

A revised proposal prepared for:
South Coast Marine Protected Areas (MPA) Baseline Program
Project Leader: Scholz, Dr. Astrid, J.
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Project Title

Establishing Consumptive and Non-consumptive Human Use Baseline Indicators for MPAs in the South Coast of California

Project Leader and Associated Staff

Since 2001, **Ecotrust** has worked with federal and state agencies, nonprofit organizations, and fishing communities to provide integrated ecological and economic assessments of fishery policy and marine conservation. Ecotrust assessed West Coast groundfish fishery policy options for the Pacific Marine Conservation Council and assembled fishery profiles for the Gulf of the Farallones, Cordell Bank, and Monterey Bay National Marine Sanctuaries. Ecotrust has assisted California's Marine Life Protection Act Initiative (MLPAI) with local knowledge collection, economic analysis, and decision support, and has served on the MLPAI Science Advisory Team. Ecotrust has performed Oregon fisheries mapping as a contractor for Oregon Wave Energy Trust, the Oregon Department of Land Conservation and Development, and in partnership with the Oregon Coastal Zone Management Association and the Southern Oregon Ocean Resources Council.

As part of these efforts, Ecotrust has conducted over two thousand interviews with fishermen and other stakeholders to collect and compile data on values of the coastal and marine environment. Ecotrust has coordinated and facilitated numerous stakeholder meetings to discuss strategies for addressing potential spatial planning conflicts.

NaturalEquity has years of experience in socioeconomic monitoring, marine policy, and protected area management. Since 2004 Chris LaFranchi, founder of NaturalEquity, has served as social science coordinator at the National Marine Sanctuary Program, where he conducts and coordinates social science research to inform management and policy initiatives on the West Coast, including the impact of marine protected areas in California on commercial fishing, recreational angling, and private recreation. More recently, he and Dr. Linwood Pendleton, of the Coastal Oceans Values Center, pioneered use of the Internet and Google to survey randomly-selected California residents on their consumptive and non-consumptive use patterns on the West Coast.

In collaboration with Surfrider Foundation, Ecotrust and Natural Equity recently completed a project to create a spatial and socioeconomic profile of non-consumptive recreational activities on the Oregon coast (LaFranchi and Daugherty 2011). In addition, Ecotrust and Natural Equity are currently involved in the North Central Coast marine protected area monitoring effort (Grant #09-015, Project #R/MPA-16), collecting data on coastal use patterns, operation costs, trip expenditures, and demographic characteristics of California's North Central Coast consumptive and non-consumptive user communities. To date, through this project, the project team:

- Tested the effectiveness of our online consumptive and non-consumptive coastal recreational use survey tool;
- Deployed the recreational survey tool in February 2011 and have received over 1,300 responses as of mid-March 2011;
- Completed development of the consumptive recreational/shore-picking survey tool;
- Completed development of the commercial and commercial passenger fishing vessel (CPFV) survey tool;
- Have begun conducting consumptive recreational dive and shore-picking interviews; and
- Will begin commercial and interviews starting May 2011.

This proposed project, *Establishing Consumptive and Non-consumptive Human Use Baseline Indicators for MPAs in the South Coast of California*, will be managed from Ecotrust's headquarters in Portland, Oregon, where project leader Astrid Scholz, Ph.D., (Vice President, Knowledge Systems), co-project leader Charles Steinback (Director of Marine Planning), and other key associated staff are based. In her role as project leader, Dr. Scholz will be responsible for overall project design and management and will provide strategic guidance on project execution, particularly for methods and analysis components. She will also oversee preparation and submission of required interim and final reports and products. As co-project leader, Steinback will oversee all aspects of project implementation and provide technical support for tool and survey design.

Chris LaFranchi, of Natural Equity, will also serve as co-project leader with Scholz and Steinback. In addition to providing strategic guidance, he will be responsible for coordinating the integration of human use indicators with ecological indicators. The Ecotrust team will coordinate with LaFranchi, based in California, via regularly scheduled e-mail and phone check-ins.

Scholz and LaFranchi will jointly coordinate involvement with a larger integrative multi-project effort in which we intend to participate (for more details, please see Rationale and Plan of Work sections below).

Key associated staff include:

- Kristen Sheeran, Ph.D., Senior Economist and Director, Economics for Equity and the Environment Network (Ecotrust): Responsible for performing economic analysis and assisting with reporting. Dr. Sheeran will be assuming all the responsibilities originally attributed to Dr. Sarah Kruse.
- Jon Bonkoski, Senior GIS Analyst (Ecotrust): Responsible for overseeing the spatial and non-spatial data analyses, estimating baseline values and analyzing pre- and post-MPA changes by coastal and marine users.
- Cheryl Chen, Marine Planning Project Manager (Ecotrust): Responsible for organizing outreach efforts and maintaining community contacts, managing data collection/field work, and coordinating project work amongst staff and project partners.

Project Goals and Objectives

The primary goal of this effort is to understand the interactions between human uses of the coastal and marine ecosystem and the South Coast marine protected area (MPA) network. To do this, we will 1) create a baseline characterization of human use patterns in the South Coast region; and 2) assess initial changes in interactions between human uses of the coastal ecosystem associated with both MPA implementation itself and any initial ecological changes that occur as a result of MPA implementation.

The objectives of this research are to:

1. Collect detailed data on the a) demographic characteristics; b) spatial use patterns; and c) economic contributions of California's South Coast region consumptive and non-consumptive coastal and marine user communities;
2. Create baseline estimates of the quantity, composition, spatial distribution, and economic contribution of coastal and marine human use activities in the study region;
3. Conduct an assessment of changes in coastal and marine human use activities since MPA implementation and compare the results to the baseline estimates;

4. Describe the initial spatial response and estimate the economic impact (to user communities and the South Coast economy) of any identified changes in coastal and marine human use activities;
5. Integrate estimates of change with ecological indicators of MPA performance; and
6. Inform the planning and implementation of long-term monitoring, and the development of both key metrics/indicators and a modeling framework for understanding the causal links between ecosystem features, socioeconomic changes, and the implementation of MPAs.

As stated in the objectives, we will initially establish a baseline of consumptive and non-consumptive coastal and marine human use data against which future comparisons can be made in an effort to empirically detect any MPA effects (e.g., increase in net benefits to users detected after controlling for exogenous factors). Data collection will occur at a resolution in which observed changes may be attributable to specific MPAs and will include the consumptive and non-consumptive vital signs and metrics identified by the MPA Baseline Program as well as additional indicators/metrics of spatial and economic changes in coastal and marine human uses and values.

Moreover, we will configure the baseline data so that direct comparisons can be made with similar baselines established in other regions of California (e.g., California North Central Coast study region) and the US West Coast, and so that it can be integrated with the ecological data being collected in the South Coast to inform a comprehensive set of modeling and analytical activities of the larger project.

Rationale

Humans are an integral part of the ecosystem in the South Coast, and their activities inside and outside the newly implemented marine protected areas are closely linked to the system's ecological responses. In order to understand these interactions, and to establish baseline data for monitoring and analysis, a comprehensive understanding of the current extent, pattern, and importance of human uses is required. This project will augment existing data on spatial use, and close socioeconomic information gaps in the region.

The data produced in this project will establish a baseline against which future comparisons will be made in an effort to empirically detect any South Coast MPA effects on the larger socio-ecological system. This requires data both inside and outside MPAs, and corresponding data from ecological data sampling sites. In contrast to the ecological sampling, human respondents determine the site selection (indeed, our surveys elicit spatial use information from respondents). Since we will collect human use data that correspond to a large set of sites across the entire study region, the socioeconomic study will likely contain all ecological data collection sites. Indeed, we will produce data that reveal the relative importance of ecological data collection sites to users.

We also will demonstrate methods and tools that can be used to cost-effectively replicate human use data collection in the future, for monitoring purposes.

This project is being submitted as one component of an integrative multi-project proposal titled, *Integrative assessment of baseline ecological and socioeconomic conditions and initial changes within the South Coast MPA region* (Principal Investigators Jennifer Caselle and Carol Blanchette), which includes the following other projects, listed with principal investigators:

- Administration and organization: Caselle and Blanchette
- Rocky intertidal: Blanchette

- Kelp and shallow rock ecosystems – SCUBA- PISCO/CRANE surveys: Caselle and Pondella
- Kelp and shallow rock ecosystems – SCUBA- ReefCheck- citizen science: Friewald
- Sandy beach – ecology and non-consumptive uses: Dugan
- Seabirds and coastal pelagics: Robinette
- Mid-depth rock and deep rock – ROV: Lindholm and Rosen
- Soft-bottom sub-tidal – shallow parts – beach seines: Love
- Nearshore and deep rock – collaborative fishing surveys and fish tagging: Hamilton and Starr

As a member of this integrative multi-project proposal, we see a number of overarching benefits including:

- Dedicated resources for administrative oversight and data management, which will facilitate integration and use of shared nomenclature;
- Opportunity for cross-disciplinary collaboration in refinement of site selection and design, implementation and analysis of data (e.g., draft hypotheses for collaborative analysis at onset of the project);
- A shared database, which will allow for synthetic analyses; and
- Mechanisms and funding for data analysis and synthesis workshops, which will ensure integrated analysis and synthesis occurs.

In addition, we see a number of specific instances where our participation in this larger effort will allow us to access and use data from and/or share our data with other projects to achieve more informed and detailed results. Examples of this include:

- Comparison of the spatial distribution and intensity of coastal and marine use activities to seabird disturbances.
- Use of data on beach-related consumptive and non-consumptive activities as exogenous factors in an analysis of changes to key metrics for sandy beaches.

We will actively exploit efficiencies with the other components of the larger effort, such as determining the timing of surveys, coordinating on field work, recruiting panel participants from the collaborative fisheries work, and identifying potential future socioeconomic citizen science opportunities in conjunction with the ecological work. We will prepare our data for integration into the shared project database using a standardized and shared set of thematic, spatial, and temporal resolution, and participate in the design and architecture of the project database early on in the project. This will facilitate the integrated analysis of the interactions between ecosystems and human uses. During the collaborative analysis component, our data will form the basis for inquiries into the relationships between human use patterns and various ecological/biological conditions (e.g., species presence/absence, size distributions) and also for estimates of the initial human use response to the MPAs in the study region.

Finally, we view this project as an opportunity to access and use data from and/or share our data with other (external) projects to achieve more informed and detailed results. For example, with the work proposed by the Santa Monica Bay Restoration Commission (SMBRC), *Measuring knowledge, attitudes, perceptions, and other resilience indicators among resource users in relation to new MPAs*, there is an opportunity to coordinate the outreach and education efforts of our respective studies (timing and participants) to both avoid potential survey fatigue and allow for comparative analysis. Together, we will investigate an analysis that compares perceived versus actual effects on fishing behavior associated with the South Coast MPAs or

other factors. This type of analysis will be informative for decision-makers in California and locations working to plan and design MPAs.

Approach

Our approach builds on previous work in support of the design and implementation of MPAs in several regions of the MLPA, notably Scholz et al. (2004; 2005; 2006a; 2008; 2010) and Pendleton and LaFranchi (2009), which demonstrated novel approaches for collecting, compiling and analyzing socioeconomic information at spatial resolutions to aid the design of MPA alternatives, including the final design implemented in the South Coast study region. By necessity, that work was focused on providing stakeholders and decision-makers a first order estimate of MPA impacts, and due to time and resource constraints did not contain the full range of consumptive and non-consumptive activities. It also constituted the first comprehensive set of socioeconomic data at an MPA-relevant scale for the South Coast, which, while recognized as desirable (Sala et al. 2002, Richardson et al. 2006), is typically absent from MPA design and implementation.

A similar approach is currently being implemented and refined through our work in the North Central Coast (NCC) monitoring program. The successes and lessons learned in the NCC will be directly applied to the methods and tools deployed in the South Coast region in order to provide a tested, consistent, and cost-effective method for long-term monitoring across California.

We propose to leverage the survey instruments and methodology developed for our North Central Coast monitoring project (Grant # 09-015, Project # R/MPA-16) to collect data on coastal use patterns, operation costs, trip expenditures, and demographic characteristics of California's South Coast consumptive and non-consumptive coastal and marine user communities. The work proposed here will help close existing coastal and marine human use information gaps and establish a baseline for long-term monitoring.

We will focus on three key categories of coastal and marine users:

- Commercial fishing;
- Commercial CPFV (consumptive, e.g., sport fishing and non-consumptive, e.g., whale watching); and
- Private coastal recreational use (e.g., surfing, beach going, kayaking, etc).

Our approach will include both the limited existing data on coastal and marine human uses and new data collection. For the former, we will draw on an earlier panel data collection effort focused on coastal and marine non-consumptive human use activities from Conception to San Pedro by Pendleton and LaFranchi (2009) as well as spatially explicit data collected by Ecotrust on commercial, CPFV, and recreational fishing as part of the South Coast MLPA process (Scholz et al. 2010). These data will be used to both reduce survey effort for a large portion of the study region and as a pre-MPA baseline against which to compare data collected to detect any MPA-related changes.

In order to collect new data, we will conduct several data collection efforts. First, we will deploy a web-based survey through Knowledge Networks, an internet survey provider specializing in providing statistically representative survey data through a peer-reviewed data collection methodology. This survey will collect spatially-explicit data on coastal recreational use patterns and associated trip expenditures. The sample will be representative of the entire study

population (i.e., it will allow us to extrapolate from sample to study population), which will be defined as residents from California counties along and associated with the South Coast study region.

We also will conduct a region-wide survey of commercial fishing and CPFV operations by targeting an economically representative sample and, where possible, obtaining census. Similar to the survey of coastal and marine recreational users, this survey also will collect spatially-explicit data. The study population for these surveys will be defined as commercial fishing vessels and CPFV operations based in and/or with a homeport in the South Coast study region. However, consideration will also be given to additional vessels or operations that fish/operate within the South Coast study region, but whose homeports or operations are located north of the South Coast study region boundary. In order to use time and funding most effectively, we likely will limit the scope of our surveys to commercial fisheries most likely to see changes associated with MPA implementation (e.g., urchin, lobster, nearshore rockfish, spot prawn, sea cucumber, rock crab, etc.) This is consistent with the approach currently being used in the North Central Coast monitoring effort.

We propose to modify our existing standardized methodology and survey instrument for conducting the surveys described above (and described in greater detail below). The proposed survey instrument will merge Ecotrust's Open OceanMap, a web-based and desktop data collection tool used to effectively collect local expert knowledge in support of a marine spatial planning process, with the sampling approach that was recently used to randomly sample California residents (*The California Coast Online Survey*), developed by NaturalEquity and the Coastal Oceans Values Center (Pendleton and LaFranchi 2009).

From these surveys, we will obtain spatially-explicit data on coastal use patterns, operation costs, trip expenditures, and demographic characteristics of California's South Coast study region consumptive and non-consumptive user communities. We intend to deploy the surveys around the one-year anniversary of the MPA network implementation so as to ensure that all data collected pertains to activities that have occurred since implementation. We describe the methods for each survey in more detail here.

Commercial fisherman and CPFV operator survey. A customized survey instrument (similar to the one currently being used in the North Central Coast monitoring effort) will be used to acquire commercial fishing data using methods designed to complement existing data previously acquired for commercial fishing and CPFV operations in the South Coast study region (see Scholz et al. 2008). Data will be collected using individual interviews and will be administered using a purposive, proportional quota sample designed to be economically representative of the commercial and CPFV fishery fleets overall. Commercial fishery data will be collected at the port, fishery, and gear-type level (e.g., Santa Barbara nearshore rockfish fishery - hook and line) as well as the study region level, when summarized across ports. CPFV surveys will target consumptive charter operators yet will collect spatial and economic data on both consumptive and non-consumptive activities, per port and across the study region.

Given the nature of the information we are interested in for this project, we will use a non-random sample designed to be representative of the most active fishermen in each fishery. It should be noted that the use of a random sample is not the most desirable sampling method to address the purpose of this study, which is to spatially represent the most economically important commercial fishing grounds and track socioeconomic shifts/changes in individual fishermen who represent the majority of landings in each commercial fishery. As was done

during the Ecotrust study (see Scholz et al. 2008 and Scholz et al. In Press for more details), we will utilize CDFG landings data to construct a purposive, proportional quota sample designed to be representative of the majority of landings in commercial fisheries in each port within the study region.

We will identify fishermen participating in a number of target commercial fisheries using California Department of Fish and Game (CDFG) landing data. CDFG staff will generate a list of fishermen by landings and we will inspect this list to identify participants such that, based on the population within the fishery groupings and port-groups, the sample will represent: (a) At least 50% of the total landings and/or ex-vessel revenue from 2000–07; and (b) At least five fishermen, except in cases where the sample population is fewer than five.

The rationale for targeting fishermen who comprise the majority of the landings (i.e. "highliners") in each fishery is based on the assumption that they have better spatial knowledge of the economically important fishing grounds than less successful or part-time fishermen. The 50% threshold was chosen to balance adequate representation of each fishery with cost-effectiveness. James Wilen and Joshua Abbott conducted an independent review of this approach, comparing it to existing logbook data from the California squid fishery. The review validated the accuracy of the spatial information resulting from the Ecotrust survey, and found our method to be appropriate in representing the economically important fishing grounds. (J. Wilen and J. Abbot, 2006, An Assessment of Ecotrust's Relative Importance Indicators: Comparisons with Logbook Data for the Market Squid Fishery, Report submitted to the California Marine Life Protection Act Initiative In partial fulfillment of Contract #2006-0014M, 8 June 2006, 24 pp.; online at <http://www.ecotrust.org/mlpa/WilenCDFGSquidReportFinal2.pdf>).

Targeting commercial fishermen who participated in the 2008 study (Scholz et al. 2008) also will allow us to conduct a comparative analysis of pre- and post-MPA implementation use patterns by port, fishery, and/or user group as well as at the study region level.

Private coastal recreational user survey. A customized, web-based survey instrument will allow us to acquire coastal recreation data that are directly comparable across all user groups. This survey utilizes a standing internet panel, hosted by a private provider (Knowledge Networks) capable of probability sampling (note: respondents cannot self-select for this survey mode) that is designed to provide a sample which is representative of the larger study population—thus allowing for extrapolation of survey data. As part of the North Central Coast study region monitoring effort, we are acquiring data for 27 activity types (e.g., surfing, beach going, kayaking, etc). This list will serve as our starting point along with the list of uses highlighted in, *The California Coast Online Survey* and will be revised as necessary to capture key coastal and marine human use activities in the South Coast study region.

Baseline creation. Using results from all surveys, we will be able to provide baseline estimates for the following:

- The a) distribution, extent, and intensity of human spatial use in the coastal and marine environment of the South Coast study region; and b) operational costs/trip expenditures at a spatial scale that is sufficient for comparing human uses inside and outside MPAs;
- The quantity of coastal users in the study population (i.e., participation rate);
- The quantity of fishing trips by commercial and CPFV sport fishing operations;
- The quantity of trips to the coast by recreational users, distributed across a set of use activities;

- The estimated direct economic impact of coastal trips; and
- The demographic and economic characteristics of coastal and marine users (i.e., a baseline for understanding existing factors influencing consumptive and non-consumptive use patterns and prospective or actual changes associated with South Coast MPA implementation)

In addition, we will use existing data to provide:

- A description of consumptive and non-consumptive human use patterns before South Coast MPA implementation, which will be compared to the new data collected.

Finally, we will use the survey results to describe:

- Spatial and thematic association with ecologically and economically relevant species.

It should be noted that these metrics/baseline estimates are consistent with those currently being used in the North Central Coast study region.

Data analysis. As mentioned previously, we anticipate being able to describe consumptive and non-consumptive use patterns just prior to, and immediately following MPA implementation. The data collected in this project will allow us, through comparisons to data collected in previous efforts (e.g. Scholz et al. 2008; Pendleton and LaFranchi 2009), to analyze the responses of consumptive and non-consumptive users to the MPAs. Observed changes between existing data and new data for private recreation, CPFV, and commercial user groups will form the basis for the development of a framework for understanding the causal role of MPAs in these changes.

We propose a series of steps to arrive at this analytical framework: (a) Initiate focus group discussions with consumptive and non-consumptive users and for-hire operators that serve them (to ask about perceptions and anticipated behaviors in response to MPAs), and (b) Meet with members of the ecological monitoring teams to formulate hypotheses about what are likely to be the most probable/significant ecological changes (significant in terms of the connection to human behavior), and (c) Devise an analytical framework that can be used to test abovementioned hypotheses in relation to a set of established socioeconomic and ecological indicators, making provision for adapting the framework/choice of indicators in view of new information.

We will develop an integrated set of socioeconomic and ecological indicators that are “linked” spatially, temporally, and numerically to the extent necessary to test for statistical correlations and, eventually, causal relationships. Such work might be confounded by MPA independent factors that affect MPA usage. Hence, we would also need to collect and use an array of MPA-independent data so we can control for a number of additional factors known or hypothesized to affect human use of the marine environment, such as fuel prices, access costs, and shift in recreational demand, to name a few. We anticipate that this work will occupy a large part of the collaborative analysis and synthesis with the rest of the larger integrative multi-project effort.

Outcomes and Deliverables

The overall outcome will be a comprehensive set of geo-referenced coastal and marine consumptive and non-consumptive data for the California South Coast study region, including a) spatial use and intensity, b) cost and expenditures associated with uses, and c) a demographic profile of users.

In addition to delivering the data, we will provide data interpretations that include, but are not limited to the following set of questions/topics:

1. Shifting fishing patterns (e.g., areas accessed, number of trips, permits actively used) and knowledge, attitudes and perceptions related to MPA implementation and other key drivers of consumptive use (e.g., fisheries regulations, fuel costs, shifting environment, etc.).
2. Patterns of private recreational use, including the economic impact of recreational trips to the coast and estimates of total recreational use for the region, distributed spatially and across users groups (e.g., beach goers, surfers, kayakers, etc.)
3. An overview of demographic and economic attributes by county and recent trends in key fisheries and factors that affect recreational use. These summary descriptions provide a baseline for understanding existing factors influencing coastal use patterns and prospective or actual changes associated with MPA implementation.
4. A description of the consumptive use patterns before MPA implementation.
 - a. For commercial fisheries, this will include information on fishery participants and landings (pounds, value, and distribution across ports and individuals).
 - b. For commercial sport fisheries, this will include information on operators and basic operations (trips taken, clients, species targeted).
5. An analysis of spatial data (from Ecotrust) to assess the distribution of existing consumptive (and non-consumptive) uses inside and outside MPAs.
6. Creation of initial data points for ongoing monitoring.
7. An assessment of implementation conditions using the final Ecotrust impact assessment for MPA networks implemented.
8. A description of initial changes in consumptive uses. We will conduct comparative analysis of pre- and post-MPA implementation use patterns such as fishing effort, catch, and value associated with individual MPAs, ports, and the study region.
9. An initial estimate of the quantity of animals removed from the system, over time and space.

In addition to data, outputs from this project will include contributions to an overarching project report, one to three peer-reviewed publications, and several “plain language” summaries of this research for use in outreach and education activities, including future citizen science activities.

Milestones Chart continued

- Project Coordination and Design – This component will include both internal and external project coordination and design. Internally, we will develop a detailed work plan for the entire three years of the project at the beginning of the project. This will allow us to coordinate and track performance towards objectives and budget, which we will review/modify at the end of each project year.

Externally, at the beginning of the project, we will collaborate with other components of the integrative multi-project effort on refinement of site selection and design; implementation and analysis of data; development of a shared database, which will allow for synthetic analyses; and participation in data analysis and synthesis workshops with the integrative team. At the end of each project year, we will coordinate with the larger project team to pursue areas of shared interest and conduct synthetic analyses.

- Outreach - Initial outreach efforts will begin in Fall 2011 and will target commercial fishermen, charter operators and recreational dive fishermen in key port communities (i.e., Santa Barbara, Ventura, Port Hueneme, San Pedro, Dana Point, Oceanside, and San Diego). Outreach efforts will be facilitated through a) key contacts established during previous work in the South Coast study region and b) contacting various user associations—such as local port or commercial fishery associations. In addition to providing a forum to voice and address concerns, these outreach meetings will also communicate project goals and objectives, review survey design and questions, and gather other key information to develop an effective monitoring methodology. During initial outreach meetings, we also plan to ask a series of qualitative questions to gather preliminary data on the possible impact of MPAs upon commercial and charter fishing.

A second and third wave of outreach efforts will coincide with the beginning of commercial and charter interviews (anticipated to begin June 2012 – to coincide with one year anniversary of MPAs implementation and then again in June 2013). These outreach efforts will focus on connecting with key port/fisheries representative and fishermen associations to inform the fishing community that interviews are beginning, provide an overview of the survey, and answer any remaining project questions.

- Survey Design and Tool Development – By necessity, survey design and tool development will occur after project coordination/design and initial outreach efforts have occurred so ideas and information gained during these initial steps can be incorporated.

During this phase, we will modify and adapt the surveys and tools currently being used in the North Central Coast monitoring effort for use in the South Coast. In addition, we will assess whether additional questions will be added to address issues that are specific to the South Coast study region.

- Data Collection/Management/Integration – The proposed approach and timing of the data collection efforts will follow the same schedule we are currently implementing for the North Central Coast baseline monitoring study. Using this approach, we will begin by conducting the private recreational use survey, using a standing internet panel in four waves for one year.

As for the commercial and CPFV data collection efforts, we also plan to conduct the first round of surveys around the one-year anniversary of the MPA network implementation and then again one year later.

In terms of data management and integration, derived products will be produced after each survey effort, using similar GIS formats (i.e., rasters, shapefiles, kml) to those we are currently producing for the North Central Coast. As part of the integrative multi-project team, the derived products will be accessible through a shared database, which will allow for synthetic analyses.

- Spatial Analysis – As mentioned in the data collection/management/integration section, after each survey effort, results will be compiled and combined spatially on where specific activities are occurring throughout the study region and the relative intensity of the activities in terms of number of trips or economic value. This work will begin after the first survey is administered and will continue throughout the entire project until all surveys are complete.
- Economic Analysis – By necessity, the economic analysis will occur after data have been collected and codified and spatial analysis has occurred. We will conduct economic analyses after both Years 1 and 2 of data collection. We will conduct a variety of spatial and non-spatial economic analyses to establish baseline values for coastal and marine users. Examples of this include a) estimating annual commercial and CPFV costs of operation by port and fishery/operation type; and b) estimating annual recreational trip expenditures by user group. In addition, for the commercial fisheries we will also combine the maps of fishing grounds from the fishermen with landings data to generate spatial representations of economic value. These maps can then be used to make comparative analyses with the location of MPAs and other factors. We will do a similar analysis for recreational activities using expenditure data instead of landings data.
- Collaborative Analysis – As part of an integrative multi-project proposal, we expect to work closely with Caselle and Blanchette and others from the onset of the project, beginning with a kick-off meeting to explore, discuss, and confirm opportunities for cross-disciplinary collaboration in refinement of site selection and design, implementation and analysis of data (e.g., draft hypotheses). Throughout the project, under the guidance of Caselle and Blanchette, we will provide regular updates and receive feedback on progress towards collaborative goals and objectives. After Years 1 and 2 of data collection are completed, we will participate in data synthesis work sessions with collaborators to investigate and report out on the baseline understanding of the interaction between ecological and socioeconomic indicators related to individual and MPA network performance.
- Reporting – Reporting is scheduled for the expected timing of the preparation and submission of project interim and final reports.

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