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; 1 Feb. 2014 – 31 Jan. 2015	**MLPA Region** North Coast
Project Title & Number Baseline Characterization of Nearshore Fish Communities Associated with Rocky Reef Habitats in the Northern California MPA Study Region	
PI name Tim Mulligan	**Co-PI name** Dave Hankin

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

We will conduct collaborative fisheries research by partnering with charter boat fishing captains and volunteer anglers to characterize the baseline status of nearshore rocky reef fish assemblages in Marine Protected Areas (MPAs) and reference sites, in the North Coast study region. This quantitative baseline data will describe the diversity, abundance, size structure, and movement patterns of rocky reef fishes found inside and outside of MPAs along the >250 mile North Coast.   Its completion will provide a benchmark for the evaluation of MPA performance. This project will geographically expand on our existing 2-year (2010-2011) dataset (Barrett et. al. 2012), funded by the Resource Legacy Fund Foundation (RLFF), on nearshore reef fishes to create a 4-year dataset surrounding the time of MPA implementation in the North Coast Region. Our sampling methods will produce data comparable to that of reef fish monitoring done on California's Central Coast MPAs and marine reserves in Oregon, and will allow for direct comparisons to be made. Unlike our previous project, fish caught during this study will be tagged, providing data on site fidelity and movement patterns of fishes across MPA boundaries.

We will analyze results from this work using many of the same statistical methods employed in our RLFF work as well as those used by the California Collaborative Fisheries Research Project (CCFRP). We will estimate abundance of species at each site both via catch-per-unit-effort (CPUE) and through mark/recapture analysis of tagged fish. The abundance and size of fish, as well as species richness, evenness, and diversity (Shannon Diversity Index) will be compared among paired MPA/reference sites and sites stratified by distance from port. Non-metric multidimensional scaling (NMDS) analysis will be used to examine patterns of species abundance and size among sites and how this varies temporally and spatially (including among MPA/reference site pairs and with distance from port). Recaptured tagged fish will also allow an analysis of current fish movement patterns (into, out of, and within MPAs and reference sites).

 In addition we will use high resolution multi-beam sonar imagery available from the California Seafloor Mapping Program to relate fish abundances and densities to distance from fishing port, size of reef, and proximity to other reefs. By engaging local fishing communities in collaborative fisheries research to monitor North Coast MPAs, we will establish a foundation for long term-term collaborative monitoring using repeatable research techniques that foster community support for MPA-related management. We will continue to develop and strengthen collaborative working relationships among fishermen, fisheries scientist, and local/state management agencies to improve marine fisheries research and management. Data from this project will compliment other North Coast baseline surveys (rocky intertidal, shallow water SCUBA, and deep water ROV surveys) to help evaluate the placement, monitoring and overall effectiveness of North Coast MPAs.

Summary of Project Activities Completed to Date

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

February-May 2014: Preparation for fieldwork
March-April 2014: Public outreach and education meetings were held prior to the field season to inform the community, to encourage participation of volunteer anglers and to encourage tag returns.
June-October 2014: Hook and line sampling of 4 MPA sites and 4 associated reference sites; each site was sampled 3 times during Year 1.
Sept-Jan 2015:
Data Analysis:
- All data entered into Microsoft Excel.
- Summary tables of fish abundance and diversity constructed for each site.
-Catch Per Unit Effort (CPUE) determined for each site.

Progress towards Education and Outreach goals:
- Established good working relationships with Commercial Passenger Fishing Vessel (CPFV) captains.
- Meet and greet between all faculty, graduate and undergraduate students involved in MPA research at Humboldt State University.
- Involved ~30 different volunteer anglers consisting of community members, recreational and commercial fishermen, and Humboldt State students.

Over 24 sampling days, 2,618 fish were caught; 2,150 were tagged. The catch was dominated by Black Rockfish (1190 individuals), followed by Blue Rockfish (385), Lingcod (344), Yellowtail Rockfish (186), and Canary Rockfish (181). The greatest number of fish were sampled at Sea Lion Gulch SMR (719). The fewest number were sampled at Pyramid Point SMCA (137).

The average catch per unit effort (CPUE) (fish/angler/hr) was highest at Sea Lion Gulch SMR (19.97) and lowest at Pyramid Point SMCA (3.81). CPUE was higher at sites farther from port regardless of MPA status. CPUE across sites was generally lower in mid-July to early August than earlier or later in the season.

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

Highlights:
Our first trip to Sea Lion Gulch SMR yielded amazing views of the sun rising through the mist over the King Range and yielded our highest catch of the summer (317 fish).

During Year 1, 2,618 fish were sampled, representing 25 species.   2,150 fish were tagged.

A 63cm Yelloweye Rockfish was tagged in the South Cape Mendocino SMR.

Building relationships with the charter boat captains and several regular volunteers.

The excitement of volunteers who had little or no fishing experience, and in a few cases had not been out on the ocean before.

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).

The biggest challenge of the 2014 field season was scheduling the CPFV's with regard to the weather. We found that scheduling trips far in advance was impractical, as these dates were often cancelled due to poor sea conditions. Because of the remote nature of some of our field sites, we occasionally had to cancel on days when the Captains could have taken a private charter trip out to more sheltered fishing grounds, resulting in lost revenue. To address this problem, we began scheduling trips when the forecast indicated a favorable weather window in 3-5 days. Securing a vessel and crew with such a short lead time did present challenges, but overall allowed us to take better advantage of the relatively small number of good weather days in our region. Effects on the project were minor: a delayed end to our field season (October instead of August) and a slight decrease in the available volunteer pool of anglers. Some potential volunteers indicated that the shorter lead time made it more difficult for them to integrate our trips into their schedules.

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

All data from the Year 1 (2014) field season has been entered into Microsoft Excel software and will be exported in comma separated value (csv) format to analytical software.

Data includes:
Date, Site, Cell, Species, Gear Type, Fork length (mm), Tag number, Condition, and Comments

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Activities Planned for following Project Year _2_ (if applicable) – *Please describe remaining work and approximate timelines for completing that work, including any anticipated budget variances necessary to complete the project.*

February-April 2015:
-Preliminary analysis of data.
- Inventory, maintenance and replacement (as needed) of equipment.
-Retention of CPFV captains for 2015 season.
-Outreach and publicity to attract volunteer anglers; educate public about the tag return program.
-Maintenance of volunteer mailing list.
April 2015: Public outreach and education meetings will be held prior to the field season to inform the community, to encourage participation of volunteer anglers, to encourage tag returns, and to share the results from the 2014 season.
May-August 2015: Hook and line sampling of MPAs and paired reference sites.
June-September 2015: Entry of data into Excel database.
September 2015-January 2016: Analysis of data
November 2015-January 2016: Report preparation.

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	*2*	*10*	*Supported: Anglers, samplers, data recorders. Volunteers: Anglers*
Masters	*2*	*3*	*Supported: Scheduling & logistics, preparation of reports, input & analysis of data.* *Volunteers: Anglers*
PhD			

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

~20 volunteers from the community participated in the project as volunteer anglers

Additional PI contact info not listed on first page:

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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.)
Craig Strickhouser	Private	Charter captain
Tim Klassen	Private	Charter captain
Jared Morris	Private	Charter captain
Kevin Riley	Private	Charter captain
Kurt Akin	Private	Charter captain
Matt Dallam	Private	Charter captain

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.*

Table 1 (attached): Abundance and diversity of species caught during Year 1 (June – October, 2014). Sites consisted of 4 MPA (Pyramid Point SMCA, South Cape Mendocino SMR, Ten Mile SMR, and Sea Lion Gulch SMR) and 4 paired reference sites (Damnation Creek, North Cape Mendocino, Westport, and Point Delgada). Each site was sampled 3 times throughout sampling season. Fish were collected via standardized hook and line sampling. Five most common species caught include black rockfish, blue rockfish, lingcod, yellowtail rockfish, and canary rockfish. Catch per unit effort (CPUE) values equal to number of fish per angler per hour. Sea Lion Gulch SMR yielded the highest CPUE of MPA sites while North Cape Mendocino yielded the highest CPUE of the reference sites.

Attached Photo: Graduate student Jay Staton and a volunteer with a Cabezon caught and tagged in the South Cape Mendocino SMR.   Photo by Ian Kelmartin

Table 1: Abundance and diversity of species caught during Year 1 (June – October, 2014). Sites consisted of 4 MPA (Pyramid Point SMCA, South Cape Mendocino SMR, Ten Mile SMR, and Sea Lion Gulch SMR) and 4 paired reference sites (Damnation Creek, North Cape Mendocino, Westport, and Point Delgada). Each site was sampled 3 times throughout sampling season. Fish were collected via standardized hook and line sampling. Five most common species caught include black rockfish, blue rockfish, lingcod, yellowtail rockfish, and canary rockfish. Catch per unit effort (CPUE) values equal to number of fish per angler per hour. Sea Lion Gulch SMR yielded the highest CPUE of MPA sites while North Cape Mendocino yielded the highest CPUE of the reference sites.

| | Crescent City | | | Eureka | | | Fort Bragg | | | Shelter Cove | | | |
Species	Damnation Creek	Pyramid Point SMCA	Total	N. Cape Mendocino	S. Cape Mendocino (SMR)	Total	Ten Mile SMR	Westport	Total	Pt. Delgada	Sea Lion Gulch SMR	Total	Total Species Count
black rockfish	130	120	250	118	190	308	90	102	192	59	381	440	1190
blue rockfish	10	4	14	37	31	68	51	78	129	24	150	174	385
lingcod	34	10	44	44	41	85	45	71	116	57	42	99	344
yellowtail rockfish	12	0	12	15	36	51	40	12	52	21	50	71	186
canary rockfish	21	0	21	45	44	89	9	41	50	13	8	21	181
china rockfish	0	0	0	0	1	1	4	25	29	25	15	40	70
copper rockfish	2	0	2	16	11	27	6	3	9	5	15	20	58
quillback rockfish	0	0	0	14	17	31	0	1	1	3	12	15	47
vermilion rockfish	2	0	2	16	12	28	2	2	4	1	8	9	43
olive rockfish	0	0	0	0	1	1	0	9	9	1	17	18	28
kelp greenling	8	1	9	2	0	2	2	5	7	1	2	3	21
yelloweye rockfish	0	0	0	3	4	7	1	1	2	3	9	12	21
rosy rockfish	0	0	0	0	0	0	0	0	0	4	9	13	13
gopher rockfish	0	0	0	0	0	0	2	4	6	2	0	2	8
cabezon	2	2	4	0	0	0	1	1	2	1	0	1	7
chinook salmon	0	0	0	0	1	1	2	0	2	0	0	0	3
market squid	0	0	0	0	0	0	3	0	3	0	0	0	3
rockfish spp	0	0	0	0	0	0	2	0	2	0	0	0	2
brown rockfish	0	0	0	0	0	0	1	0	1	0	0	0	1
buffalo sculpin	0	0	0	0	0	0	1	0	1	0	0	0	1
halibut	0	0	0	0	0	0	0	0	0	1	0	1	1
pacific sanddab	0	0	0	0	0	0	1	0	1	0	0	0	1
petrale sole	0	0	0	0	1	1	0	0	0	0	0	0	1
red irish lord	1	0	1	0	0	0	0	0	0	0	0	0	1
unk. flatfish	0	0	0	0	1	1	0	0	0	0	0	0	1
widow rockfish	0	0	0	0	0	0	0	0	0	0	1	1	1
Total Catch/Site	222	137	359	310	391	701	263	355	618	221	719	940	2618
CPUE (fish/angler/hr)	6.17	3.81	4.99	8.61	10.86	9.74	7.31	9.86	8.58	6.14	19.97	13.06	9.09