



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: 2014 MLPA Region: North Coast Region

Project Title & Number: Baseline Characterization and Monitoring of the MPAs along the North Coast: ROV Surveys of the Subtidal. Project Number: R/MPA-41

PI name: Andrew Lauermann Co-PI name: Dirk Rosen

PI Contact Info Co- PI Contact Info (please list additional PIs and contact info in the "Project Personnel" section if necessary)

Address: 321 3rd Street, Eureka CA 95501 Address: 1230 Brickyard Cove Road, Suite 101, Richmond CA 94801

Email: andy@maregroup.org Email: dirk@maregroup.org

Phone: 530 210-6604 Phone: 510 232-1541

Project Goals & Objectives

Three primary project goals have been proposed and include: 1) baseline characterization of selected MPAs across the North Coast Study Region, 2) assessment of initial changes in fishes, macro-invertebrates, and associated seafloor habitats in select MPAs during the first two years following designation, and 3) recommendations for future monitoring efforts in the region. Three of the ecosystem features identified as priorities in the North Coast RFP: Mid-depth Rock Ecosystems, Soft-bottom Subtidal Ecosystems, and Deep Ecosystems including canyons within MPAs and adjacent reference study sites will be surveyed. The objectives for each primary goal are described below:

Baseline Characterization

Prior to field data collection, we will review available historical information on subtidal communities represented in north coast. This will include an evaluation of remote operated vehicle (ROV) data collected by the Project Leaders in partnership with California State University Monterey Bay and the California Department of Fish and Wildlife in the North Coast Study Region during 1999, 2001, and 2004 and the North-Central Coast Study Region from 2009-2011, focusing primarily on fish and invertebrate species found in rocky habitats sampled at those locations. Using historical information and available multibeam mapping data, study sites and transect locations will be selected.

Following transect selection, we will collect both video and still photographic imagery of mid-depth (20-100m) and deep (>100 m) subtidal, soft and hard bottom habitats, inside and out of (from north to south) Pt. St. George Offshore SMCA, Reading Rock SMR, Mattole Canyon SMR, and Ten Mile SMR to provide a permanent record of seafloor communities occurring at the time of MPA implementation. Sampling will include video and still imagery of 1) substrate and seafloor structure, 2) macro-invertebrates, and 3) associated fishes. Using video and still imagery collected (over both sampling years), we will provide a summary description and assessment of ecological conditions inside SMRs and/or SMCAs and comparable reference sites outside.

Assessment of Initial Ecological Changes

One year after the initial ROV survey, we will collect a second year of video and still photographic imagery from the same treatment sites sampled in Year 1. Using both years' data, we will describe any ecological changes to community composition and structure in sites sampled, including all fishes and macro-invertebrates (species composition, abundance and density, and size distributions) and seafloor habitats (percent cover and relief of biogenic and physical habitat attributes identified as priorities). We will also identify data elements considered sensitive and/or rapid to respond to MPA implementation. Potential explanations for any changes observed, specifically whether they can be attributed to MPA establishment, will be provided.

Recommendations for Future Monitoring

Using data collected, we will evaluate the spatial and temporal scale at which ROV imagery should be sampled to produce robust data on species assemblages and habitat composition. We will recommend a set of indicator species (based on quantitative analysis), technology, and methods to assess long-term status and trends for subtidal ecosystems surveyed.

Summary of Project Activities Completed to Date

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

All activities performed over year one were focused on meeting project objectives for goal 1: Baseline Characterization. Prior to year one data collection, study sites and transect locations were selected using multibeam imagery in combination with historic north coast and north central coast ROV data. Transect locations were placed to traverse all three habitat types outlined in our original project proposal: soft bottom, hard bottom and transitional habitats. Field data collection occurred from September 12th through October 10th, which produced over 52 km of video transect from 31 individual ROV dives (see attached figures). Project sampling goals for year one were met, with 48 transects ranging in length from 250 to 2,000 meters long being collected in all three habitat types at all study locations. Over 205 hours of archival video from the ROVs five video cameras and over 8,000 stills have been cataloged for post-processing which will begin in spring of 2015.

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

In addition to field activities in support of the North Coast Baseline Assessment Program, we also surveyed an additional 28 sites throughout the north coast region as part of a CDFW statewide program to evaluate MPAs and provide data in support of fisheries management. Over 58 km of video and almost 9,000 still images were collected on 114 transects within 13 study locations which include: Point Saint George, Crescent City, Reading Rock, Eureka, South Cape Mendocino, Sea Lion Gulch, Big Flat, Shelter Cove, MacKerricher, Noyo, Cabrillo and Albion. Site selection and data collection protocols, including post-survey video annotation, are comparable to those used in our North Coast Baseline Assessment. This additional data, which we are providing to CDFW, can be combined with our north coast baseline data to further expand understanding of the north coast MPA network. This comprehensive analysis will be undertaken by CDFW and its partners, including MARE, following the completion of the North Coast Baseline Program.

Several blog posts have been posted to Ocean Spaces describing our north coast field activities and a short video has been produced as part of a California Department of Parks and Recreation (CDPR) education program. The CDPR, in cooperation with CDFW and MARE, is developing an educational distance-learning unit of study for use in the PORTS (Parks Online Resources for Teachers and Students) program. The goal is to deliver MPA-related programs to 8,000+ students across California this academic year, with one component being an interactive ROV video that teachers can use in class.

For the third year in a row, almost a hundred K-12 students have been educated about our work. Seventh grade students from a local north coast school have shared in the 2014 ROV surveys through short email descriptions and imagery. The students also had the opportunity to not only learn about the work we're doing, but also got the opportunity to see the real "pressures" associated with our work. Students colored and personalized Styrofoam cups that we took to the bottom of a nearby canyon to be compressed by the weight of 400 meters of water. Sharing their excitement and experience through the cover of the schools paper, next year's class is already asking if they get to do the same thing.

In addition, a stakeholder whose families favorite fishing grounds were lost as part of the Ten Mile SMR implementation came out with us for a day to see his old fishing grounds through the cameras of an ROV and to learn about the research and value of MPAs. He has asked to come volunteer again during the year two survey of the Ten Mile SMR.

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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).

None

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

All data is still in its original raw format and includes standard definition video transects (both forward and down facing cameras) recorded to DVD and DVCAM tapes. Standard resolution stereo video, high definition video and high definition still imagery have been recorded onto two portable hard drives. Raw ROV sensor and positional data has also been recorded onto a portable hard drive and recorded to the field PC hard drive.

Data Formats
 Forward and down facing video: DVD-R and Sony PDV-184N
 Stereo video: Standard computer format (.avi)
 HD video: Sony Handycam format (.mts)
 ROV sensor and positional data: Hypack shared memory format (.out) and text string format (.txt)

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.

Video annotation of year one transects is scheduled to occur April 1st through June 31st, 2015. Preliminary analysis of year one data will occur in July, 2015 and year two data collection will run September 20th through October 4th, 2015. Adjustments to sampling design will be made based on preliminary analysis of year one data. Year two video annotation is TBD, but well within the proposed timeline for this project.

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 | | 1 | Field Participation |
| Undergraduate | 1 | | Video Post-processing |
| Masters | 2 | | Field Participation / Video Post-processing / Thesis (1) |
| PhD | | | |

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

CDFW volunteers that participated in field activities: **3**

CDPR volunteer that participated in field activities: **1**

North coast stakeholder volunteer that participated in field activities: **1**

Additional PI contact info not listed on first page:

Dr. Rick Starr:

California Sea Grant Extension Program

Moss Landing Marine Labs

8272 Moss Landing Road,

Moss Landing, CA 95039.

Phone: (831) 771-4442

email: starr@mlml.calstate.edu

Donna Kline:

Moss Landing Marine Labs

8272 Moss Landing Road,

Moss Landing, CA 95039.

Phone: (831) 771-4446

email: dkline@mlml.calstate.edu

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> |
|---|--|---|
| <i>Campbell Foundation</i> | <i>Foundation</i> | <i>Financial Support</i> |
| <i>Goodman Family Foundation</i> | <i>Foundation</i> | <i>Financial Support</i> |
| <i>Michael Prall</i> | <i>State (CDFW)</i> | <i>Survey Planning / Field Participation</i> |
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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.

Figures 1-5. ROV survey lines at MPA and adjacent reference study sites surveyed in September and October of 2014.

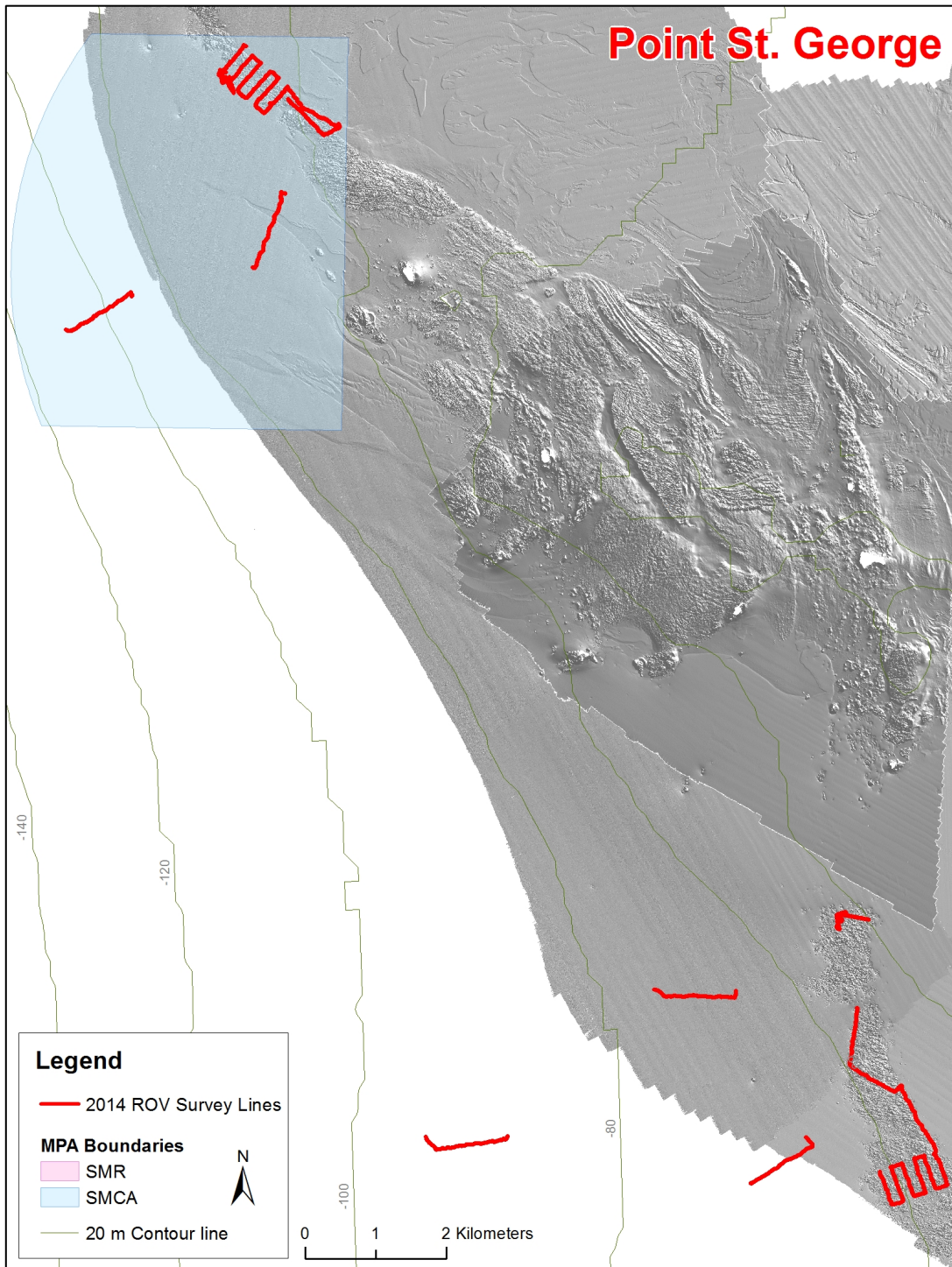
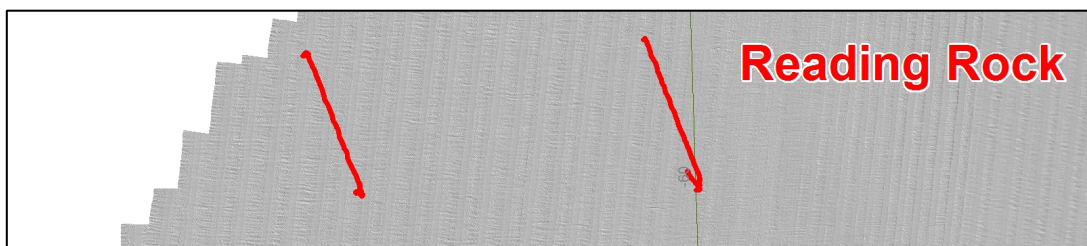


Figure 1. Point Saint George SMCA and outside reference area 2014 ROV survey lines.



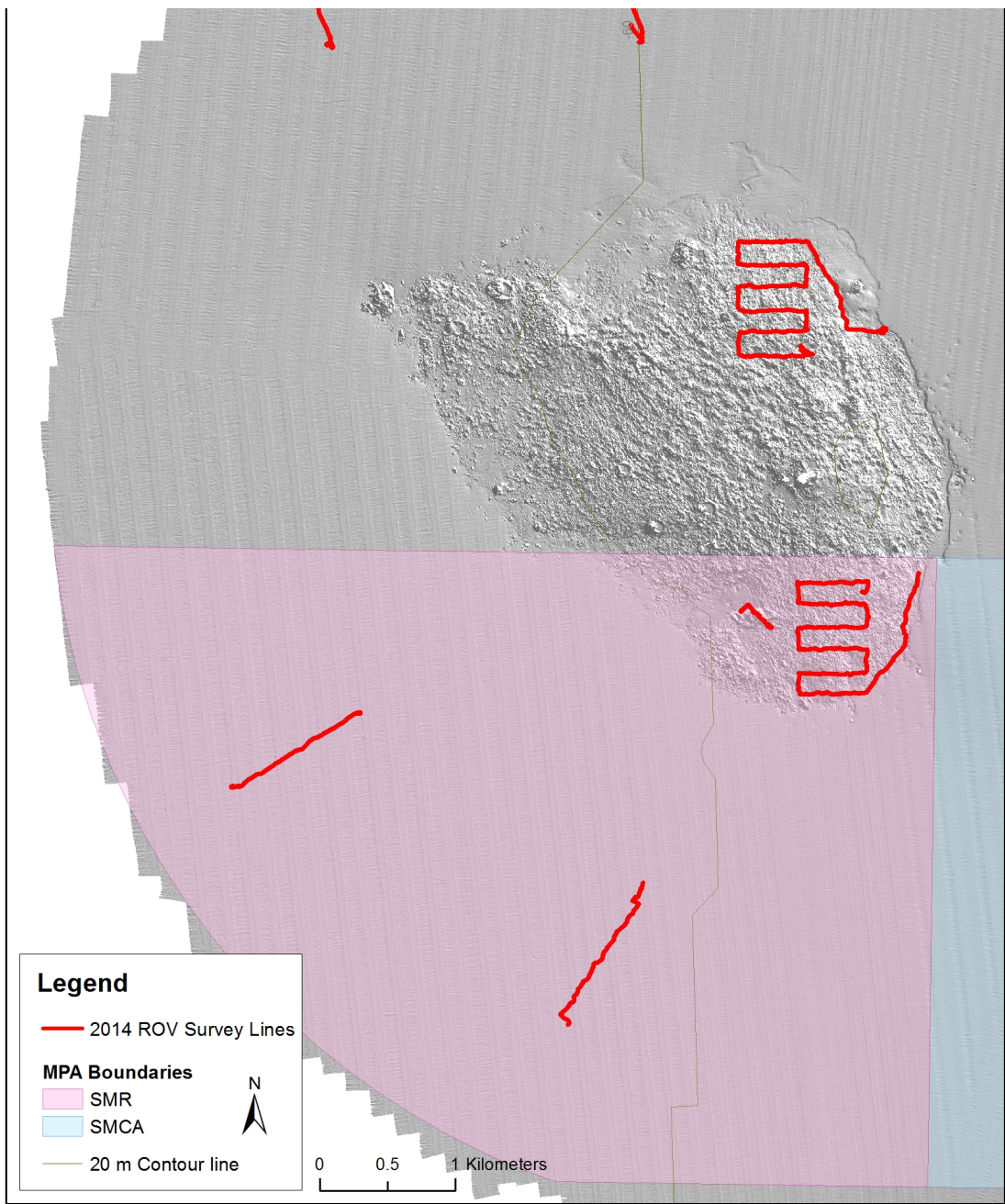
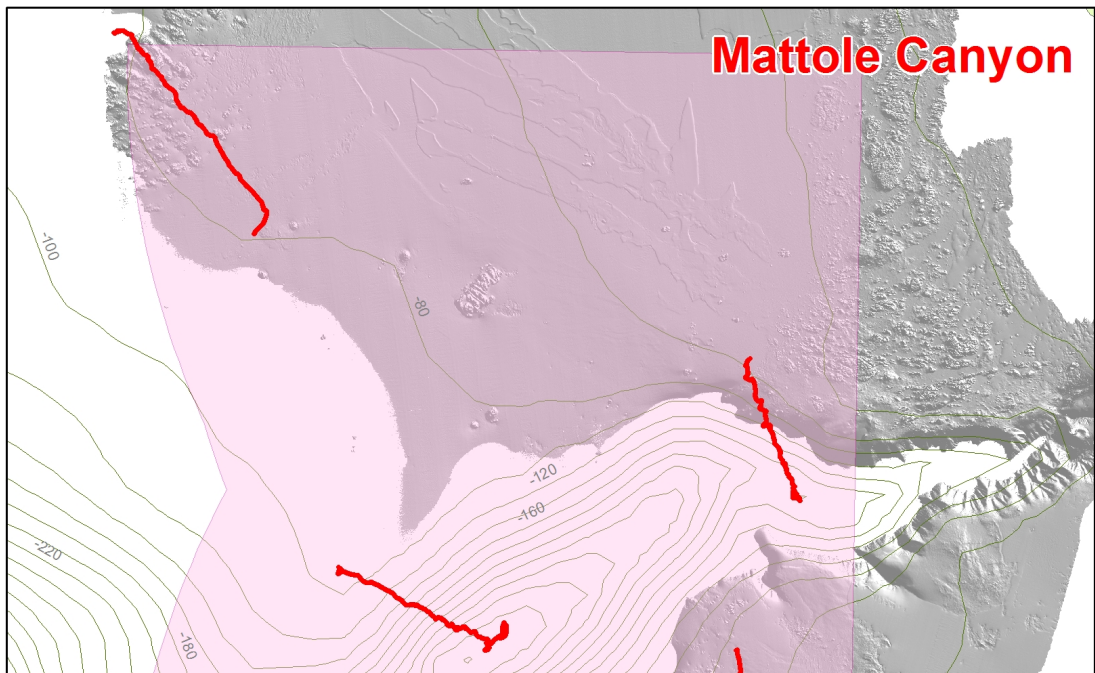


Figure 2. Reading Rock SMR and outside reference area 2014 ROV survey lines.



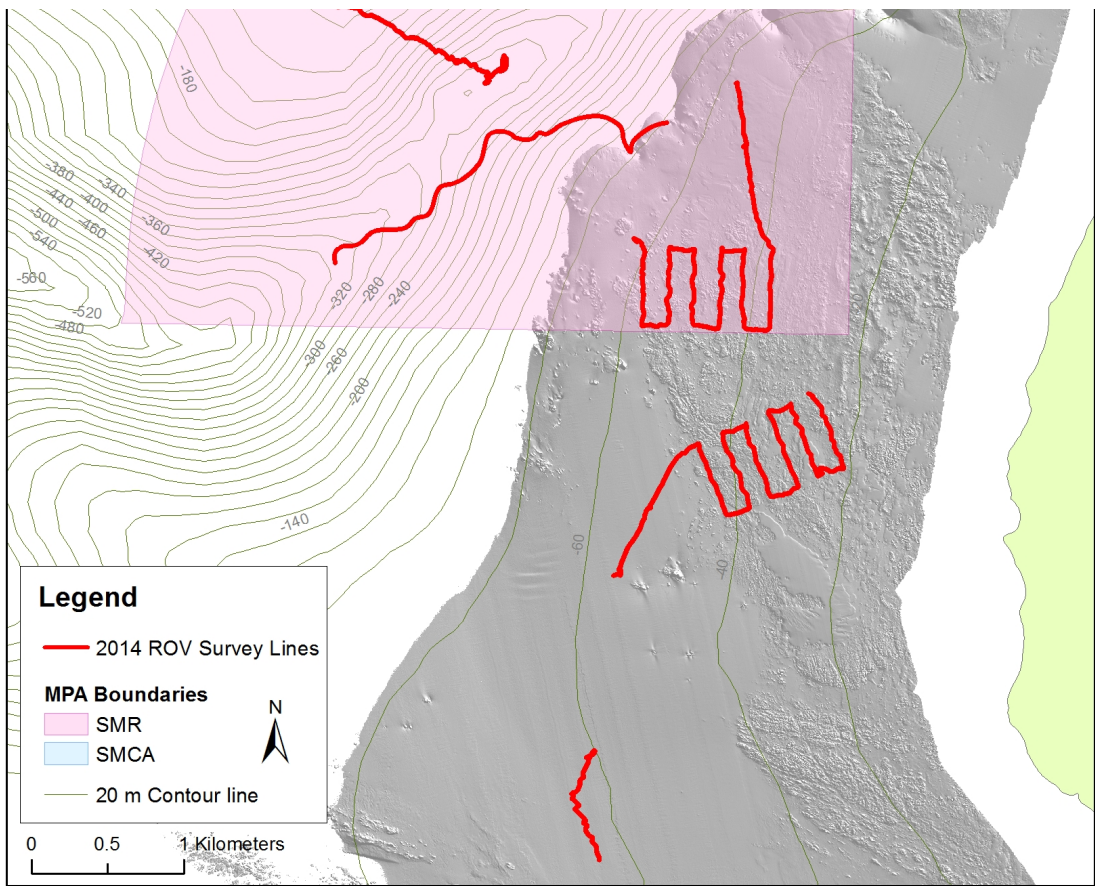
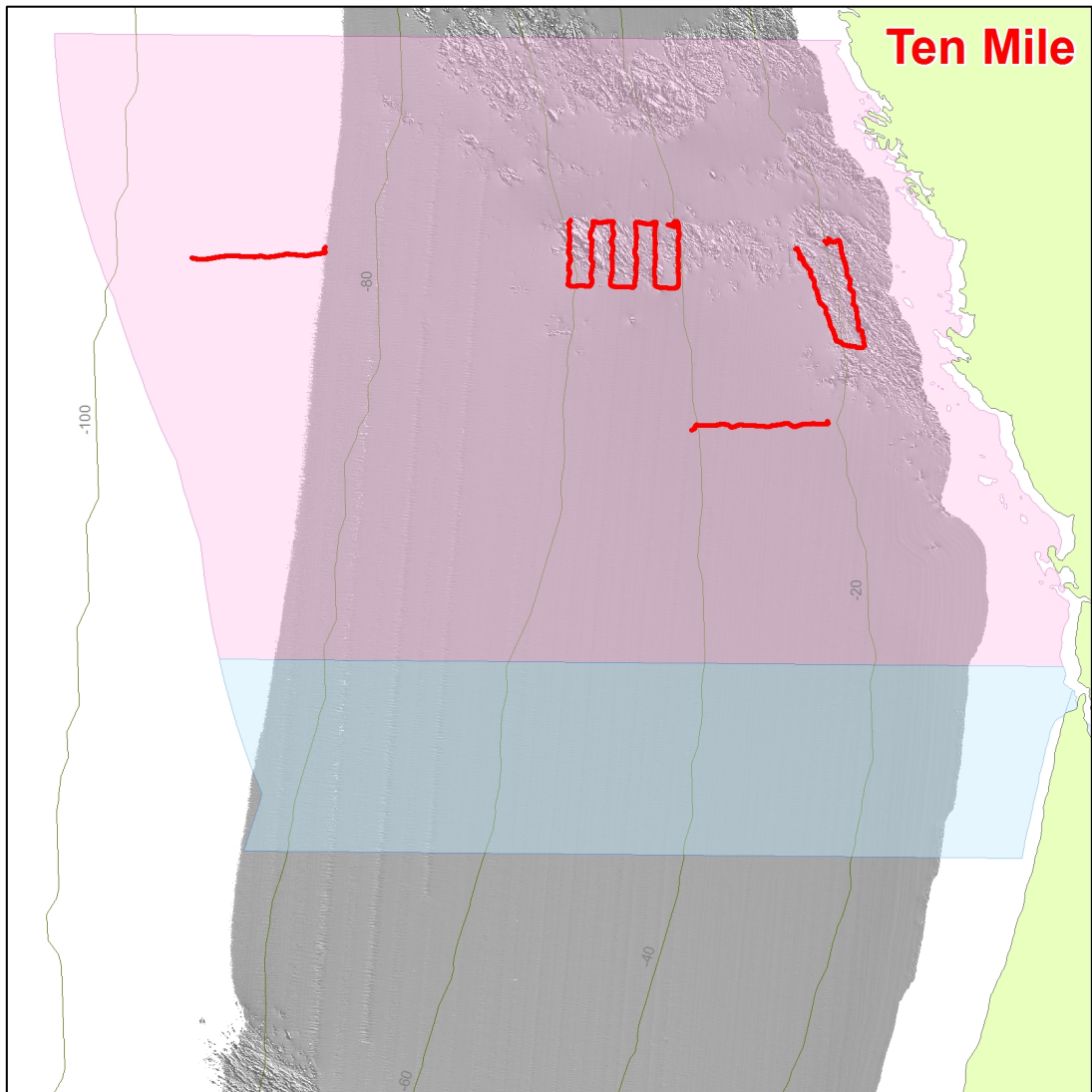


Figure 3. Mattole Canyon SMR and outside reference area 2014 ROV survey lines.



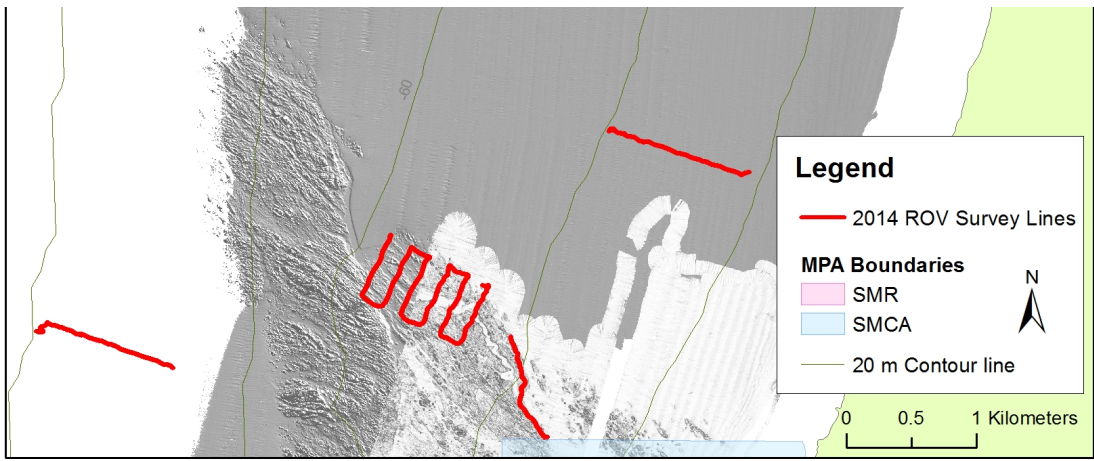


Figure 4. Ten Mile SMR and outside reference area 2014 ROV survey lines.



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Project Information

Project Year: 2014 MLPA Region: North Coast

Project Title & Number: R/MPA-41B, Grant Number C0100100 Title: Baseline Characterization and Monitoring of the MPAs along the North Coast: ROV Surveys of the Subtidal

PI name: Rick Starr Co-PI name: [empty]

PI Contact Info Co- PI Contact Info (please list additional PIs and contact info in the "Project Personnel" section if necessary)

Address: Moss Landing Marine Labs, 8272 Moss Landing Road, Moss Landing, CA 95039 [empty]

Email: starr@mml.calstate.edu [empty]

Phone: 831-771-4442 [empty]

Project Goals & Objectives

The remotely operated vehicle (ROV) work Marine Applied Research & Exploration (MARE) and collaborators are planning will allow assessment of changes in the first two years after implementation of protection as well as recommendation for future monitoring. We are partnering with MARE in the development of a deepwater baseline for the northern portion of California. On this project we will provide fish sizing support, species identification oversight, methods refinement and statistical analysis. Tasks Requested of MLML for North Coast ROV Surveys include:

- 1) Video training (spp. ID, protocols)
- 2) Assistance in Quality Control of Database
- 3) Video Lab Work
 - Review still photos to ID Fish
 - Review spp ID of other reviewers
 - Video processing of selected transects to calibrate observations of MARE staff
 - Stereo sizing of fish
- 4) Work at Sea
- 5) Data Analyses/ report writing

Summary of Project Activities Completed to Date

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

In this project period, we provided survey design assistance, training, and quality control service. Initially, we worked with Dirk Rosen and Andy Lauerman of MARE to design ROV surveys of north coast MPAs. Then we planned and conducted specialized software training for stereo camera calibration and data collection (using SeaGIS EventMeasure and CAL software). We assisted in developing customized data collection techniques to be applied to North Coast MPA requirements. We developed and conducted flatfish identification training for key MARE personnel. This included personal instruction as well as supplying reference material such as a custom PowerPoint flatfish identification series and reference list. As part of this training, we reviewed still photos and provided identification verification of fishes that were used by data collectors. After the summer surveys, we participated in two meetings with MARE personnel to review survey design and results.

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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

See annual report provided by MARE

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).

See annual report provided by MARE

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

MARE controls the data

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.

Year 2 of this project will be very similar to Year 1. Tasks Requested of MLML for North Coast ROV Surveys include:

- 1) Video training (spp. ID, protocols)
- 2) Assistance in Quality Control of Database
- 3) Video Lab Work
 - Review still photos to ID Fish
 - Review spp ID of other reviewers
 - Video processing of selected transects to calibrate observations of MARE staff
 - Stereo sizing of fish
- 4) Work at Sea

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.

| | <i>Students Supported</i> | <i>Student Volunteers</i> | <i>Nature of Assistance</i> |
|----------------------|---------------------------|---------------------------|-----------------------------|
| <i>K-12</i> | | | |
| <i>Undergraduate</i> | | | |
| <i>Masters</i> | | | |
| <i>PhD</i> | | | |

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

See MARE annual report

Additional PI contact info not listed on first page:

Summary for project R/MPA-41B, Grant Number C0100100
for the period of 2/1/2014-1/31/2015

Project Title:

Baseline Characterization and Monitoring of the MPAs along the North Coast: ROV Surveys of the Subtidal

Principal Investigator: Rick Starr, Moss Landing Marine Laboratories

Introduction:

The state of California recently implemented a network of Marine Protected Areas (MPAs) in northern California. Coupled together with the 3 MPA regions to the south, the northern California MPA network is designed to protect and rebuild critical marine resources. The success of the resource management policy that created the system of MPA networks, however, is dependent upon the quality of monitoring that takes place to identify and quantify the effects of the new reserves. Especially important is the monitoring of the deeper portions of the MPAs as they represent 75% of the protected areas. The remotely operated vehicle (ROV) work Marine Applied Research & Exploration (MARE) and collaborators are planning will allow assessment of changes in the first two years after implementation of protection as well as recommendation for future monitoring.

We are partnering with MARE in the development of a deepwater baseline for the northern portion of California. On this project we will provide fish sizing support, species identification oversight, methods refinement and statistical analysis. Tasks Requested of MLML for North Coast ROV Surveys include:

- 1) Video training (spp. ID, protocols)
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 - Stereo sizing of fish
- 4) Work at Sea
- 5) Data Analyses/ report writing

Work to Date

In this project period, we provided survey design assistance, training, and quality control service. Initially, we worked with Dirk Rosen and Andy Lauerman of MARE to design ROV surveys of north coast MPAs. Then we planned and conducted specialized software training for stereo camera calibration and data collection (using SeaGIS EventMeasure and CAL software). We assisted in developing customized data collection techniques to be

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