



Facilitating Research in Monterey Bay National Marine Sanctuary: Summary of the 2010 Workshop to Inform the Ecosystem-based Management Initiative

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About the Marine Sanctuaries Conservation Series

The National Oceanic and Atmospheric Administration's National Ocean Service (NOS) administers the Office of National Marine Sanctuaries (ONMS). Its mission is to identify, designate, protect and manage the ecological, recreational, research, educational, historical, and aesthetic resources and qualities of nationally significant coastal and marine areas. The existing marine sanctuaries differ widely in their natural and historical resources and include nearshore and open ocean areas ranging in size from less than one to over 5,000 square miles. Protected habitats include rocky coasts, kelp forests, coral reefs, sea grass beds, estuarine habitats, hard and soft bottom habitats, segments of whale migration routes, and shipwrecks.

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Monterey Bay National Marine Sanctuary:
Summary of the 2010 Workshop to Inform the
Ecosystem-based Management Initiative**

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Cover

The ONMS West Coast Region's *R/V Fulmar* off Plaskett Rock along the Big Sur coastline of central California. The *R/V Fulmar* supports various marine science activities in the Monterey Bay National Marine Sanctuary including science diving, remotely operated vehicles, and seabird and marine mammal surveys. Credit: Steve Lonhart, NOAA/MBNMS/SIMoN

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Executive Summary

Monterey Bay National Marine Sanctuary (MBNMS) has embarked upon a new initiative to improve ecosystem-based management (EBM) in the sanctuary by applying best available science and integrating and coordinating with partner agencies and stakeholders. The EBM Initiative has four primary goals:

- Maintain and/or restore marine ecosystem health, services and function;
- Ensure protection of unique and rare features;
- Facilitate research to differentiate between natural variation and human impacts;
- Facilitate ecologically and economically sustainable uses, including fisheries.

By working collaboratively with partner agencies and stakeholders, information related to these four goals has been and will continue to be gathered and evaluated to identify and implement actions to improve ecosystem-based management in the sanctuary.

To address the EBM Initiative goal of facilitating research, MBNMS staff convened a workshop on October 26th, 2010. The purpose of this workshop was to review existing spatial management, determine how it affects marine science, and discuss what kinds of strategies, if any, could facilitate science that supports ecosystem-based management of MBNMS. For this workshop, existing spatial management was discussed primarily in the context of marine regulated areas. The workshop was attended by 23 members of the regional research community, three fishermen who are collaborative vessel operators during research cruises, three members of the MBNMS Sanctuary Advisory Council's Ecosystem-based Management Subcommittee, four members of the public and 14 sanctuary program staff.

In preparation for the workshop, MBNMS staff requested invited members of the regional research community to answer a brief on-line questionnaire. Twenty-two responses were received. Staff compiled this information and used it to better understand how marine regulated areas affect marine science in MBNMS and the compatibility of various human activities with marine science. This information was also used to help structure the agenda and prepare materials for the workshop. In addition, a summary of responses was presented at the workshop prior to discussion sessions and served as a starting point for those discussions.

Prior to each of the three workshop discussion sessions MBNMS staff provided an overview of the discussion topics coupled with results from the on-line questionnaire. Because there are many different types of marine regulated areas off central California, including three national marine sanctuaries, the first presentation reviewed the location of major regulated areas in or adjacent to MBNMS, the regulations specific to each type of area, and the known or potential impacts of these regulations on marine science. To ensure that participants understood the diversity and spatial arrangement of these regulated areas, participants received three sets of supporting materials (provided in Appendices A-C): maps showing the location of regulated areas in central California; a 'cheat sheet' summarizing information about each type of regulated area (e.g., managing

agency, date established, permanence, research permit requirements); and a summary of regulations within each area.

After the presentation, participants were divided into three groups in separate rooms, and independently discussed the same list of topics. The participants discussed how existing spatial management either facilitates or impedes marine science and ways management could facilitate science. The second breakout discussion session focused on how current and emerging human activities affect marine science operations in MBNMS. Finally, a third discussion session brought all participants together and focused on the future of spatial management in MBNMS, including potential impacts of modifications to existing regulated areas, marine spatial planning at the regional and national level, marine science needs of MBNMS, and the role of the scientific community in management processes.

Key findings of this workshop were:

- Participants found the current spatial management scheme to be complicated and confusing. A more integrated and transparent system of spatial management could facilitate marine science planning and operations in MBNMS.
- Regulations and permitting requirements of state and federal agencies have both a real and perceived impact on regional scientists and can limit their ability to do marine science.
- There are science questions that are difficult to pursue in MBNMS given current spatial management (e.g., ocean acidification, impact of bottom trawling, acoustics).
- Areas are needed where research is promoted to study both applied and basic science questions and, in some areas, to allow for manipulative experiments.
- Long-term cooperative research sites (e.g., sentinel sites) could serve to protect scientific equipment given sufficient enforcement, and add value by co-locating compatible scientific studies, and sharing equipment and data.
- Scientists as stakeholders: given the impact that existing and future regulated areas and activities have on marine science capabilities, a number of workshop participants expressed a need for the regional science community to take a stronger role as stakeholders during decision making processes. It was noted that the stakeholder role should be kept separate from the traditional role the scientific community plays as providers of the best available science to inform resource managers.

This workshop was a successful first step in gathering information on how MBNMS can facilitate research in the sanctuary and better achieve the goals of the EBM Initiative. A draft report was made available to workshop participants for comments prior to the release of the final report. In addition, staff has summarized the findings of the workshop in oral presentations to both the MBNMS Research Activities Panel (November 12, 2010) and Sanctuary Advisory Council (December 9, 2010).

Key Words

Monterey Bay National Marine Sanctuary, marine science, research operations, human activities, ecosystem-based management

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Introduction

General background

The National Marine Sanctuary System is mandated to “maintain for future generations the habitat, and ecological services, of the natural assemblages of living resources that inhabit these areas.”¹ Now more than ever, agencies responsible for the stewardship of marine ecosystems must pursue innovative, proactive ways to manage and protect our valuable marine resources. We must work to accommodate multiple uses, ensure continued public access for recreational and commercial activities, and sustain and preserve healthy ecosystems and marine resources that are critical to the well-being and prosperity of us all.

As human use of the ocean continues to increase, resource agencies are challenged to effectively and efficiently manage significant and often competing demands on marine resources. Overlapping uses and differing perspectives among stakeholders can generate conflicts and misunderstandings. The existing laws, authorities, and governance structures intended to manage the use and conservation of marine resources have historically been applied in a piecemeal, single-sector manner, with little coordination among agencies. Within the National Marine Sanctuary System there are hundreds of domestic policies, regulations, and laws covering Federal, State, tribal, and local interests. These multiple regulatory layers create management challenges and potential conflicts among stakeholders.

In July 2010, President Obama adopted a new National Ocean Policy to address challenges such as these, calling for implementation of innovative management approaches such as Ecosystem-based Management (EBM). The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. EBM differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the entire ecosystem, including humans, and the cumulative impacts of different sectors. EBM relies on the best available information and science, coordination across partner agencies, integration of ecological, social, and economic factors, and stakeholder involvement in planning processes. Ecosystem-based management will help to improve long-term protection of marine resources, while allowing multiple uses that are compatible with resource protection.

According to the final recommendations of the Interagency Ocean Policy Task Force, one important approach for enhancing ecosystem-based management is to bring together diverse coastal and ocean stakeholders to make informed and coordinated decisions about how to use and manage coastal and marine resources. By taking a comprehensive examination of the different uses, resources and jurisdictions within a marine area, we can ensure diverse human uses are supported, reduce conflicts among stakeholders, maximize benefits people receive from the ocean, and help preserve a healthy marine ecosystem.

¹ Title 16 United States Code, Chapter 32, §1431(a)(4)(C)

MBNMS's Ecosystem-based Management Initiative

Since Monterey Bay National Marine Sanctuary's designation in 1992, the management and regulation of human activities, as well as access to resources and areas, have been implemented independently by multiple agencies with different priorities and jurisdictions over the sanctuary's 6,094 square-miles of ocean. These independent actions have resulted in a largely uncoordinated approach to the management of human activities. To date there has not been a collaborative, science-based process that addresses the various interests of multiple agencies and stakeholders to produce a comprehensive and ecosystem-based management approach for the sanctuary. A comprehensive approach would help reduce conflicts in use, simplify regulations for user groups, enhance protection of marine resources, and minimize redundancies across jurisdictions.

In recognition of these challenges and issues, Monterey Bay National Marine Sanctuary (MBNMS) is implementing the Ecosystem-based Management Initiative to more effectively manage the sanctuary. The primary purpose of the EBM Initiative is to improve ecosystem-based management by applying the best available science and integrating and coordinating with partner agencies and stakeholders. The EBM Initiative has four primary goals:

- Maintain and/or restore marine ecosystem health, services and function;
- Ensure protection of unique and rare features;
- Facilitate research to differentiate between natural variation and human impacts;
- Facilitate ecologically and economically sustainable uses, including fisheries.

By working collaboratively with partner agencies and stakeholders, information related to these four goals will be gathered and evaluated to identify and implement actions to improve ecosystem-based management in the sanctuary.

To gather information related specifically to the goal of facilitating research, MBNMS staff convened a workshop on October 26th, 2010. The purpose of this workshop was to review existing spatial management, determine how it affects marine science, and discuss what kinds of strategies, if any, could facilitate science that supports ecosystem-based management of MBNMS.

Workshop preparations

In preparation for the workshop, sanctuary staff compiled information on existing spatial management in MBNMS. The following information was gathered for each type of regulated area (available in Appendices A-C):

- GIS data of the most up-to-date management boundaries;
- a summary of regulations;
- level of governance;
- managing agency;
- year established;
- constancy of the boundaries;
- permanence of the area(s); and
- research permit requirements.

Staff created an on-line questionnaire consisting of 9 questions (Appendix D). A map showing the boundaries of all regulated areas in MBNMS and a summary of the regulations for each area type were created as references for respondents (provide in appendices). The purpose of the questionnaire was to provide MBNMS staff with preliminary information on how marine regulated areas currently affect marine science in MBNMS and the compatibility of various human activities with marine science. Members of the regional research community that had been invited to attend the workshop were emailed a request to take the on-line questionnaire four weeks prior to the workshop. Twenty-two responses to the questionnaire were received.

Information gathered through the questionnaire was used to help structure the agenda and prepare materials and presentations for the workshop. A summary of responses was presented at the workshop prior to discussion sessions (Appendix E) and served as a starting point for those discussions.

Workshop structure and agenda

Twenty-three members of the regional research community, three fishermen who are collaborative vessel operators during research cruises, three members of the MBNMS Sanctuary Advisory Council's Ecosystem-based Management Subcommittee, and four members of the public attended the workshop (Appendix F). The one-day agenda consisted of four sessions: background information, two breakout group sessions, and one large group discussion (agenda available on pages 6-7).

The workshop began with MBNMS Superintendent Paul Michel introducing the Ecosystem-based Management Initiative, including the goals, strategies for implementation, and the role of workshops in the information gathering phase of the process. The purpose of this workshop was to receive information from the participants on how regional marine science is affected by existing spatial management and human activities, and to discuss strategies that could facilitate science in the sanctuary. To ensure that all workshop attendees had a clear understanding of current spatial management in the sanctuary, staff reviewed the location of regulated areas in and adjacent to MBNMS, the regulations specific to each type of area (including MBNMS's regulations), and their potential impacts on marine science. Participants received three sets of supporting materials: maps showing the location of regulated areas in central California (Appendix A); a summary of regulations for each type of regulated area (Appendix B), and a 'cheat sheet' summarizing information about each type of regulated area (e.g., managing agency, date established, research permit requirements; Appendix C).

Prior to each breakout discussion session, MBNMS staff provided an overview of the discussion topics coupled with results from the on-line questionnaire. After the presentation, participants were divided into three groups in separate rooms, and independently discussed the same list of topics. During the first session, the participants discussed how existing spatial management affects marine science in MBNMS. Participants focused specifically on how current spatial management either facilitates or impedes marine science and provided suggestions on how to improve management to facilitate science. The second discussion session focused on how human activities affect marine science operations in MBNMS. In particular, participants discussed the compatibility of current and emerging human activities with marine science in MBNMS.

The last discussion session brought all participants together and focused on the future of spatial management and marine science in MBNMS. This discussion began with the potential impacts of modifications to existing regulated areas on regional science, but then broadened to include marine spatial planning at the regional and national level, marine science needs of MBNMS, the Ecosystem-based Management Initiative of MBNMS, and the role of the scientific community as a stakeholder in management processes.

Summary of workshop discussions

MBNMS staff took notes during each discussion session. Two note takers – one using a flip chart and one using a laptop computer – were assigned to each discussion session. Flip charts were used to capture the main themes during small and large group discussions and to help breakout groups report out to the large group. Laptop note takers attempted to capture individual comments during the small and large group discussions and the question and answer periods. Note takers did not capture individual comments verbatim, but aimed to capture the overall content of the discussions. After the workshop, all the notes were combined and grouped by topics. Similar comments may have been combined for brevity. The ordering of topics generally follows the workshop agenda. The purpose of the summary notes section of this report (pages 8-22) is to provide the range of topics covered and summarize comments received during the workshop.

Key findings

A number of topics came up repeatedly in discussion sessions. These topics included:

- The current spatial management scheme is complicated and confusing, apparently because each managing agency is focused primarily on its own mandates and specific regulations. A more integrated and transparent system of spatial management could facilitate marine science planning and operations in MBNMS.
- Regulations and permitting requirements of state and federal agencies have both a real and perceived impact on regional scientists and can limit their ability to do marine science.
- There are science questions that are difficult to pursue in MBNMS given current spatial management (e.g., ocean acidification, impact of bottom trawling, acoustics).
- Areas are needed where research is promoted to study both applied and basic science questions and, in some areas, to allow for manipulative experiments.
- Long-term cooperative research sites (e.g., sentinel sites²) could serve to protect scientific equipment given sufficient enforcement, and add value by co-locating compatible scientific studies, and sharing equipment and data.

² The term ‘sentinel sites’ was used by some staff and participants during discussion sessions, but no definition of this term was provided by staff or suggested by participants. This term was used during discussions of sites for long-term monitoring studies and/or equipment installation. ONMS has tentatively defined the term sentinel sites as ‘intensely studied and monitored areas within national marine sanctuaries’. The definition aligns very closely with the way the term was used during the workshop.

- Scientists as stakeholders: given the impact that existing and future regulated areas and activities have on marine science capabilities, a number of workshop participants expressed a need for the regional science community to take a stronger role as stakeholders during decision making processes. It was noted that the stakeholder role should be kept separate from the traditional role the scientific community plays as providers of the best available science to inform resource managers.

Next steps

This workshop was a successful first step in gathering information on how MBNMS staff can facilitate research in the sanctuary to better achieve the goals of the EBM Initiative. A draft report was made available to workshop participants for comments prior to the release of the final report. In addition, staff has summarized the findings of the workshop in oral presentations to both the MBNMS Research Activities Panel (November 12, 2010) and Sanctuary Advisory Council (December 9, 2010).

The expected next steps related to the EBM Initiative goal of facilitating research in the sanctuary include:

- Validate and expand workshop findings through additional outreach to the regional research community (e.g., follow-up survey, presentations), perhaps facilitated by the MBNMS's Research Activities Panel;
- Create a task force to address concerns over research permitting;
- Create a task force to develop strategies to facilitate research in the sanctuary (e.g., improved coordination, opportunities for collaboration, web portal activities related to ship time);
- Integrate spatial data layers showing research activities (e.g., research equipment locations, long-term monitoring sites) to develop spatial data layers for research hotspots;
- Analyze the spatial data to identify potential research areas and/or sentinel sites and evaluate potential conflicts with other sustainable uses;
- Present findings from the above analyses to expert groups and stakeholders to develop strategies to facilitate research and minimize impediments to multiple uses.

Workshop Agenda

Workshop on Research Areas in the MBNMS

Monterey Bay National Marine Sanctuary

NMFS, Santa Cruz Lab

October 26th, 2010

Goal: To review existing spatial management, determine how it affects marine science, and discuss what kinds of strategies, if any, could facilitate science that supports ecosystem-based management of Monterey Bay National Marine Sanctuary

8:00-8:30 *Coffee and continental breakfast in lab foyer*

8:30-9:00 Welcome/Introductions

Review agenda

Ground rules

9:00-9:20 Background information:

- What is the Initiative and how this workshop fits into the process

9:20-10:00 Review existing spatial management with an emphasis on regulated areas

- Location of and regulations in existing regulated areas in the region
- Summarize responses to the on-line questionnaire relative to regulated areas

10:00-10:15 *Break (refreshments provided)*

10:15-11:15 Break-out Groups Session 1 - Facilitated discussion on the topic:

How does existing spatial management affect research activities and operations in the region?

- Have you located studies inside regulated areas because they facilitate your science?
- Have you avoided locating studies inside regulated areas because they restrict your science?
- What factors limit the ability to conduct studies in regulated areas (e.g., habitat type, depth, disturbance, equipment, lack of control sites)
- Are there certain questions that cannot be studied given the current management scheme?
- Any suggestions for improving current management scheme to facilitate science?

11:15-12:00 Report out and discussion

12:00-12:15 Public Question & Answer period

- 12:15-1:00 *Lunch (provided)*
- 12:30-1:00 Optional Brainstorming Session – Workshop on Sustainable Uses in the MBNMS
- 1:00-1:20 Review human activities in the region
- Summarize responses to the on-line questionnaire relative to human activities
 - What human activities currently interact (positively and negatively) with research activities and operations
- 1:20-2:20 Break-out Groups Session 2 - Facilitated discussion on the topic:
How do human activities affect research activities and operations in the region?
- What human activities are incompatible with your research studies? Are those activities currently managed in the region?
 - Are there human activities that are necessary to your research studies? Can you find areas to work where those activities occur?
 - Are there emerging human activities that could affect your research studies?
- 2:20-3:00 Report out and discussion
- 3:00-3:15 *Break (refreshments provided)*
- 3:15-4:30 The future of spatial management in the region
- Discuss scheduled changes in status quo zoning – how do they impact research?
 - Any suggestions for modifications to the current management that would facilitate research
- 4:30-4:45 Public Question & Answer period
- 4:45-5:00 Wrap up – next steps
- 5:00 Adjourn

All attendees are invited to the West Side Brew Pub (on Swift Street – behind New Leaf market) for casual conversation and refreshments (not hosted).

Note: We will not be striving for consensus during this workshop; a range of considerations may be reflected in the presentations and discussions.

Note: Index cards will be available to the public to write down questions and comments. We will answer questions directly related to the topics covered in the agenda during the designated public Question and Answer periods. If a question is not addressed during the Question and Answer period due to insufficient time, MBNMS staff will respond via email.

Summary Notes of Workshop Discussions

Monterey Bay National Marine Sanctuary staff convened a workshop on October 26th, 2010 to gather information on how existing spatial management (see Appendix A for maps) and human activities in MBNMS affects marine science, and to discuss what kinds of strategies could facilitate science that supports ecosystem-based management of the sanctuary. The workshop summary provided below was compiled from notes taken by staff during the workshop using both flip charts and laptop computers. Note takers did not capture individual comments verbatim, but aimed to capture the overall content of the discussions. Similar comments have been grouped by topics and similar comments may have been combined for brevity. Therefore, a single bullet point below may represent a comment made once or multiple times throughout the day and may represent the point of view of one or several participants. The views expressed in the notes summary reflect those of one or more workshop participants and are not necessarily consistent with the management objectives and actions of MBNMS or the Office of National Marine Sanctuaries. The ordering of topics generally follows the workshop agenda (available on pages 6-7). Appendix G contains a list of acronyms used in this report.

Topic: How does existing spatial management affect marine science?

In the first breakout group session, workshop participants were asked to discuss how existing spatial management affects marine research activities and operations in MBNMS. Specifically participants were asked whether they had located studies inside or outside of regulated areas because those areas either facilitate or restrict science. Participants discussed which factors (e.g., habitat type, depth, disturbance, equipment, control sites) limit their ability to conduct studies in regulated areas. Participants identified questions that could not be studied given the current management scheme and made suggestions for improving current management to facilitate science.

Reasons to do science INSIDE regulated areas

- Minimize negative impacts of human activities on research equipment or operations
 - scientists have placed gear inside no-trawl areas to avoid disturbance or loss
 - less vessel traffic in MBNMS (especially fishing vessel traffic) has made it easier to release and follow drifters – less vessel traffic may be due to reduced fishing activity in some zones and/or offshore vessel traffic zones
- Scientist(s) want(s) resource managers to use their science to inform management
 - example: a study using SCUBA to count fish was located in MBNMS, as opposed to an adjacent area, in hopes that results would be used by managers
- The study focuses on the impact of the regulated area, resources, or activities
 - Studies on the effectiveness of the regulated area(s)

- telemetry studies (fish), SCUBA, and remotely operate vehicle (ROV) surveys of organisms and habitat to look at effectiveness of Marine Life Protection Act (MLPA) State Marine Reserves (SMRs) and State Marine Conservation Areas (SMCAs)
 - Consumptive vs. non-consumptive human use impacts of MLPA Marine Protected Areas (MPAs)
 - Inside vs. outside comparison to understand impact of a human activity
 - using MLPA MPAs to study impact of harvest/collection
 - using Areas of Special Biological Significance (ASBS) to study impacts of pollutants/discharges on water quality (WQ); is WQ better inside than outside?
 - Studies on ecosystem recovery after removal of human activities.
 - recovery from fishing, bottom trawling, discharge
 - Studies of ecosystem processes in areas with less human perturbations
 - Natural seafloor disturbance
 - Sediment resources
- MPAs are also a good education tool - introducing students to areas that are less disturbed by humans

Questions that could NOT be studied given current spatial management

- Beach nourishment studies
 - MBNMS prohibits creating new disposal sites
- Studies using bottom trawling
 - Experimental trawling not allowed in MLPA SMR/SMCA, state waters
 - Currently it is difficult to study the effects of bottom trawling. Need to allow experimental trawling in no-trawl areas and restrict trawling in historically trawled areas (this would require redesigning the current trawl/no-trawl areas and regulations)
- Ocean acidification studies
 - MBARI conducted an ocean acidification study outside sanctuary boundaries because discharge of liquid CO₂ is prohibited in MBNMS³
 - ASBS may not allow discharge liquid CO₂ either

³ Discharging or depositing any material or matter (including liquid CO₂) within or into the sanctuary is a prohibited activity. Small-scale discharge of liquid CO₂ to study the effects of ocean acidification has been authorized under research permits in the MBNMS, because the adverse effects on Sanctuary resources were deemed short-term and negligible.

- The need to install a submerged cable for power may make it difficult to move the Free Ocean CO₂ Enrichment (FOCE) experiment into shallow water (MBNMS and state regulate the installation of submerged cables)
- Adaptive management of regulated areas
 - Unable to modify the regulations
- MPA impacts on displacement of fishing effort
- Effectiveness of some regulated areas
 - Unable to sample or do manipulative experiments inside some areas
- Habitat creation/restoration
 - Difficult to create/restore habitat to see what would develop in a habitat that used to exist
- Acoustics (including passive listening)
 - Permitting process led to one of these studies moving outside MBNMS
- Long-term monitoring stations/sites no longer sampled/studied because new MPA regulations prohibit this activity
 - e.g., MLPA SMRs and potentially Davidson Seamount
- Restricted over-flight zones (MBNMS) have limited research by Naval Postgraduate School. May also restrict use of LIDAR

Reasons studies are located OUTSIDE regulated areas

- Lower cost of research
 - MBNMS requirement to recover anchors <500 lbs substantially increases costs and sometimes researchers opt to do those studies outside MBNMS
 - MBARI has moved study of sediment flux of canyon system outside MBNMS
- Permitting issues
 - Lengthy process to obtain some research permits, especially if there are multiple layers of zoning (State, Federal, etc.)
 - Obtaining fishing permit exemptions from PFMC – timing, process, and politics (by the time an exemption was permitted, the optimal study period had been missed)
 - More permitting entities mean more reporting back is required
- Overlap of two or more zones
 - ASBS (which regulate discharge) overlap in some areas with MLPA MPAs (which regulate “take” of biological resources). Having some areas with one type of protection and some areas with two types of protection could result in experimental design problems

- Dischargers need to monitor outfalls in ASBS; however, to do that research they need to employ sampling methods limited by overlapping zones (e.g., sediment samples and trawling)
- Regulated areas may not contain the habitat type, bathymetry or other features needed for the research question or operations

Other ways marine science is limited by current spatial management

- Currently there is a patchwork of restrictions that are static – they do not necessarily represent or protect dynamic processes
- Many of the zones deal with fishing activity so that lines are somewhat arbitrary from the perspective of other resources and can make it difficult to utilize these zones for non-fishing related research
 - For example there are two canyons offshore – one is inactive and one is active – would be good to compare them, but zoning over those areas is different
- The current areas/zones are not set up for research
 - Need to be able to do science to determine if current protected areas are effective. Manipulation studies to address management questions/issues are not allowed in some regulated areas
 - MLPA MPAs
 - Boundaries of EFH areas
 - ASBS
 - Some researchers would like to do randomized block studies with different treatments (e.g., to manipulate trawling, aquaculture), but can't be done under current spatial management
 - Existing areas are set up for management, not research; therefore it can be difficult to test hypotheses regarding responses to changes in human use
- Because MPAs have been established, there is research to study effects/benefits of those MPAs. Other research is not happening because research effort is being focused on the protected areas
- Having areas managed by government agencies means that politics can get in the way of efficient science

Topic: Compatibility of human activities with marine science

In the second breakout group session, workshop participants were asked to discuss how human activities affect marine research activities and operations in the region. Specifically participants were asked to identify human activities that are incompatible with their research studies. In addition, participants discussed the types of human activities that are necessary to their research

studies (e.g., an activity required for research operations, the study evaluates the impact of the activity on resources). The potential effects of emerging human activities were also discussed.

Human activities that can be INCOMPATIBLE with marine science

- Personal motorized watercraft, kayakers, other boating can interfere with buoys (subsurface, surface)
- Shipping lanes and vessel traffic
 - Interrupt transects and deploying equipment (e.g., CTDs)
- Dredging and dredge disposal
 - Dredge disposal offshore at Moss Landing interfering with canyon transport studies
 - Dredge may alter the distribution of pollutants (DDT found down canyon axis and unclear if it is from dredge or watershed)
- Point and non-point pollution
 - Pollution can negatively affect natural conditions that in-turn might be the target of research
 - It is difficult to find good reference areas that are not affected by any pollution sources but are similar in other respects to the coastal areas affected by pollution
- Recreational SCUBA diving
 - Theft or tampering with deployed equipment
 - Feeding fish affects behavioral studies
 - Anchoring on study sites (marker buoys would help prevent this)
- Intertidal access
 - Trampling of long-term monitoring sites
 - Harvesting
- Poaching within MPAs
 - Scientists/boat operators frequently have observed people fishing in the MLPA reserves
- Fishing activities
 - Fishing gear (traps, crab pots, trawling, trolling) and vessels can disturb cables, anchors, benthic instruments, moored instruments and buoys (both surface and subsurface)
 - Harvest can impact research through
 - habitat disturbance
 - biomass removal
 - Lost fishing gear (gill nets, long lines) affect ROV work, could entangle AUVs

- Space conflicts between research and fishing - Who has the right of way?
- Conversely research instruments can impact fishing and boating
- Some scientific equipment can be incompatible with other scientific equipment or activities
- Harvest to support aquaculture

Suggestions for minimizing incompatibility of activities

- Human activities are occurring even though they are prohibited
 - Need for enforcement
 - Lack of enforcement response due to limited resources
 - Local law enforcement doesn't know what is anchored on seafloor or subsurface
 - Need for education
 - Local
 - Non-English speaking
 - Non-local (e.g., violators from central California)
- Sometimes conflicts could be avoided if there was a way to manage timing of those activities
 - Presence of fishing gear (e.g., crab pots) prevents sampling at long-term monitoring stations. Because the monitoring occurs at the same time every year, the fishing could just be limited at those sites for a short time window
 - Sampling at long term monitoring stations has been prohibited by Navy activity in military zones. Shared information on timing of activities could reduce conflicts

Human activities that are NECESSARY to marine science

- Fishing – Fisheries-dependent data important to research and management
- Boating
- SCUBA
- Sediment sampling
- Dredging – without it the research vessels could not leave the harbor
- Infrastructure (construction and maintenance)
- Conservation (Agency, Non-Government Organizations, etc.)

Some human activities were identified as ‘necessary’ because the activity is the factor being studied. If the human activity ceased, then there would be no need for the studies and research effort would be directed to another topic.

- Energy production
- Sewage treatment and discharge
- Freshwater and/or thermal discharge
- Land uses and non-point source pollution

What emerging human activities could impact marine science

- Global climate change associated impacts (sea level rise, ocean acidification, nutrient loading, etc.)
 - Need to understand human-caused vs. natural cycles/changes
- Energy production
 - Offshore alternative energy (wind, wave)
 - Deep energy exploration
 - There is need for science/monitoring
- Seafloor mineral extraction
- Geo-engineering (e.g., iron fertilization)
- Fisheries: expanding fishery take, rebuilding fisheries to sustainable levels, new fisheries
- Aquaculture
 - Offshore pens
- Deep ocean exploration for research and tourism
- New construction and development along coast
- Coastal armoring
- Human population growth
- Coastal and Marine Spatial Planning (CMSP)
- Pollutants – endocrine disruptors, pesticides, herbicides, other anthropogenic contaminants, emerging pollutants
- Increased underwater noise

Topic: The future of management in the sanctuary

In the third discussion session, all workshop participants were asked to discuss, as a single group, the future of management and science in MBNMS. This session began with the potential

impacts of modifications to existing regulated areas on regional science, including the creation of areas to promote and facilitate research. Participants discussed other ways to facilitate regional science, such as improving coordination among researchers and streamlining the permitting process. The discussion then broadened to include marine spatial planning at the regional and national level, marine science needs of MBNMS, the Ecosystem-based Management (EBM) Initiative of MBNMS, and the role of the scientific community as a stakeholder in management processes.

Areas that promote and/or facilitate research

- There is a need for long-term protected areas in relevant locations where research is promoted and manipulative studies are allowed. Many of the current protected areas allow observational research only
 - The science should be able to focus on many aspects of understanding the ecosystem, not just for management purposes
 - Need to be established for the LONG-TERM. Allows for repeated assessment of organisms, habitats, and human impacts to understand both short-term and long-term responses to protection
 - Need to accommodate manipulative studies to look at response of community to stressors
 - Allow human uses that may be prohibited elsewhere or are incompatible with some research
 - Manipulative trawling, aquaculture, and basically randomized block studies with different treatments. For example, the experimental fisheries study in Morro Bay
 - May lead to short-term incompatibilities with other research projects in the areas
 - May need to establish impact areas and non-impact areas
 - Have areas that are not affected by human activities or have certain time periods that human activities are not allowed
 - Consider using current MPAs as the control sites when feasible
 - What about studies that want to examine variation in variables (e.g., changes in pollutants, carbon dioxide, salinity)? Currently studies like this take place in the lab, is it feasible to do them at an ecosystem scale?
- Suggested characteristics of research areas
 - Include different habitat types inside
 - Nearshore
 - Offshore water column
 - Offshore benthic

- Consider including research ‘hot spots’ – locations repeatedly used for research and monitoring. Long-term monitoring sites should be included to help maintain those sources of long-term trend data
 - Mussel Watch
 - CalCOFI lines
 - Pearse’s intertidal survey transects
 - NMFS groundfish trawl surveys
- Consider including processes ‘hot spots’
 - Upwelling zones
 - Beach erosion
 - Sediment transport
 - Larval fish recruitment
- Considering selecting areas where indicators of ecosystem health can be measured
 - The IEA and EBM Initiative should help identify those indicators
 - Baseline studies (e.g., Beach COMBERS) may help provide those indicators
- Consider how surroundings could influence the focal area
 - Surrounding/overlapping regulated areas
 - Terrestrial/watershed
 - Example: for determination of natural water quality in ASBS, ocean reference sites have been selected that have 95% open space in the contributing watershed
 - Inputs and processes
- Consider a type of research area (e.g., sentinel sites) that focuses on coordination/collaboration among researchers while minimizing equipment disruption and facilitating enforcement
 - Location(s) where researchers co-locate equipment
 - Examples: MARS cable, M1 buoy
 - Creates a synergy with other research, shared data sets, etc.
 - Provides protection for the equipment
 - Exclude activities likely to disturb equipment
 - Facilitate enforcement
 - Location where certain type of equipment can be installed that would not be readily permitted elsewhere

- For example, submerged cables (availability of research cable could decrease boat traffic and underwater noise in and around the site)
- One group suggested having sentinel sites within MBNMS that connect to research hot spots
 - Research hot spots: located around long-term research sites/stations/equipment
 - Sentinel sites could:
 - Have areas for manipulative experiments; need to be able to regulate human activities inside the area
 - Have an alternative sanctuary permit process for these areas, encouraging research to benefit overall MBNMS understanding
 - Also have control areas to assess natural/healthy state of the ecosystem
- Other considerations
 - Use areas that are already closed to fishing as much as possible – avoid creating new areas closed to fishing
 - Instead of new zoning, issue a permit. Similar to MBNMS research permits
 - Think more critically about co-locating research or other ways of separating incompatible activities (temporal regulations or permitting)
 - There was interest in exploring the Smooth Ridge area as a potential research study area due to the equipment on the seafloor and its vulnerability to damage from bottom contact fishing gear
 - May not be able to study a ‘natural’ system. For example, if you’re studying fish populations, endocrine disrupters are confounding factors that might be unavoidable

Coordination of research

Another way to facilitate marine science in the region would be to create tools to improve coordination among the research community

- Create a regional marine science information database – what research is occurring in the region and the location of study sites/stations?
 - Could improve coordination between agencies related to planning science
 - Could help researchers leverage funding
 - Better coordination could reduce redundancy
 - The Coast Water Quality Data Synthesis Assessment and Management (SAM) project should be expanded beyond water quality to other ecological data
- Ways to get location information from researchers

- MBNMS permit applications will provide information – however, not all research requires a permit
- Agencies scientists required to make navigation data available
- Researchers likely to provide location information if there are deliverables/products that benefit the research community
- Need to include scientists that live outside the region, but work in MBNMS
- Ways to provide summary information to research community
 - MBNMS/SIMoN website already provides this type of information
 - Research project summaries, MPA monitoring map, water quality viewer
 - Can be difficult to keep this kind of tool up to date, especially if you want to make data available, not just metadata
 - A meeting of area researchers to share what they are doing and learn what others are doing
 - Have regularly schedule calls (e.g., weekly) that summarize all of the activities and locations of on-going research in MBNMS. This could include a map. A call/map is one idea of the deliverable in return for the information from scientists
- Any reason researchers would not want to disclose location information of current research?
 - Yes, if studying populations or resources subject to poaching, vandalism, etc. or threatened populations
 - There may be confidentiality issues (e.g., not supposed to disclose specific locations of fisheries-dependent data)
 - Constraints of time and staffing for scientists. Process for providing information would need to be quick and easy

Permitting

Permitting problems (some of these problems are summarized on Page 10 above)

- The permitting process can be slow and cumbersome, especially when there are multiple permitting agencies involved⁴
 - Must apply separately for permits from each agency.
 - To get a permit from one agency sometimes requires use of methods prohibited by another agency
- The process of obtaining CDFG scientific collecting and MPA permits needs to be improved/streamlined; MPA Monitoring Enterprise should be included/engaged

⁴ The majority of MBNMS research permit applications received are to conduct routine research activities with short-term, negligible adverse effects on Sanctuary resources. These permits are typically issued within 14 days or less, and no application fees are required.

- Doing new/emerging/innovative research can cause additional permitting problems because research methods may be new and/or impacts are not known
- Reporting back to agencies is very time consuming especially if there are multiple permitting agencies

Potential solutions

- Develop a common set of permit requirements across agencies
 - Identify research exemptions - a spectrum of activities that fall under a threshold (no permit necessary)⁵
 - The regional water quality control board has thresholds for projects. If a project is of small size and/or duration, it may not require a permit; perhaps MBNMS could “adopt” such a scheme
 - Need to look more at scale of impact (i.e., size of anchors, drilling, discharging, etc.). What is “allowable”?
 - Establish a set of broad pre-approved permits that are allowed⁶
 - Get the outside community to help MBNMS decide on certain permitting issues (e.g., acoustic levels, CO₂ levels) to create a criteria of yes/no or a general blanket permit for these topics⁷
- Streamlining of the permitting process would be very helpful, especially for studies in locations with overlapping regulations and multiple management agencies
 - A one-stop shop for permitting similar to Resource Conservation Districts for freshwater research
 - MBNMS has a pretty good history of easing reporting
 - Could sanctuary function as an “ombudsmen” to coordinate across agencies?
- Streamline reporting back to permitting agencies - would be ideal to have a single report that satisfies the many agencies requiring them
- May be useful to facilitate a meeting in the future on the topic of science permits

⁵ If an activity is prohibited by MBNMS regulations (thus unlawful to be conducted), a permit must be requested. If the activity will have at most short-term and negligible adverse effects on Sanctuary resources and qualities, a research permit can be issued.

⁶ The methods and scope of every research application received by MBNMS vary greatly, and pre-approving activities is not practical. Common research permit triggers are identified at the permitting website (http://montereybay.noaa.gov/resourcepro/permit/permits_need.html). More often than not, common research activities will have at most short-term and negligible adverse effects on Sanctuary resources and qualities, and a research permit can be issued.

⁷ Sanctuary staff consult with other agencies and subject matter experts during the permit application review process. For example, the disturbance or take of marine mammals is permitted by regulations under the Marine Mammal Protection Act, and marine mammal scientists at NOAA Fisheries are consulted for requests to operate sound emitting equipment (e.g., acoustics).

- Outreach to funding agencies (such as NSF) marketing that sanctuaries are a place to encourage research
- Provide letters of support from the sanctuary program with appropriate research proposals to allay concerns of funding agencies related to research permitting requirements

Enforcement

- Tampering with equipment had been a problem for some researchers. Local law enforcement should know what is anchored on seafloor or subsurface
- Enforcement of human activities is not working in some areas (e.g., MLPA MPAs); but enforcement will be a problem in the foreseeable future (especially given budgets)
- Citizen enforcement/notification via iPhone images/video application
- Have NOAA law enforcement know where studies are or have cooperative research sites for placement of expensive equipment and other equipment that would otherwise be vulnerable to tampering/theft

Other ways to facilitate research

- Need education and outreach on existing spatial management
 - Improve access to current spatial management boundaries
 - The maps created for the workshop were very helpful to many participants who had never seen all the overlapping zones on one map before
 - Need maps at boat ramps
 - Need a way to see boundaries when at sea and to know what is allowed/not allowed in any portion of the ocean
 - Include spatial management areas on navigation charts
 - iPhone app?
 - Need a way to inform out-of-area researchers of the current regulations, permitting needs, etc. when they travel here to do research
 - Need information on when regulated areas are coming up for review
 - Could help inform experimental design
 - Will help research community know when to plug into review process as a stakeholder group
- Need to promote/help science occur via ship time and funding opportunities
- Can MBNMS staff facilitate research in other regulated areas? This might reduce need for new areas

Scientists as stakeholders

- Scientists are stakeholders, and scientists have an obligation to help inform public policy
- Scientists should be involved as stakeholders in the process of marine spatial planning
 - As a stakeholder at the table, discuss how zoning can impact research and the compatibility of research with other activities. To make sure there are areas accessible for research
 - Keep stakeholder role separate from the traditional scientist role of providing best available science to decision makers and follow-up monitoring to determine if management goals are met
- The research community as a whole needs to be represented in decision making processes (e.g., offshore aquaculture, alternate energy), rather than just tapping a few individuals
 - Need mechanism that includes more than just marine science (agriculture and other land-uses that impacts water quality in the ocean)
- Need scientists involved in the process of anticipating and responding to emerging issues
 - Anticipate location of projects
 - Collect baseline data
 - Develop types of indicators
 - Conduct small scale manipulations

Research strategic plan

- MBNMS needs a strategic plan that outlines research priorities, and in a format that is simpler to read than the current Management Plan
 - Need this to focus the research with limited funds
 - Would help MBNMS prioritize assets (i.e., Twin Otter aircraft, R/V *Fulmar*)
 - Related to Research Areas: what are the priority questions and how would a research area help answer those questions?
 - The MBNMS Research Activities Panel (RAP) could help to identify these needs
- Put list of research needs into a timeline. Prioritize by time

Ecosystem-based Management (EBM) Initiative

Continue information gathering on topic of facilitating research and research areas

- Add the following to the maps and regulation summaries
 - Kelp leases
 - California's Critical Coastal Areas
 - Relevant zoning on land

- Where is research concentrated?
 - Include Mussel Watch sites
 - SIMoN is in the process of developing a map viewer of all monitoring projects registered in the SIMoN system
- Where are human uses concentrated? Include
 - Clean Water Act Section 303(d) listed impaired waters in the sanctuary and its watersheds
 - Offshore outfalls for waste water
 - The aggregated Vessel Monitoring System (VMS) tracks (though important to remember that these data are confidential and can only be presented as an aggregate)
- Have research community identify research hot spots:
 - Where are the essential activity areas for researchers?
 - Where do we most want to avoid conflicts with other users?
 - What is critical to researchers?
- Hot spots for other stakeholder groups⁸
 - Where are the human activities occurring? The MPA Science Center has mapped a lot of it
 - Hot spots for vessel activity – could use VMS to map hotspots as long the information was aggregated
- Location of different ecological functions and resource hot spots to help identify indicators to measure ecosystem health⁹

MBNMS staff should think about research and research areas in the larger context of the EBM Initiative

- What are the key questions to inform the EBM Initiative? Maybe this is a way to prioritize research questions
- Be involved in PFMC's Essential Fish Habitat (EFH) review process
- Be involved in PFMC's Ecosystem Fishery Management Plan
- Be involved in NOAA's Integrated Ecosystem Assessment (IEA)
 - Importance of water quality data – effects of poor water quality are masked/subtle and therefore hard to test using field experiments. Need to include them as indicators in IEA...but hard to define, hard to find the necessary data (especially offshore)

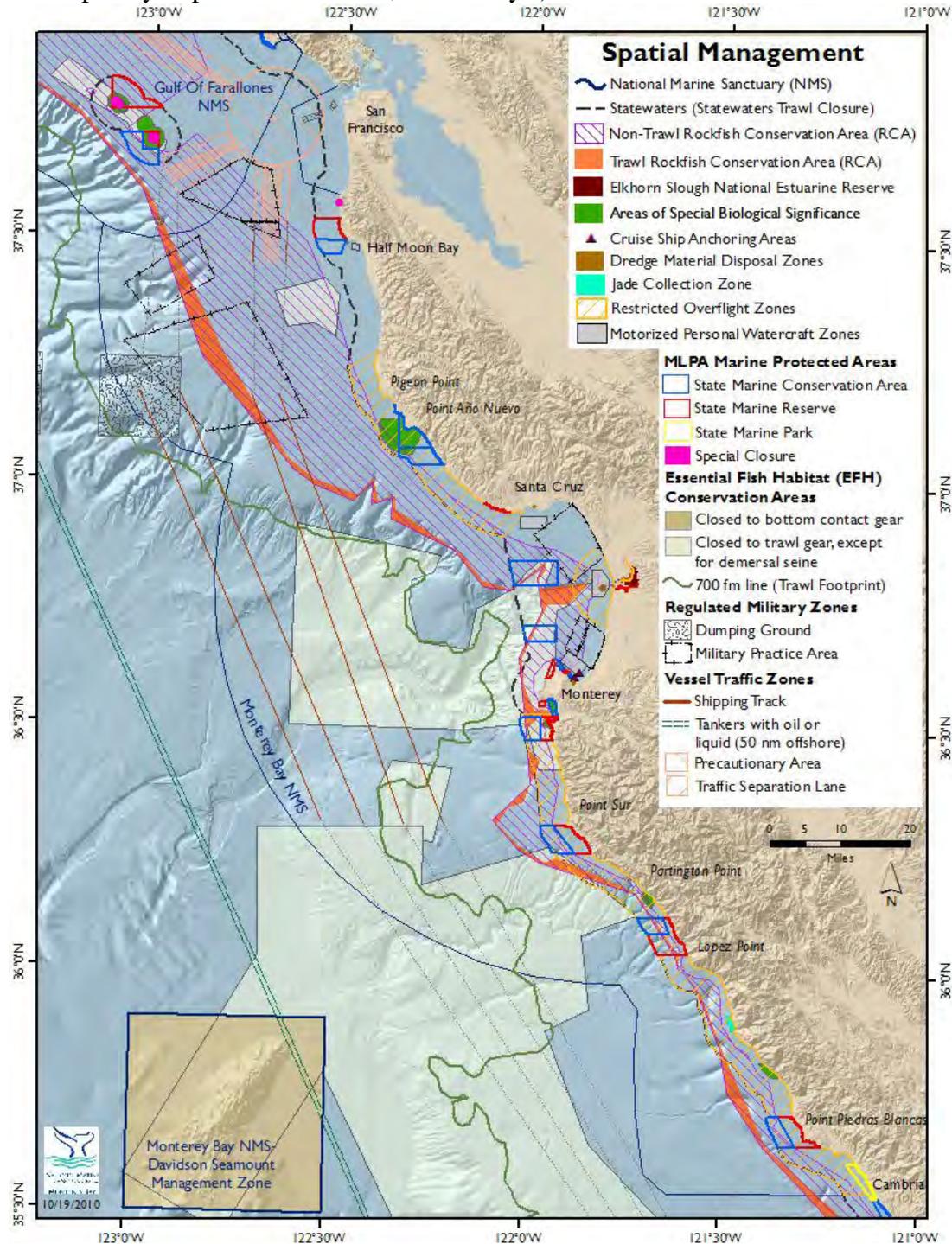
⁸ This type of information is being collected as part of the EBM Initiative at the Sustainable Uses Workshop.

⁹ This type of information is being collected as part of the EBM Initiative at the Unique and Rare Features in the MBNMS Workshop. In addition, the Integrated Ecosystem Assessment is developing indicators of ecosystem health for the California Current Large Marine Ecosystem.

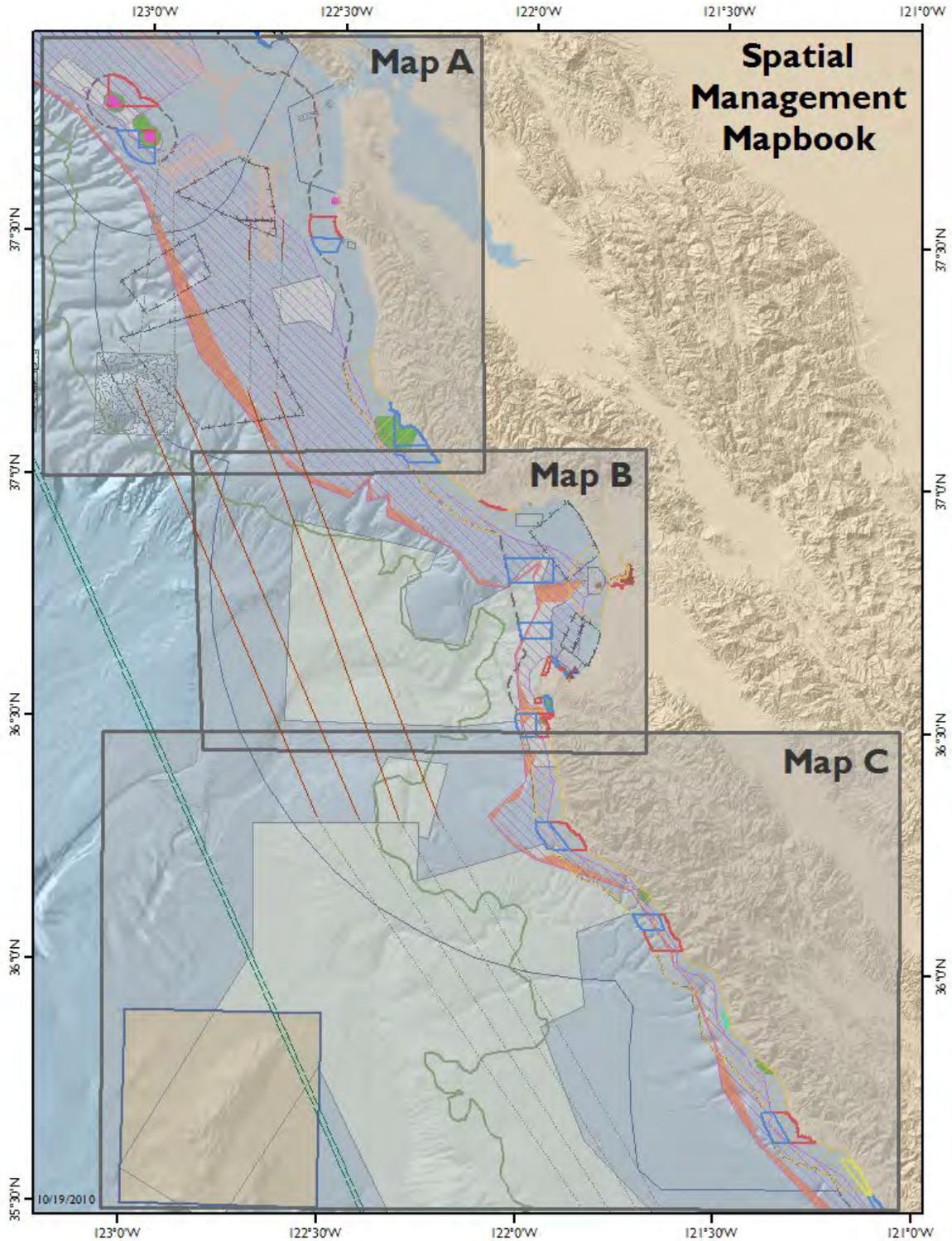
- Should put in a recruitment parameter from estuarine and freshwater habitats into IEA, maybe as a way to add an indicator for water quality
- The socio-economics/human dimensions are large issues.³ Socio-economics needs a set of indicators or needs to be prioritized. This is potentially easier than for the ecosystem. But it is really important to include if doing EBM because humans are a part of the ecosystem

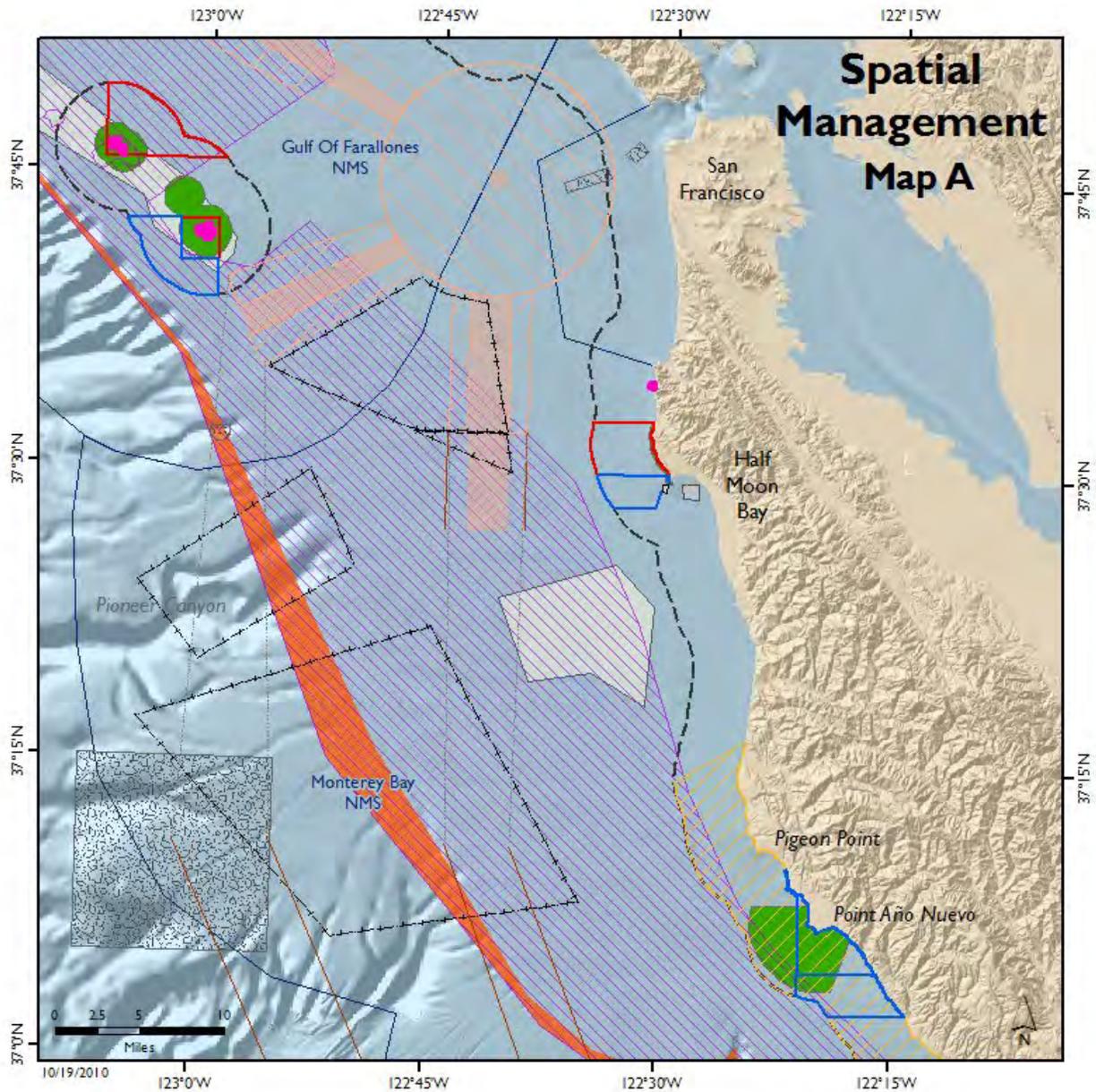
Appendix A: Maps of Regulated Areas in Monterey Bay National Marine Sanctuary

A set of maps provided the workshop participants a visualization tool to quickly understand the extent and overlap of the regulated areas identified in Appendices B and C. The first map shows an overview of the regulated areas in Monterey Bay National Marine Sanctuary. (Maps were developed by Sophie DeBeukelaer, GIS Analyst)



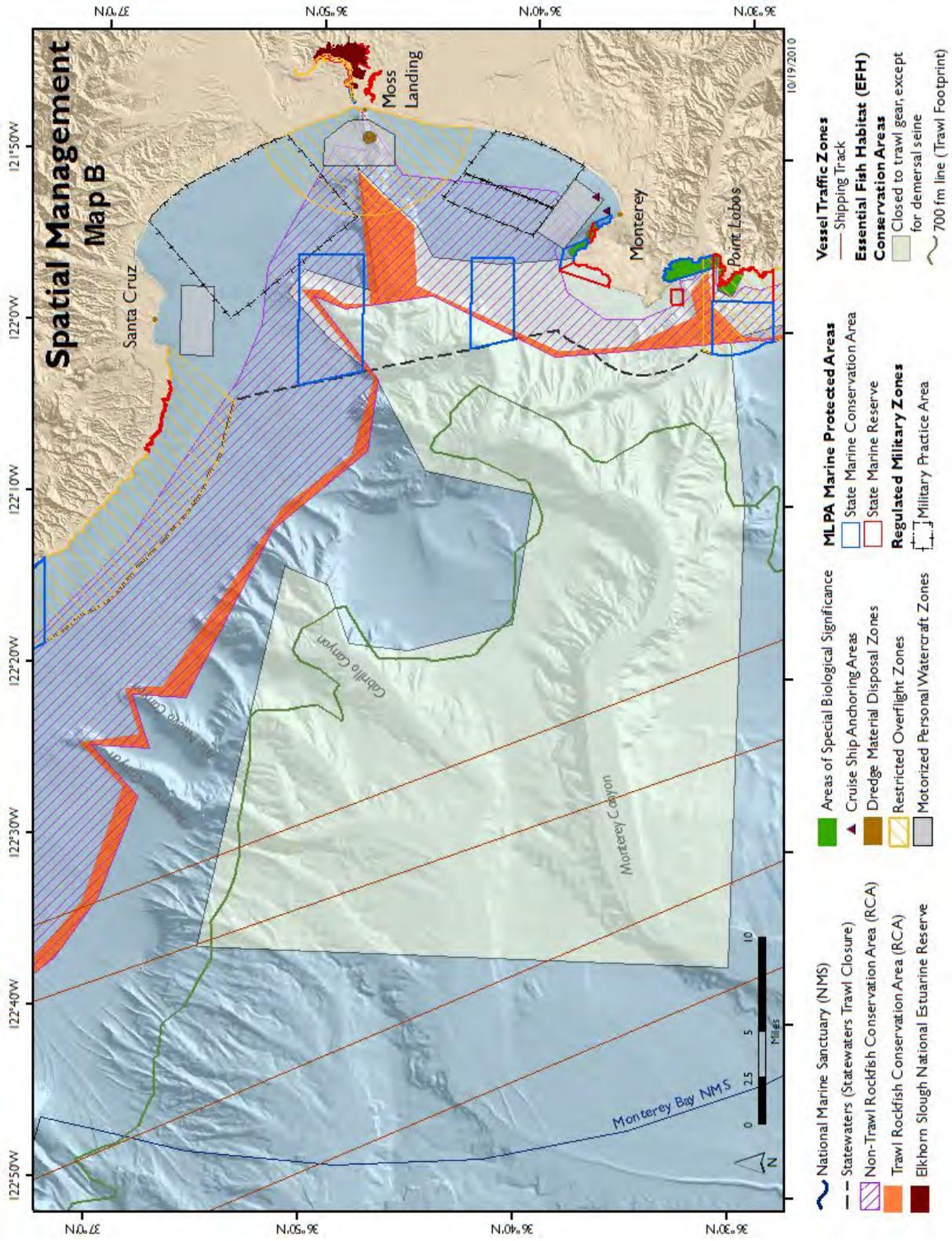
The second part of the map set contains four maps. The first one (labeled “Spatial Management Mapbook”) is a basic overview map showing the extent of each of the following maps, Map A, B and C. Maps A, B and C were developed to provide the participants with a larger scale view of the areas so that the regulated area boundaries and overlaps would be more easily discernable.

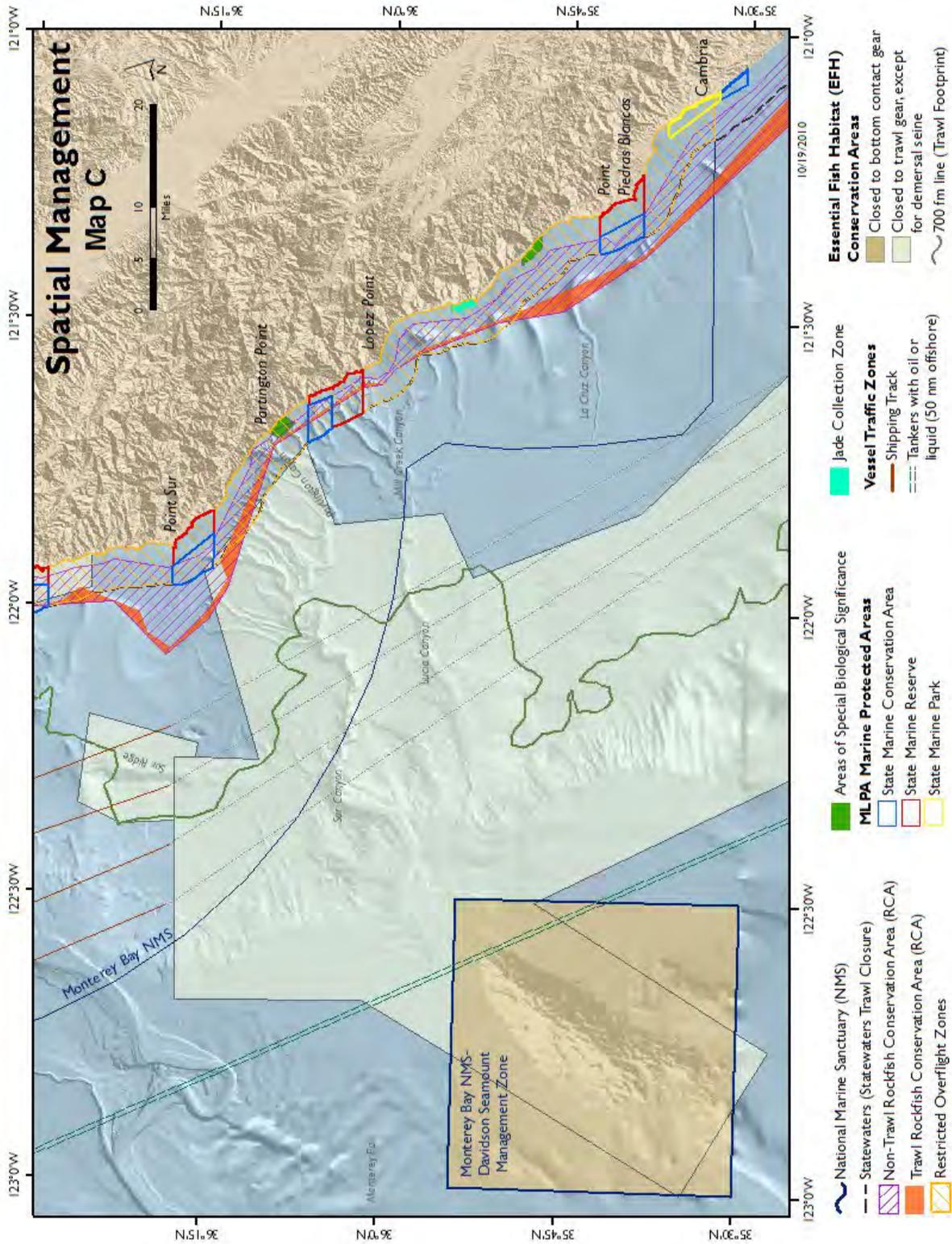




- National Marine Sanctuary (NMS)
- Statewaters (Statewaters Trawl Closure)
- Non-Trawl Rockfish Conservation Area (RCA)
- Trawl Rockfish Conservation Area (RCA)
- Areas of Special Biological Significance
- Restricted Overflight Zones
- Motorized Personal Watercraft Zones
- MLPA Marine Protected Areas**
- State Marine Conservation Area
- State Marine Reserve
- Special Closure

- Essential Fish Habitat (EFH) Conservation Areas**
- Closed to trawl gear, except for demersal seine
- 700 fm line (Trawl Footprint)
- Regulated Military Zones**
- Dumping Ground
- Military Practice Area
- Vessel Traffic Zones**
- Shipping Track
- Precautionary Area
- Traffic Separation Lane





Appendix B: Summary of Regulations

Workshop participants received a handout providing a summary of the activities regulated in each of the areas shown on the maps (Appendix A). The updated version provided below has been slightly modified to improve accuracy.

Area	Regulated Activities
<p>Monterey Bay National Marine Sanctuary (MBNMS)</p>	<p>The following activities are prohibited in the MBNMS:</p> <ul style="list-style-type: none"> • Exploring for, developing or producing oil, gas or minerals. <ul style="list-style-type: none"> • Except for traditional small-scale collection of loose jade (see <u>Jade Collection Zone</u> on maps in Appendix A). • Drilling, dredging or altering submerged lands; or placing or abandoning structures or matter on or in submerged lands. <ul style="list-style-type: none"> • Except as incidental and necessary to anchoring, aquaculture, kelp harvesting, lawful fishing, jade collecting, installing authorized navigational aids, dock/pier construction or authorized harbor maintenance. • Deserting a vessel aground, at anchor or adrift; or leaving harmful matter aboard a grounded or deserted vessel. • Discharging or depositing any material or matter within or into the sanctuary (e.g. pollutants, trash, objects, etc.), or from outside the boundaries if it subsequently enters and injures the sanctuary. <p>Except:</p> <ul style="list-style-type: none"> • Fish, chumming materials or bait used in lawful fishing. • Clean water from anchor wash, bilges, deck wash, engine or generator cooling. • Clean effluent from Type I or II marine sanitation devices and clean graywater from small boats or 300 GRT vessels without sufficient sewage or graywater holding capacity. • Cruise ships may only discharge clean water from anchor wash, engine or generator cooling water, and bilges. • Federally permitted dredge material at approved sites (see <u>Dredge Material Disposal Zones</u> on maps in Appendix A). • Actual or attempted taking, disturbing, injuring or possessing any sanctuary resource below 3,000 feet within the <u>Davidson Seamount Management Zone</u> (on maps in Appendix A) • Introducing or releasing introduced species. <ul style="list-style-type: none"> • Except for striped bass caught within the sanctuary. • Except within California state waters. • Attracting any white shark, regardless of intent. • Disturbing, taking or possessing any marine mammal, sea turtle or bird within or above the sanctuary. <ul style="list-style-type: none"> • Except as permitted by regulations under the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA) and the Migratory Bird Treaty Act (MBTA). • Actual or attempted moving, removing, injuring or possessing historical resources. <ul style="list-style-type: none"> • Except as incidental to lawful kelp harvesting, aquaculture or fishing operations. • Flying motorized aircraft below 1,000 feet above sea level in any of the four

Area	Regulated Activities
	<p>restricted zones (see <u>Restricted Overflight Zones</u> on maps in Appendix A).</p> <ul style="list-style-type: none"> • Operating motorized personal watercraft except within the five designated zones and access routes (see <u>Motorized Personal Watercraft Zones</u> on maps in Appendix A). • Interfering with, obstructing, delaying, or preventing enforcement actions by NOAA or authorized enforcement partners. <p>Complete regulations for MBNMS available http://montereybay.noaa.gov/resourcepro/resource_pro.html</p>
<p>Essential Fish Habitat (EFH) Conservation Areas</p>	<p>Discrete area closures for specific gear types were implemented to minimize to the extent practicable the adverse effects of commercial fishing on fish Essential Fish Habitat (EFH).</p> <p>Two types of EFH Conservation Areas are located inside the MBNMS:</p> <ul style="list-style-type: none"> • Closed to Bottom-contact gear or other gear deployed deeper than 500-fm • Closed to bottom trawl gear other than demersal seine <p>For more information: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-Closed-Areas/Index.cfm</p>
<p>700 fathom Trawl Closure</p>	<p>The Pacific Fishery Management Council froze the trawl “footprint” by prohibiting bottom trawling in the EEZ between 700 fathoms (1,280 meters), the current maximum depth of bottom trawling, and 1,094 fathoms (3,500 meters), which is the outer extent of groundfish EFH. (A fathom is 6 feet.)</p> <p>For more information: http://www.pcouncil.org/habitat-and-communities/habitat/</p>
<p>Rockfish Conservation Areas (RCAs)</p>	<p>Rockfish Conservation Areas (RCAs) are large-scale closed areas that extend along the entire length of the U.S. West Coast. The locations of the RCA boundaries are set in order to minimize opportunities for vessels to incidentally take overfished rockfish by eliminating fishing in areas where and times when those overfished species are likely to co-occur with more healthy stocks of groundfish. The RCA boundaries are lines that connect a series of latitude/longitude coordinates intended to approximate particular depth contours.</p> <p>RCAs may change during the year. There are four types of RCAs:</p> <ul style="list-style-type: none"> • Trawl (groundfish) RCA: Commercial fishing vessels targeting groundfish are prohibited from fishing with bottom trawl gear. • Trawl (non-groundfish) RCA: Commercial fishing vessels targeting California halibut, sea cucumber and ridgeback prawn are prohibited from fishing with bottom trawl gear. • Non-trawl RCA: Commercial vessels fishing with gear other than trawl gear are prohibited from fishing for federally managed groundfish (except for 'other' flatfish using specified hook and line gear with no more than 12 hooks per line). • Recreational RCA: Recreational bottom fishing for federally managed groundfish (except other flatfish) is prohibited within this zone. <p>The Trawl RCA is closed between lines defined by coordinates connected with</p>

Area	Regulated Activities
	<p>straight lines to approximate the depths of 100 and 150 fathoms. The Trawl RCA boundaries in the MBNMS have remained constant since January 2007. All trawling is prohibited within this area except under an exempted fishing permit approved by the Pacific Fisheries Management Council.</p> <p>For more information about RCAs: http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/Groundfish-Closed-Areas/Index.cfm</p>
MLPA State Marine Reserve (SMR)	<p>It is unlawful to injure, damage, take or possess any living, geological or cultural marine resource, except under a permit or specific authorization from the managing agency for research, restoration or monitoring purposes. Access and use (such as walking, swimming, boating and diving) may be restricted to protect marine resources.</p> <p>Site specific regulations available http://www.dfg.ca.gov/mlpa/mpa_regs.asp</p>
MLPA State Marine Conservation Area (SMCA)	<p>It is unlawful to injure, damage, take or possess any specified living, geological or cultural marine resources for certain commercial, recreational, or a combination of commercial and recreational purposes (restrictions vary by site).</p> <p>Site specific regulations available http://www.dfg.ca.gov/mlpa/mpa_regs.asp</p>
MLPA State Park	<p>It is unlawful to injure, damage, take or possess any living or nonliving marine resources for commercial exploitation purposes. Any human use that would compromise protection of the species of interest, natural community or habitat, or geological, cultural or recreational features, may be restricted by the designating entity or managing agency.</p> <p>Site specific regulations available http://www.dfg.ca.gov/mlpa/mpa_regs.asp</p>
MLPA Special Closures	<p>No person except employees of specified agencies, in performing their official duties, or unless permission is granted by the department [CDFG], shall enter the area. Vessel speed is limited in some special closures.</p> <p>Site specific regulations available http://www.dfg.ca.gov/mlpa/mpa_regs.asp</p>
Statewaters Trawl Closure	<p>It is unlawful to engage in bottom trawling in ocean waters of the state.</p>
Areas of Special Biological Significance (ASBS)	<p>The following discharges are prohibited:</p> <ul style="list-style-type: none"> • The discharge of elevated temperature wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited. • The discharge of discrete, point-source sewage or industrial process wastes in a manner that would alter water quality conditions from those occurring naturally is prohibited. • The discharge of waste from non-point sources, including but not limited to storm water for waste from non-point sources, Regional Boards will give high priority to areas tributary to ASBSs.

Area	Regulated Activities
	<p>For more information http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.shtml</p>
<p>Elkhorn Slough National Estuarine Research Reserve (ESNERR)</p>	<p>The ESNERR boundaries overlap with those of the Elkhorn Slough Ecological Reserve. The ecological reserve regulates many activities including fishing, collecting, swimming, boating, introduction of species, use of aircraft, use of pesticides and take or disturbance of geological formations, archaeological artifacts, plants and animals.</p> <p>For ecological reserve regulations http://montereybay.noaa.gov/research/techreports/marinezones/eser.html</p>
<p>Vessel Traffic Separation Scheme (TSS)</p>	<p>Traffic Separation Schemes help provide order and predictability to vessel movements. They establish lanes with a "separation zone" between opposing vessel traffic. Rules for the TSS, and the navigation rules (aka Rules of the Road) in general, are designed to enhance safety and reduce conflicts between the many waterway users (e.g., freight ships, tank vessels, tug and barge combinations, fishing vessels, and recreational boaters).</p> <p>A vessel using a traffic separation scheme shall:</p> <ol style="list-style-type: none"> 1. Proceed in the appropriate traffic lane in the general direction of traffic flow for that lane. 2. So far as is practicable keep clear of a traffic separation line or separation zone. 3. Normally join or leave a traffic lane at the termination of the lane. <p>For complete regulations http://www.navcen.uscg.gov/?pageName=Rule10</p>
<p>Recommended Tracks for Vessels</p>	<p>Recommended Tracks for tankers, ships containing hazardous materials, barges, and large commercial vessels. These zones are managed by the U.S. Coast Guard, U.S. Department of Transportation, NOAA, U.S. Department of Commerce, International Maritime Organization, and the United Nations. Adherence is voluntary but accomplished by agreements between large vessel operators and agencies. Recommended tracks in and near the MBNMS are:</p> <ul style="list-style-type: none"> • Tankers carrying crude oil, black oil, or other persistent liquid cargo in bulk to remain 50 nm or more offshore; • Vessels carrying hazardous cargo in bulk have separate northbound and southbound tracks and traffic separation schemes; • Other vessels 300 gross tons and above have separate northbound and southbound tracks and traffic separation schemes. <p>For more information http://montereybay.noaa.gov/resourcepro/resmanissues/vessels.html</p>
<p>Military Zones</p>	<p>Military zones are areas in which military training operations are conducted by the Department of Defense and marine activities may be restricted.</p> <ul style="list-style-type: none"> • <i>U1, U2, and U5 Submerged Submarine Operating Areas:</i> As submarines may be operating in these areas, vessels should proceed with caution. During non-explosive torpedo practice firing, all vessels are cautioned to keep clear of Naval Target Vessels flying a large red flag from the highest

Area	Regulated Activities
	<p>masthead (outside State Waters).</p> <ul style="list-style-type: none"> • <i>Warning Area 285</i>: This area has flight restrictions for civilian aircraft because it is used for naval air operations including low level fighter jet and helicopter operations (not shown on map). • <i>Naval Operating Area</i>: Used for training in various phases of mine warfare operations. During the period from August 1 to February 15, inclusive each year, no operations will be carried out which will involve placing any obstructions in the water nor will any operations be carried out at night. During the period from February 16 to July 31, inclusive each year, operations may be carried out which will involve laying exercise mines and other moored or bottom obstructions. When moored or bottom obstructions are laid, a notice to mariners will be issued giving notice of their approximate location within the danger zone, and vessels shall keep clear. • <i>Hunter Military Operations Area</i>: This area has flight restrictions for civilian aircraft because it is used for helicopter tactical training operations by the U.S. Army (not shown on map). • <i>Fort Ord Restriction Area</i>: This area was decommissioned in 1994. This area is considered dormant and access is no longer limited. • <i>Explosives Dumping Area</i>: Disused
<p>Other National Marine Sanctuary (GNFMS or CBNMS)</p>	<p>CBNMS Prohibitions:</p> <ul style="list-style-type: none"> • Exploring for, or developing or producing, oil, gas, or minerals in any area of the Sanctuary. • Discharging or depositing from within or into the Sanctuary (other than from a cruise ship) any material or other matter (with some exceptions). • Removing, taking or injuring benthic organisms on or within the line representing the 50-fathom isobath surrounding Cordell Bank. • Drilling into, dredging, or otherwise altering the submerged lands; or constructing, placing, or abandoning any structure, material or other matter on or in the submerged lands • Taking or possessing any marine mammal, sea turtle, or bird within or above the Sanctuary, except as authorized by the Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA). • Introducing or otherwise releasing from within or into the Sanctuary any non-native species, except striped bass (<i>Morone saxatilis</i>) released during catch and release fishing activity. <p>Complete regulations for CBNMS available http://cordellbank.noaa.gov/protect/welcome.html#regulations</p> <p>GNFMS Prohibitions:</p> <ul style="list-style-type: none"> • Exploring for, developing, or producing oil or gas (with some exceptions). • Discharging or depositing, from within or into the Sanctuary, any material or other matter (with some exceptions). • Discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality (with some exceptions). • Constructing any structure other than a navigation aid on or in the submerged

Area	Regulated Activities
	<p>lands of the Sanctuary; placing or abandoning any structure on or in the submerged lands of the Sanctuary; or drilling into, dredging, or otherwise altering the submerged lands of the Sanctuary in any way (with some exceptions).</p> <ul style="list-style-type: none"> • Operating any vessel engaged in the trade of carrying cargo within an area extending 2 nmi from the Farallon Islands, Bolinas Lagoon or any ASBS. • Operation of motorized personal watercraft, except for the operation of motorized personal watercraft for emergency search and rescue missions or law enforcement operations (other than routine training activities) carried out by the National Park Service, U.S. Coast Guard, Fire or Police Departments or other Federal, State or local jurisdictions. • Disturbing birds or marine mammals by flying motorized aircraft at less than 1000 feet over the waters within one nmi of the Farallon Islands, Bolinas Lagoon, or any ASBS except to transport persons or supplies to or from the Islands or for enforcement purposes. • Possessing, moving, removing, or injuring, or attempting to possess, move, remove or injure, a Sanctuary historical resource. • Introducing or otherwise releasing from within or into the Sanctuary an introduced species (with a few exceptions). • Taking or possessing any marine mammal, sea turtle, or bird within or above the Sanctuary, except as authorized by the Marine Mammal Protection Act (MMPA), Endangered Species Act (ESA), and Migratory Bird Treaty Act (MBTA). • Attracting a white shark in the Sanctuary; or approaching within 50 meters of any white shark within the line approximating 2 nmi around the Farallon Islands. • Deserting a vessel aground, at anchor, or adrift in the Sanctuary. • Leaving harmful matter aboard a grounded or deserted vessel in the Sanctuary. • Anchoring a vessel in a designated seagrass protection zone in Tomales Bay, except as necessary for mariculture operations conducted pursuant to a valid lease, permit or license. <p>Complete regulations for GFNMS available http://farallones.noaa.gov/manage/regulations.html</p>

Appendix C. Regulated Areas in Central California Cheat Sheet

Workshop participants received a handout summarizing the level of governance, managing agency, year established, constancy of the boundaries, permanence of the areas, regulations, and research permit requirements of each regulated area type shown on the maps (Appendix A). The updated version provided below has been slightly modified to improve accuracy. Please note: To understand the research permit requirements of at a given location, check the research permit requirements of all overlapping zones.

Regulated Area Type	Level of Governance	Managing Agency	Year Established	Constancy	Permanence	Regulations	Research Permit Required?
National Marine Sanctuary Zones							
Cordell Bank National Marine Sanctuary (CBNMS)	Federal	NOAA/ONMS	1989	Year-round	Permanent; regulations can be modified through regulatory review process	see Appendix B: Regulations Summary	Yes, for any activities that are prohibited under the regulations.
Gulf of the Farallones National Marine Sanctuary (GFNMS)	Federal	NOAA/ONMS	1981	Year-round	Permanent; regulations can be modified through regulatory review process	see Appendix B: Regulations Summary	Yes, for any activities that are prohibited under the regulations.
Monterey Bay National Marine Sanctuary (MBNMS)	Federal	NOAA/ONMS	1992	Year-round	Permanent; regulations can be modified through regulatory review process	<p>The following activities are prohibited in the MBNMS: (For a complete list of prohibited activities please see Appendix B: Regulations Summary.)</p> <ul style="list-style-type: none"> • Oil/gas/minerals exploration or development • Drilling/dredging/altering submerged lands • Placing structures/matter on submerged lands • Discharging/depositing material (e.g. pollutants, trash, objects, etc.), into sanctuary waters. • Taking or injuring any sanctuary resource below 3,000 feet within the Davidson Seamount Management Zone. • Introducing or releasing introduced species (except in state waters) • Attracting any white shark, regardless of intent. • Disturbing/taking any marine mammal, sea turtle or bird within or above the sanctuary (except as permitted by MMPA, ESA, MBTA). • Moving/removing/injuring/possessing historical resources. • see Restricted Overflight Zones. • see Motorized Personal Watercraft Zones 	Yes, for any activities that are prohibited under the regulations. MBNMS Research Permit required for activities such as: <ul style="list-style-type: none"> • Quadrat bolts • Sediment collection • Rock removal • Trawling for research purposes • Instrumentation or equipment on seafloor • Moorings and buoys • Discharge (e.g., dyes, AUVs, XBTs, matter) • Overflights • Attracting white sharks • Davidson Seamount resource collection • Amendments

Regulated Area Type	Level of Governance	Managing Agency	Year Established	Constancy	Permanence	Regulations	Research Permit Required?
Restricted Overflight Zone	Federal	NOAA/ ONMS/ MBNMS	1992	Year-round	Permanent; regulations can be modified through regulatory review process	Motorized aircraft are restricted from flying below 1,000 feet above these four zones within the Sanctuary.	Yes, for overflight below 1000 ft inside these zones
Motorized Personal Watercraft (MPWC) Zone	Federal	NOAA/ ONMS/ MBNMS	1992	Four are year-round; a fifth is conditional and seasonal	Permanent; regulations can be modified through regulatory review process	Recreational use of motorized personal watercraft within the Sanctuary is allowed within the four year-round designated zones and access routes and the seasonal conditional zone at Pillar Point within the Sanctuary. The seasonal conditional zone exists only when a High Surf Warning has been issued by the National Weather Service and is in effect for San Mateo County during December, January, or February.	Yes, to use MPWC inside the MBNMS if operating outside of these zones
Jade Collection Zone	Federal	NOAA/ ONMS/ MBNMS	1998	Year-round	Permanent; regulations can be modified through regulatory review process	Traditional small-scale collection of loose jade is allowed in the designated zone.	N/A
Dredge Material Disposal Zone	Federal	NOAA/ ONMS/ MBNMS	1972- 1993	Year-round	Permanent	Federally permitted dredge material can be disposed of only at approved sites (All dredge material disposal sites were established after enactment of the Clean Water Act in 1972 and before the effective date of MBNMS regulations on January 1, 1993).	N/A
Federal Fisheries Management Zones							
Essential Fish Habitat (EFH) Conservation Areas -Bottom Trawl	Federal	NOAA/ NMFS	2006	Year-round	Permanent; scheduled for review at least every 5 years and interim review process available	Commercial vessels fishing with bottom trawl gear other than demersal seine are prohibited from fishing in these areas.	A research permit or letter from NMFS to do research in these areas is recommended, but not required.
Essential Fish Habitat (EFH) Conservation Areas -Bottom Contact	Federal	NOAA/ NMFS	2006	Year-round	Permanent; scheduled for review at least every 5 years and interim review process available	Commercial vessels fishing with bottom-contact gear or other gear deployed deeper than 500 fathoms are prohibited from fishing in these areas.	A research permit or letter from NMFS to do research in these areas using the specified gear type(s) is recommended, but not required.
700 fathom Trawl Closure	Federal	NOAA/ NMFS	2006	Year-round	Permanent; scheduled for review at least every 5 years and interim review process available	Closed to commercial vessels fishing with bottom trawl gear from 700 - 1094 fathoms	A research permit or letter from NMFS to do research in these areas using the specified gear type(s) is recommended, but not required.

Regulated Area Type	Level of Governance	Managing Agency	Year Established	Constancy	Permanence	Regulations	Research Permit Required?
Trawl (Groundfish) Rockfish Conservation Area (RCA)	Federal	NOAA/NMFS	2002	Year-round; boundaries may change from year to year	Temporary; are expected to be removed when the resources recover sufficiently	Commercial fishing vessels targeting groundfish are prohibited from fishing with bottom trawl gear within this zone (typically between 100 - 150 fathoms in the MBNMS)	A research permit or letter from NMFS to do research in these areas for the specified species using the specified gear type(s) is recommended, but not required.
Trawl (Non-Groundfish) Rockfish Conservation Area (RCA)	Federal	NOAA/NMFS	2002	Year-round; boundaries may change from year to year	Temporary; are expected to be removed when the resources recover sufficiently	Commercial fishing vessels targeting California halibut, sea cucumber and ridgeback prawn are prohibited from fishing with bottom trawl gear within this zone (typically between 100 - 150 fathoms in the MBNMS)	A research permit or letter from NMFS to do research in these areas for the specified species using the specified gear type(s) is recommended, but not required.
Non-trawl Rockfish Conservation Area (RCA)	Federal	NOAA/NMFS	2002	Year-round; boundaries may change from year to year	Temporary; are expected to be removed when the resources recover sufficiently	Commercial vessels fishing with gear other than trawl gear are prohibited from fishing for federally managed groundfish, except for 'other' flatfish using specified hook and line gear with no more than 12 hooks per line, typically between 20 or 30 - 150 fathoms in the MBNMS	A research permit or letter from NMFS to do research in these areas for the specified species using the specified gear type(s) is recommended, but not required.
Recreational Rockfish Conservation Area (RCA)	Federal	NOAA/NMFS	2002	Seasonal changes in boundaries; boundaries may change yearly	Temporary; are expected to be removed when the resources recover sufficiently	Recreational bottom fishing for federally managed groundfish (except other flatfish) is prohibited within this zone (not shown on map; varies seasonally from shoreline, 20, or 40 fathoms out to the EEZ in the MBNMS)	
State Management Zones							
MLPA State Marine Reserves (SMR)	State	CDFG	2007, 2010	Year-round	Permanent; scheduled for review approximately 5 years after implementation	Take of any living or nonliving marine resources is prohibited	Yes, CDFG may permit research, restoration, and monitoring activities in these areas.
MLPA State Marine Conservation Area (SMCA)	State	CDFG	2007, 2010	Year-round	Permanent; scheduled for review approximately 5 years after implementation	Allows some combination of commercial and/or recreational take (restrictions vary by site)	Yes, CDFG may permit research in these areas.
MLPA State Marine Park (SMP)	State	CDFG	2007, 2010	Year-round	Permanent; scheduled for review approximately 5	Commercial take of any living or nonliving marine resources is prohibited.	No, only a CDFG scientific collecting permit is needed

Regulated Area Type	Level of Governance	Managing Agency	Year Established	Constancy	Permanence	Regulations	Research Permit Required?
					years after implementation		
MLPA Special Closures	State	CDFG	2007, 2010	Year-round	Permanent; scheduled for review approximately 5 years after implementation	"no disturbance zones" either 300 or 1000 feet around an area to protect marine birds and/or mammals (restrictions vary by site)	Yes, CDFG permits required to enter the area.
Statewaters Trawl Closure	State	CDFG	1953, 2006	Year-round	Permanent, regulations can be modified if California Fish and Game Commission has adequate evidence for changes	Use of bottom trawl gear is prohibited in state waters; within 3 nm of shore & all of Monterey Bay	
Areas of Special Biological Significance (ASBS)	State	SWRCB	1974, 1975, 2005 (nomenclature change)	Year-round	Permanent; regulations can be modified by Resolutions	The following discharges are prohibited 1) elevated temperature wastes, 2) discrete, point-source sewage or industrial process wastes, and 3) waste from non-point sources, including but not limited to storm water or waste from non-point sources	Yes, a permit is required for discharges
Elkhorn Slough National Estuarine Research Reserve (ESNERR)	State/ Federal	CDFG, NOAA/ OCRM	1979	Year-round	Permanent; regulations can be modified through regulatory review process	A wide range of activities are regulated including: collection of plants and animals, introduction of species, swimming, operation of vessels and aircraft.	Yes, researchers need to submit a research proposal to the ESNERR for consideration.
Other Zones							
Recommended Tracks for vessels	International	IMO, USCG, NOAA	2000	Year-round	Permanent, recommendations can be modified by USCG	Separate northbound and southbound tracks for 1) Vessels carrying hazardous cargo in bulk and 2) Other vessels 300 gross tons and above. Tankers carrying crude oil, black oil, or other persistent liquid cargo in bulk to remain 50 nm or more offshore.	No
Vessel Traffic Separation Scheme (TSS)	Federal	USCG, NOAA	1995	Year-round	Permanent, regulations can be modified by USCG	Traffic Separation Schemes help provide order and predictability to vessel movements. They establish lanes with a "separation zone" between opposing vessel traffic.	No
Military Zones	Federal	DOD	N/A	Some zones are year-round; others are seasonal	Permanent	Regulations are site specific. For details see Appendix B: Regulations Summary.	No

Appendix D: On-line Questionnaire on www.SurveyMonkey.com

I. Instructions

Thank you for taking this survey. The survey has 9 questions and will likely take 10-15 minutes to complete. Responses will be used by MBNMS staff to better understand how regulated areas in the marine environment affect research activities in central California and the compatibility of various human activities with research.

Two supporting documents are available on the SIMoN website:

- 1) A map of existing regulated areas in and around the MBNMS
(http://www.sanctuariesimon.org/research_areas_workshop/regulated_areas_maps.pdf)

- 2) A summary of the regulations within each regulated area
(http://www.sanctuariesimon.org/research_areas_workshop/regulation_summary.doc)

Please refer to these while taking the survey.

II. Regulated Areas

A number of regulated areas exist in central California. The purpose of these questions is to determine if you conduct science in one or more of these areas and how the regulations in these areas affect your ability to do science. Please refer to the maps and summary of regulations available on the SIMoN website while answering these questions

1. Relative to your past and on-going scientific studies, do you conduct science in this regulated area?

If you are not familiar with the location of these areas, please reference the maps.

Regulated Area Type	Yes	No	Don't Know
Monterey Bay National Marine Sanctuary (MBNMS)			
Other National Marine Sanctuary (GNFMS or CBNMS)			
MLPA State Marine Reserve (SMR)			
MLPA State Marine Conservation Area (SMCA)			
MLPA Special Closures			
Elkhorn Slough National Estuarine Research Reserve (ESNERR)			
Essential Fish Habitat (EFH) Closed to bottom contact gear			
Essential Fish Habitat (EFH) Closed to trawl gear except demersal seine			
700 fathom Trawl Closure			
Trawl Rockfish Conservation Area (Trawl RCA)			
Non-Trawl Rockfish Conservation Area (Non-trawl RCA)			
State Water Trawl Closure			
Areas of Special Biological Significance (ASBS)			
Military Zones			
Motorized Personal Watercraft Zones			
Vessel Traffic Lanes			
Restricted Overflight Zones			
Dredge Material Disposal Zones			
Cruise Ship Anchoring Sites			
Other			

2. Relative to your past and on-going scientific studies, are the regulations of this regulated area a) incompatible, b) compatible, or c) necessary to your studies?

If you are not familiar with the regulations in these areas, please reference the regulations summary.

Regulated Area Type	Incompatible	Compatible	Necessary	Don't Know
Monterey Bay National Marine Sanctuary (MBNMS)				
Other National Marine Sanctuary (GNFMS or CBNMS)				
MLPA State Marine Reserve (SMR)				
MLPA State Marine Conservation Area (SMCA)				
MLPA Special Closures				
Elkhorn Slough National Estuarine Research Reserve (ESNERR)				
Essential Fish Habitat (EFH) Closed to bottom contact gear				
Essential Fish Habitat (EFH) Closed to trawl gear except demersal seine				
700 fathom Trawl Closure				
Trawl Rockfish Conservation Area (Trawl RCA)				
Non-Trawl Rockfish Conservation Area (Non-trawl RCA)				
State Water Trawl Closure				
Areas of Special Biological Significance (ASBS)				
Military Zones				
Motorized Personal Watercraft Zones				
Vessel Traffic Lanes				
Restricted Overflight Zones				
Dredge Material Disposal Zones				
Cruise Ship Anchoring Sites				
Other				

3. Relative to your future scientific studies (either planned or desired), are the regulations of this regulated area a) incompatible, b) compatible, or c) necessary to your studies?

If you are not familiar with the regulations in these areas, please reference the regulations summary.

Regulated Area Type	Incompatible	Compatible	Necessary	Don't Know
Monterey Bay National Marine Sanctuary (MBNMS)				
Other National Marine Sanctuary (GNFMS or CBNMS)				
MLPA State Marine Reserve (SMR)				
MLPA State Marine Conservation Area (SMCA)				
MLPA Special Closures				
Elkhorn Slough National Estuarine Research Reserve (ESNERR)				
Essential Fish Habitat (EFH) Closed to bottom contact gear				
Essential Fish Habitat (EFH) Closed to trawl gear except demersal seine				
700 fathom Trawl Closure				
Trawl Rockfish Conservation Area (Trawl RCA)				
Non-Trawl Rockfish Conservation Area (Non-trawl RCA)				
State Water Trawl Closure				
Areas of Special Biological Significance (ASBS)				
Military Zones				
Motorized Personal Watercraft Zones				
Vessel Traffic Lanes				
Restricted Overflight Zones				
Dredge Material Disposal Zones				
Cruise Ship Anchoring Sites				
Other				

4. For each regulated area marked "incompatible" in Question #2 or #3 above, provide a brief explanation why.

5. For each regulated area marked "necessary" in Question #2 or #3 above, provide a brief explanation why.

6. Do the existing regulated areas limit your scientific studies? If yes, how would you alter (e.g., spatially, temporally) the existing regulated areas to facilitate your scientific studies?

No

Yes

If Yes, please explain

III. Compatibility of Activities

The purpose of these questions is to evaluate the compatibility of human activities (regulated and unregulated) and scientific research.

7. Has this activity affected your research in the past? If yes, check box. Check all that apply. In addition, please select one of the following: is this activity a) incompatible, b) compatible, or c) necessary?

Human Activity	Past Impact	Incompatible	Compatible	Necessary
Aerial Surveys				
Anchoring				
Aquaculture				
Beachgoing				
Boating – motorized				
Boating – non-motorized (includes kayaks)				
Coastal Armoring				
Commercial Fishing with Bottom Trawl				
Commercial Fishing with Other Bottom Contact Gear				
Commercial Kelp Harvest				
Commercial Pelagic Fishing				
Desalination Plants				
Dredging or Dredge Disposal				
Energy Production				
In-takes				
Large vessel traffic / shipping				
Military operations				
Non-point Source Pollution				
Oil Spill				
Other				
Point Source Pollution / Outfalls				
Recreational Fishing				
Road Maintenance				
Science by others				
SCUBA diving				
Shore-based recreational harvest / collecting				
Submerged Cables				
Swimming / surfing				
Tidepooling / Trampling				
Wildlife viewing				

8. For those activities marked above as incompatible with your scientific studies, briefly explain why.

9. For those activities marked above as being necessary to your studies, briefly explain why.

IV. Thank you

Thank you for completing the survey.

10. Please provide us with your email address (or your name if you'd follow up with you if necessary. This is a required field.

prefer) so we can

Appendix E: Summary of Preliminary Information Gathered from On-line Questionnaire

Questions about Regulated Areas:

Do you conduct science in regulated areas?

Based on the responses to this question, the regulated areas are ranked from highest use to lowest use:



The following regulated areas were identified as incompatible with the scientific studies of one or more respondents:

- MBNMS
- Restricted Over-flight Zones
- Dredge Material Zones
- MLPA: SMR, SMCA, special closures
- ASBS
- Elkhorn Slough NERR
- Vessel Traffic Lanes
- Military Zones

Reasons for incompatibility include:

- MBNMS: have to get research permits for some activities
- Restricted Overflight Zones: limit ability to get aerial imagery
- MLPA SMR and SMCA: long-term monitoring study using bottom trawl is no longer allowed to sample in these sites
- MLPA Special Closures: no boat access limits access for water samples
- ASBS: cannot discharge even small amounts or do dye studies
- Military Zones: no access
- Vessel Traffic Lanes: large vessels strike moorings leading to equipment loss

The following regulated areas were identified as necessary to the scientific studies of one or more respondents:

- MBNMS
- MLPA: SMR, SMCA, Special Closures
- ASBS
- Dredge Material Disposal Zones

Reasons for the necessity of the regulated areas include:

- MLPA SMR and SMCA:
 - Control human uses and allow for comparative studies of effects of human use
 - Provide location to monitor abundance and density without the confounding effects of human extraction
- Dredge Material Disposal Zones: dredge spoil would change the natural environment being studied
- ASBS and ESNERR: monitoring discharges from land in these areas

Do regulated areas limit your scientific studies?

- Permitting process with some agencies (e.g., MBNMS, CDFG) is time-consuming and the permit approval process can be too slow to allow for efficient research
- ASBS limit discharges, which prevents research on water quality
- New MPAs remove sample sites from long-term monitoring studies
- Regulations not followed or enforced in some areas - incompatible human uses still occurring
- Limited locations where expensive equipment can be installed without potential for loss from incompatible human uses (e.g., vessels, fishing equipment)

Questions about Human Activities:

How do human activities influence research?

The following activities were identified as having affected research activities in the past.

The following activities were identified as incompatible with the scientific studies of one or more respondents:

- Beach going
- Boating
- Swimming
- Offshore aquaculture
- Large vessel traffic
- Oil spills
- Submerged cables
- Fishing
 - with bottom trawl gear
 - with bottom contact gear
 - with long lines
- Military operations
- Point and non-point source pollution

Reasons for incompatibility include:

- Beach going, swimming, boating, vessels: high intensity of these human activities can interfere with research activities
- Aquaculture: changes abundance of organisms, inhibit surveys
- Oil spills: effect abundance and health of ecosystem
- Large Vessels Traffic/Military Operations: researchers are sometimes excluded from areas
- Submerged Cables: interfere with some types of sampling
- Fishing with bottom trawls, other bottom contact gear, long-lines:
 - Can interact with research equipment such as anchored sampling buoys
- Military Operations: Interactions with sampling buoys
- Point & Non-Point source pollution: effects of water quality changes are noticeable and affect research

Other responses to the question of incompatibility:

- Some sampling and field operations (e.g., operating vessels, installing moorings, deploying drifters) may be incompatible with various human activities
- Emerging issues such as vessel traffic, pollution and oil exploration could impact scientific studies in future

The following activities were identified as necessary to the scientific studies of one or more respondents because the activity is part of research operations:

- Boating
- Collecting

- Fishing
- Discharge
- SCUBA diving
- Aerial Surveys
- Anchoring (for extended periods of time)

The following activities were identified as necessary to the scientific studies of one or more respondents because the activity is the focus of the research question(s):

- Desalination plants
- Energy intake, outfalls, discharge areas
- Point and non-point source pollution

Appendix F: Workshop Participants

Name and affiliation of participants in the Workshop on Research Areas in the Monterey Bay National Marine Sanctuary held on October 26, 2010.

Name	Affiliation
Research Community	
Allen, Mandy	Monterey Bay Aquarium Research Institute
Barry, Jim	Monterey Bay Aquarium Research Institute
Beck, Mike	The Nature Conservancy
Connor, Judith	Monterey Bay Aquarium Research Institute
Crofts, John	NOAA/NMFS/SWFSC/Environmental Research Division
Croll, Don	University of California Santa Cruz
Gregorio, Dominic	State Water Resources Control Board
Hardin, Dane	Applied Marine Sciences
Harrold, Chris	Monterey Bay Aquarium
Hunt, John	University of California Davis Marine Pollution Studies Laboratory at Granite Canyon
LaFranchi, Chris	NOAA/ONMS/West Coast Region
Lindholm, James	California State University Monterey Bay
Malone, Dan	Partnership for Interdisciplinary Studies of Coastal Oceans
Mason, Janet	NOAA/NMFS/SWFSC/Environmental Research Division
Paull, Charlie	Monterey Bay Aquarium Research Institute
Pearse, John	University of California Santa Cruz
Ralston, Steve	NOAA/NMFS/SWFSC/Fisheries Ecology Division
Ramp, Steve	Central & Northern California Ocean Observing System
Shester, Geoff	Oceana
Starr, Rick	California Sea Grant/ Moss Landing Marine Laboratory
Storlazzi, Curt	United States Geological Survey
Williams, Tommy	NOAA/NMFS/SWFSC/Fisheries Ecology Division
Wilson-Vandenberg, Deb	California Department of Fish and Game
Collaborative Fishermen /Research Operators	
Christmann, Jim	
Maricich, Tim	
Mattusch, Tom	

Name	Affiliation
Sanctuary Advisory Committee (SAC) Ecosystem-based Management Subcommittee	
Harrold, Chris	MBNMS SAC - Research Primary
Hunt, John	MBNMS SAC - Research Alternate
Scheiblauer, Steve	MBNMS SAC - Harbors
Public	
Herz, Randy	MBNMS SAC - Diving Alternate
Leabourne, Kourtney	MBNMS SAC - At-Large Alternate
Niggemeyer, Heidi	Monterey Regional Water Pollution Control Agency
Zweig, Casey	Center for Ocean Solutions
Staff	
Brown, Jennifer	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Burton, Erica	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Capps, Nicole	NOAA/ONMS/Monterey Bay National Marine Sanctuary
De Beukelaer, Sophie	NOAA/ONMS/Monterey Bay National Marine Sanctuary
DeVogelaere, Andrew	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Dunsmore, Rikki	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Grimmer, Karen	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Hoover, Bridget	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Hunter-Thomson, Kristin	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Lonhart, Steve	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Lurie, Lisa	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Michel, Paul	NOAA/ONMS/Monterey Bay National Marine Sanctuary
Uttal, Lisa	NOAA/ONMS/Monterey Bay National Marine Sanctuary
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Appendix G: List of Acronyms

ASBS: Areas of Special Biological Significance
AUV: Autonomous Underwater Vehicle
Beach COMBERS: Coastal Ocean Mammal/Bird Education and Research Surveys
CalCOFI: California Cooperative Oceanic Fisheries Investigations
CBNMS: Cordell Bank National Marine Sanctuary
CDFG: California Department of Fish and Game
CMSP: Coastal and Marine Spatial Planning
CTD: conductivity, temperature, depth
DDT: dichlorodiphenyltrichloroethane
DOD: Department of Defense
EBM: Ecosystem-based Management
EBMI: Ecosystem-based Management Initiative
EFH: Essential Fish Habitat
EIS: Environmental Impact Statement
ESA: Endangered Species Act
ESNERR: Elkhorn Slough National Estuarine Research Reserve
FOCE: Free Ocean CO₂ Enrichment
GFNMS: Gulf of the Farallones National Marine Sanctuary
GIS: Graphic Information System
IEA: Integrated Ecosystem Assessment
IMO: International Maritime Organization
LIDAR: Light Detection And Ranging
MARS: Monterey Accelerated Research System
MBARI: Monterey Bay Aquarium Research Institute
MBNMS: Monterey Bay National Marine Sanctuary
MBTA: Migratory Bird Treaty Act
MLML: Moss Landing Marine Laboratories
MLPA: Marine Life Protection Act (in the state of California)
MMPA: Marine Mammal Protection Act

MPA: Marine Protected Area
MPWC: Motorized Personal Watercraft
NMFS: National Marine Fisheries Service
NOAA: National Oceanic and Atmospheric Administration
NSF: National Science Foundation
OCRM: Office of Ocean and Coastal Resource Management
ONMS: Office of National Marine Sanctuaries
PFMC: Pacific Fisheries Management Council
RAP: Research Activities Panel
RCA: Rockfish Conservation Area
ROV: Remotely Operated Vehicle
SAC: Sanctuary Advisory Council
SAM: Synthesis Assessment and Management
SIMoN: Sanctuary Integrated Monitoring Network
SMCA: State Marine Conservation Area
SMP: State Marine Park
SMR: State Marine Reserve
SWFSC: Southwest Fisheries Science Center (part of NMFS)
SWRCB: State Water Resources Control Board
UCSC: University of California, Santa Cruz
USCG: United States Coast Guard
USGS: United States Geological Survey
VMS: Vessel Monitoring System
XBTs: Expendable Bathythermographs