appearing thin and exhausted on several different occasions, but only one carcass was seen. Another biologist who works for a marine seabird monitoring project as well as Sea Grant in Eureka, CA confirmed that she has also seen Western Grebes displaying this odd behavior.

In Humboldt and Del Norte counties, the beaches with the busiest human and dog traffic are the two Crescent City beaches, Clifford Kamph and Kellogg. We have noticed a lot of vehicle traffic on the beach at Kellogg in particular.

Reading Rock SMCA has undergone much change in physical characteristics throughout Year I due to the overflow of a river that empties into the ocean just outside the sampling area.

The wrack on Samoa SMCA and Mad River Beach has been dominated by eelgrass *(Zostera*) and sand crabs (*Emerita analoga*) molts.

Description of any unforeseen events and substantial challenges, and resulting effects on project activities and progress. Please indicate any issues that may affect other PI's or require coordination with other Baseline partners (e.g., ME, DFG, Sea Grant).

Unusually rough sea conditions, especially during May and June 2014, and coordinating with CDFW personnel necessitated extending our sampling period into September for the Reading Rock SMCA/Gold Bluffs Beach and Samoa SMCA/Mad River Beach sites; these same factors, plus a severe knee injury to PI, Rosa Laucci ,which necessitated extending the training period of Smith River Rancheria personnel, extended our sampling period for the Pyramid Point SMCA/Kellogg Beach sites into October.

Two sampling trips to the MacKerricher SMCA/Ten Mile Beach South sites proved to be unfishable due to great quantities of drift macroalgae dominating the surfzones. For 2015 these sites will be dropped from the sampling schedule and be replaced by the adjacent Ten Mile SMR/Ten Mile Beach SMCA sites with Inglenook Beach serving as a reference site.

Adverse weather conditions made bird and physical parameter surveys difficult in December at Pyramid Point SMCA and Kellogg Beach.

PI Nielsen accepted the Director's position at the Romberg Tiburon Center for Environmental Studies, San Francisco State University moving her lab from Sonoma State University, after the biodiversity sampling was completed. The move delayed the start of sorting and IDing the specimens, but analysis is currently underway and monthly field surveys in Mendocino Co. proceeded as planned.

We had hoped to recruit one to two tribal interns through the Intertribal Sinkyone Wilderness Council (ISWC) to work on the project with us. We worked with the ISWC to distribute information on paid internship opportunities for tribal community members. Disappointingly, we were unsuccessful in that effort and did not receive any applications or inquiries.

Data status (i.e., paper/raw format or digitized; if digitized, what format?)

Data from the sandy beach biodiversity sampling effort during summer 2014 was collected on paper data forms in the field, and as biological and physical samples. All field data collected on paper forms were initially scanned for archiving and subsequently entered into excel spreadsheets. The biological and physical samples were preserved immediately after collection, and are stored and being processed in either the Nielsen or Dugan laboratories. As samples are processed the data are initially entered onto paper forms and then promptly entered into excel spreadsheets.

Data from monthly beach surveys of birds, wrack, people and physical characteristics are likewise collected on paper forms that are scanned, archived and promptly entered into a shared google drive spreadsheets. These google spreadsheets are downloaded regularly by the Nielsen lab and archived as excel spreadsheets.

All field collection data for surfperch and night smelt have been entered in excel spreadsheets and summarized in tables. Surfperch gut content data is currently being collected/processed and remains in raw (paper) format. Relative abundance of night smelt spawning populations has been tabulated using the Walker Scale http://grunion.pepperdine.edu/sighting.asp). Night smelt samples collected for size composition and sex ratio characterization are currently being processed and remain in raw (paper) format.

Activities Planned for following Project Year __ (if applicable) – *Please describe remaining work and approximate timelines for completing that work, including any anticipated budget variances necessary to complete the project.*

PIs Dugan and Nielsen and their research teams are on track to complete analyses of the biodiversity samples from summer 2015 during year two of the project. Monthly beach surveys of birds, wrack, people and physical characteristics are proceeding as planned under supervision of PIs Nielsen, Craig and Laucci and is on track to be completed in summer 2015.

For Year II (1 February 2015-31 January 2016) monthly surfperch and night smelt sampling led by PIs Mulligan and Laucci, in MPAs and reference sites, will be conducted May – July (weather dependent). Surfperch gut studies and night smelt size composition and sex ratio data will be processed/analyzed, August 2015 - 31 January 2016. Surfperch gut contents will be identified to the lowest possible taxon by Dr. Helen Mulligan, HSU. Special attention will be given to sand crabs (*Emerita analoga*), another focal taxon in this study. Basic calculations will be used to compute an Index of Relative Importance (IRI) for each food class for each size/seasonal grouping of fish. Monthly sampling at the Samoa SMCA and at two adjacent reference sites will examine redtail surfperch and sand crab trophic links, over an annual scale, beginning in late February/early March. This will serve as an M.S. thesis for Ms. Michelle Succow (see below). Surfperch dissections will also include the removal of otoliths, fin clips, and scales and opening the body cavity to weigh mesenteric fat, the gut, the liver, and the gonads. If embryos are present they will be removed in order to record their length, weight, and to remove otoliths. This portion of the study will be completed by Ms. Katherine Crane, CDFW. To improve access and to increase surfperch sampling success at the Reading Rock SMCA and Gold Bluffs Beach sites, beach driving permits will be requested from Redwood National and State Parks.

Under the supervision of PIs Craig and Mulligan, HSU graduate student Michelle Succow will start monthly sampling at the Samoa SMCA and at two adjacent reference sites to examine redtail surfperch and mole crab trophic links, over an annual scale, beginning in late February/early March 2015. This project will also serve as the basis of an M.S. thesis research project for Michelle Succow. In conjunction with the thesis work of Michelle Succow, PI Craig and his lab group will conduct further surveys of mole crab abundance at local MPA beaches (and control sites) during summer of 2015.

To improve access and to increase surfperch sampling success at the Reading Rock SMCA and Gold Bluffs Beach sites, beach driving permits will be requested from Redwood National and State Parks for Year II. Motorists are currently allowed on all of the beaches that we sample in the northern bioregion and were used for the surfperch sampling on Mad River Beach, Samoa SMCA, Kellogg Beach, and Pyramid Point SMCA during the 2014 field season. All of our 2014 night smelt data was collected by commercial fisherman also using vehicles on beaches, including Reading Rock SMCA and Gold Bluff Beach. The patchy distribution of our target species', limited access points, and length of beaches that we sample necessitate the use of vehicles for adequate data collection. We tried to sample surfperch on Gold Bluff Beach and Reading Rock SMCA on foot in 2014 and these two beaches yielded uncharacteristically low catches. This was unexpected as nearly the entire commercial fishery for redtail surfperch takes place on Gold Bluff Beach. We believe our limited access to the beach by foot is limiting our ability to adequately sample the beach. This year we will be doing all of the night smelt sampling ourselves and need to continue with the standardized sampling protocol used by the commercial fisherman in 2014.

While we recognize the potentially negative impacts of driving on beaches, we highlight the care taken to reduce our impacts below and the substantial gain in knowledge resulting from this project about an understudied region of California's coast. Our project represents the only in situ night smelt data collection effort in history and the most comprehensive northern California surfperch survey to date. Our data will help to fill a significant void in knowledge while contributing very little negative ecological impact in addition to the driving done by the existing commercial fisheries that take place on these beaches. For example, Redwood National and State Park permits contain stipulations that lighten the potentially negative impacts of beach driving: 1) Permitted vehicle access is limited to the wave slope, which is defined as the area that has been wet by the previous high tide but does not include any vegetated areas, 2) The maximum speed limit on the beach is 10 mph and is reduced to 5 mph when snowy plovers are present, and 3) Vehicle access is temporarily closed when snowy plovers are determined to be breeding. The lead project staff member who will be responsible for driving on these beaches for the fishing surveys has completed a US Fish and Wildlife approved training course on western snowy plovers that was specifically designed for qualified commercial fisherman that operate motor vehicles on beaches. The training emphasized threats posed by vehicle traffic in snowy plover habitat and driving techniques that minimize potential impacts.

Project Personnel – *Please indicate additional project personnel involved in your MPA baseline project, including students and volunteers, or additional PI contact information if necessary, as well as the nature of their assistance in the project project.*

	Students Supported	*Student Volunteers*	*Nature of Assistance*
K-12			
Undergraduate	*8*	*9*	*Field sampling & lab sorting*
Masters	*7*	*3*	*Field sampling & lab sorting*
PhD	*1*		*Field sampling, sample processing &identification*

Number of other Volunteers not counted above and the nature of their assistance in the project:

Two members of the Smith River Rancheria assisted in surfperch fishing and one helped with biodiversity sampling and monthly bird and wrack beach surveys (including PI Laucci's assistant, Kaytuck Steinruck)

At one surf perch fishing expedition on Kellogg Beach, two additional tribal volunteers, from the Tolowa and Yurok Tribes, helped with the fishing effort. PI Laucci was unable to participate due to her recovery from knee surgery.

Additional PI contact info not listed on first page:

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Rosa Laucci, 140 Rowdy Creek Road, Smith River, CA 95567; rosa.laucci@tolowa.com; 707-951-3712

Sean Craig, Humboldt State University, Department of Biological Sciences, 1 Harpst St., Arcata, CA 95521; sfc4@humboldt.edu; (707) 826-3245

Cooperating Organizations and Individuals - *Please list organizations or individuals (e.g., federal or state agencies, fishermen, etc.) that provided financial, technical or other assistance to your project since its inception, including a description of the nature of their assistance.*

Name of Organization or Individual	*Sector (City, County, Fed, private, etc.)*	*Nature of cooperation (If financial, provide dollar amount.)*
California Commercial Beach Fisherman's Association	*Commercial Night Smelt Fishing*	*Night smelt field sampling, Year 1*
California Department of Fish and Wildlife	*CA State*	*Night smelt laboratory processing, data analysis and storage (Year 1 size distribution and sex ratio data); Field sampling assistance*
HT Harvey and Associates	*Private Consultants*	*Night smelt Laboratory processing, data analysis and storage (Year 1 size distribution and sex ratio data); Field sampling assistance*

Project Outputs and Materials: *Please provide any other project-relevant information, such as descriptions of attached materials, media coverage your project has received, presentations, publications, images etc.*

Photos and two short videos of swash surfing olive snails from the field sampling efforts at North Coast beach study sites are available at the following dropbox link: https://www.dropbox.com/sh/vgro4wfit9cs9re/AACEWbpbm4e-f8ndP20kyPpPa?dl=0

Our project was featured in the Romberg Tiburon Center's fall 2014 *bayside* newsletter and distributed via email and in hard copy. Pdf version is available at this link: http://rtc.sfsu.edu/about/documents/RTC_bayside_fall_2014_web_F.pdf

Media coverage of this MPA research is in progress at Humboldt State University, where a new issue (spring 2015) of the alumni magazine "Humboldt" is being developed, covering the activities of the students involved in this research.