

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	2013	MLPA Region	South Coast
Project Title & Number	R/MPA-25 California Spiny Lobsters: A Partnership to Quantify Baseline Levels of Abundance, Size Structure, Habitat Use and Movement along the South Coast		
PI name	Hovel, Kevin	Co-PI name	Neilson, Douglas
PI Contact Info		Co- PI Contact Info	
<i>(please list additional PIs and contact info in the "Project Personnel" section if necessary)</i>			
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Project Goals & Objectives

The original objectives of our project were to:

1. Map benthic substrata in order to link lobster abundance to benthic habitat composition and distribution across a range of spatial scales;
2. Establish baseline estimates of lobster density and shelter use through SCUBA-based surveys;
3. Implement a tag-recapture program to estimate spiny lobster abundance, size-frequency distribution, growth, spillover, and mortality;
4. Determine how CPUE and the amount and distribution of lobster fishing effort changes after MPA establishment.
5. Establish a public outreach system to provide information on the purpose of our work with Monitoring Enterprise and the progress made toward project goals.

Summary of Project Activities Completed to Date

Overview of Project Year 2_ Activities, including progress towards meeting goals & objectives

Benthic substratum mapping has been underway since the fall of 2011, and as of fall 2013 all of Pt. Loma and La Jolla have been mapped with our narrow beam sonar that allows substratum mapping even in dense kelp cover. We have generated benthic substratum maps and begun to overlay lobster abundance and behavior data onto these maps.

SCUBA-based surveys for lobster density, shelter use, and habitat associations began in spring of 2012, and we conducted 100 surveys inside and outside of four MPAs (Cabrillo in Pt. Loma; South La Jolla; Swami's in Encinitas; and Laguna Beach) during summer and early fall 2012. Surveys recommenced in late spring 2013 after lobster fishing season ended and weather conditions permitted safe monitoring of offshore locations. In 2013 we resurveyed the four MPAs surveyed in 2012, conducting 6 transects inside each MPA and 6 transects outside each MPA. The survey effort in 2013 included the Point Vicente MPA in Palos Verdes. We have compiled all of our data and have conducted univariate and multivariate analyses to suggest how the probability of finding lobsters varies with aspects of benthic habitat, as well as how lobster shelter use behavior varies among MPAs. A major component of this objective is manipulative experiments on lobster behavior conducted by the graduate student working on this project, Amalia Harrington. Amalia has completed her experiments on how various behaviors that lobsters exhibit in shelters influence their susceptibility to predators. The data are presently being summarized for presentations at conferences in fall 2013.

Lobster tagging began in the fall of 2011 and was extensively pursued in the summer of 2012 by tagging lobsters inside and outside of five MPAs (Cabrillo, South La Jolla, Swami's, Laguna Beach, and Pt. Vicente). Tagging was conducted aboard lobstermen's vessels by lobstermen, project personnel (PIs, students, and DFG personnel), and volunteers. All lobsters captured in traps > 55 mm carapace length were tagged ventrally with individually numbered, plastic t-bar tags, and data were collected on length, sex, reproductive status, and shell condition for each lobster. Tag numbers of any recaptured lobsters were noted. After lobster fishing season ended in spring of 2013 we resumed our tagging program by targeting MPAs for which we needed more information based on results from 2012. For instance, we made several trips to Swamis MPA in Encinitas in 2013 to increase our tagging rate and tag return rate, which will allow us to better interpret our results. We also conducted a rigorous study of how gear type (i.e. different types lobster traps used in mark-recapture work) influences the segment of the lobster population that we have been capturing, measuring, and tagging. Data are now all entered and we estimate that we have tagged between 20,000 and 25,000 lobsters across all five MPAs. Analyses presently are being conducted for each MPA to (i) quantify lobster population size, (ii) quantify lobster movement (e.g. spillover), and (iii) link lobster catch information to benthic habitat maps.

An important goal for this component of the project was to establish a strong corps of volunteers we could rely on to assist with lobster tagging. SDOF reached out to over 20,000 southern Californian residents within their database to recruit volunteers for this project. With the help of the SDOF staff and program interns, they received hundreds of volunteer applications. SDOF sorted through the volunteers and interviewed them individually. SDOF created a volunteer manual and tested each potential volunteer. Once trained, volunteers helped the lobster fishermen and scientists capture and record data. SDOF also has created and maintained a website for fishers to use to report tagged lobsters they have caught.

Lastly, we will be using catch information to quantify short-term changes in CPUE and fishing behavior, but project is scheduled to be implemented in the winter of 2013 when data on two seasons of fishing effort becomes available.

MPA Baseline Program Annual Report

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

The partnership to tag lobsters that we have created has been very successful. This partnership exists between scientists, lobstermen, managers, students, and volunteers. This has resulted in over 20,000 tagged lobsters that will yield information on spillover, population size, size distribution, and growth.

Additionally the experiments on lobster behavior have been very successful and have yielded interesting results about the way in which small, vulnerable lobsters use shelter. Survival of these lobsters varies with shelter scaling (the relationship between lobster size and shelter size) and the nature of lobster groups (aggregations) in shelters also influences lobster survival.

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).

Vessel breakdown was the only unforeseen event that occurred. A lobsterman's vessel that we planned to use extensively for tagging was not operational for the 2013 season. We overcame this obstacle by recruiting other lobstermen in the San Diego area to assist with the project.

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

All tagging and survey data were initially collected on paper, and these data sheets have been stored. Data from paper data sheets have been transferred to digital form (Excel files) for summary and analysis using Excel and Matlab, as well as GIS and statistical programs.

Activities Planned for following Project Year 3 (if applicable) – *Please describe remaining work and approximate timelines for completing that work, including any anticipated budget variances necessary to complete the project.*

Remaining work consists of analyses to summarize lobster catch data and lobster habitat use data. We also will be conducting our analyses of short-term changes to fishing due to MPAs and submitting a final report. We plan to have analyses of catch data and habitat use data completed by January 2014. Analyses of short-term changes to fishing should be completed by May 2014. Our final report is due in early summer 2014.

There also will be work required to integrate our data with the other MPA baseline projects. The project PIs are meeting in January 2014 to work on this integration.

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.

	<i>Students Supported</i>	<i>Student Volunteers</i>	<i>Nature of Assistance</i>
<i>K-12</i>			
<i>Undergraduate</i>	<i>Whitney Dailey</i>		<i>Field work</i>
<i>Masters</i>	<i>Amalia Harrington</i>		<i>Field work and analyses</i>
<i>PhD</i>		<i>Robert Dunn</i>	<i>Field work</i>

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

Victoria Minnich: field data collection and data processing.

Steven Hebert: field data collection

Tom Valencia: field data collection

Kristin Frick: field data collection

Carter Warwick: field data collection

Brooke Daly: field data collection

Stephanie Doyl: field data collection

Zachary Stevens: field data collection

Ryan Petty: field data collection

Additional PI contact info not listed on first page:

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Samantha Harrod, Interim Executive Director, San Diego Oceans Foundation, 1875 Quivira Way C-5 San Diego, CA 92109 619.523.1903

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.

<i>Name of Organization or Individual</i>	<i>Sector (City, County, Fed, private, etc.)</i>	<i>Nature of cooperation (If financial, provide dollar amount.)</i>
San Diego Oceans Foundation	Private	Logistics, dissemination, outreach
Dave Rudie	Private	Facilitation as president of SD Oceans Foundation
Shad Catarius	Private, fisherman	Field data collection, lobster natural history
Rodger Healy	Private, fisherman	Field data collection, lobster natural history
Kenny Swanson	Private, fisherman	Field data collection, lobster natural history
Josh Fisher	Private, fisherman	Field data collection, lobster natural history
John Law	Private, fisherman	Field data collection, lobster natural history

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.

Students on the project have presented project findings at three national conferences (the Benthic Ecology Meeting in 2012, the Estuarine Research Federation in 2013, and the Western Society of Naturalists in 2013 (note: the latter two conferences are scheduled for the first week of November 2013).

We have extensive images from on board tagging boats, as well as underwater (for lobster experiments) and some short videos of lobsters in shelters.

We created a 5 minute video in which project PIs describe the lobster tagging component of the work and its importance to establishing baseline levels of lobster abundance in MPAs.