

**MBNMS Research Activity Panel
Meeting Summary
January 9, 2009**

Host: James Lindholm – Nearshore Ecology (CSUMB)

Location: Boardroom at the Alumni & Visitor's Center (Building 97)
Fourth Avenue
California State University Monterey Bay
Seaside, CA

Date: Friday, January 9th, 2009; 9:00 am to 12:00 pm

MEMBERS:

	Discipline	Primary/ Alternate	Name	Institution
X	Research Coordinator		DeVogelaere, Andrew	Monterey Bay National Marine Sanctuary
	Biological Oceanography	primary	Chavez, Francisco	Monterey Bay Aquarium Research Institute
	Biological Oceanography	alternate	Kudela, Raphael	University of California, Santa Cruz
X	Deep-Sea Ecology	primary	Cailliet, Greg	Moss Landing Marine Laboratories
	Deep-Sea Ecology	alternate		
	Estuarine Ecology	primary	Wasson, Kerstin	Elkhorn Slough NERR and Foundation
X	Estuarine Ecology	alternate	Van Dyke, Eric	Elkhorn Slough NERR and Foundation
X	Fisheries	primary	Grimes, Churchill	NOAA Fisheries Service
	Fisheries	alternate	Vasques, Jason	California Department of Fish & Game
X	Marine & Coastal Geology	primary	Storlazzi, Curt	United States Geological Survey
	Marine & Coastal Geology	alternate	Paull, Charles	Monterey Bay Aquarium Research Institute
X	Marine Conservation Biology	primary	Harrold, Chris*	Monterey Bay Aquarium
	Marine Conservation Biology	alternate	Micheli, Fiorenza	Hopkins Marine Station
X	Marine Policy	primary	Faurot-Daniels, Ellen	California Coastal Commission
X	Marine Policy	alternate	Sharp, Gary	Center for Climate/Ocean Resources Study
X	Nearshore Ecology	primary	Lindholm, James	California State University Monterey Bay
X	Nearshore Ecology	alternate	Carr, Mark	University of California, Santa Cruz
X	Physical Oceanography	primary	McPhee-Shaw, Erika	Moss Landing Marine Laboratories
X	Physical Oceanography	alternate	Ramp, Steve	CeNCOOS/MBARI
X	Shelf & Slope Ecology	primary	Yoklavich, Mary	NOAA Fisheries Service
	Shelf & Slope Ecology	alternate	Starr, Rick	California Sea Grant Extension Program
X	Social Sciences	primary	Pomeroy, Caroline	California Sea Grant Extension Program
X	Social Sciences	alternate	Kildow, Judith	Monterey Bay Aquarium Research Institute
	Water Quality	primary	Epel, David	Hopkins Marine Station
X	Water Quality	alternate	Hunt, John†	University of California, Davis

*Sanctuary Advisory Council Member: Research (Primary)

†Sanctuary Advisory Council Member: Research (Alternate)

GUESTS:

	Name	Institution
X	Burton, Erica	Monterey Bay National Marine Sanctuary
X	Cheriton, Olivia	PISCO; University of California, Santa Cruz
X	Conley, Gary	Monterey Bay National Marine Sanctuary
X	de Marignac, Jean	Monterey Bay National Marine Sanctuary
X	Eng, Mike	Monterey Bay National Marine Sanctuary
X	Hoover, Bridget	Monterey Bay National Marine Sanctuary
X	King, Chad	Monterey Bay National Marine Sanctuary
X	Kline, Donna	CSU Monterey Bay
X	Knight, Ashley	CSU Monterey Bay
X	LaFranchi, Chris	West Coast Regional Office, National Marine Sanctuaries
X	Malone, Dan	PISCO; University of California, Santa Cruz
X	Michel, Paul	Monterey Bay National Marine Sanctuary
X	Parrish, Richard	NOAA Fisheries (retired)
X	Scheiblaue, Steve	City of Monterey
X	Selbie, Hugo	PISCO; University of California, Santa Cruz
X	Skinder, Carolyn	Monterey Bay National Marine Sanctuary
X	Subia, Matthew	CSU Monterey Bay
X	Wooninck, Lisa	Monterey Bay National Marine Sanctuary

CONSENT ITEMS**Introductions/Modifications to the Agenda (Chris Harrold)**

- Ellen Faurot-Daniels is stepping down from RAP (1/30/09); she has taken new job with OSPR/CDFG; therefore “Marine Policy” primary discipline is open

PRESENTATIONS**Institute for Applied Marine Ecology (James Lindholm)**

- Lindholm gave an overview of CSUMB bachelor and masters program/degrees, within Institute for Applied Marine Ecology
- Lindholm summarized recent and current research activities

MBNMS Federal MPAs Initiative (Steve Scheiblaue/City of Monterey)**Supporting Material**

1. Letter from Paul Michel to SAC (dated 2/15/08; attached)
2. Letter from Paul Michel to SAC (dated 4/15/08; attached)
3. Letter from Scheiblaue to Harrold (dated 11/21/08; attached)
4. Letter from Harrold to Scheiblaue (dated 11/24/08; attached)

5. Email from Chris Harrold to RAP LISTSERV (12/5/08; LISTSERV delivery failed), Erica Burton subsequently forwarded Harrold's email to RAP LISTSERV (12/8/08; Subject: Harrold: Role of the MBNMS RAP); email contained letter from Harrold to Michel (dated 1/14/08; attached)

Background Info

- Scheiblauber (Harbor Master, Monterey) wrote a letter to the RAP chair (dated 11/21/08) requesting time to speak at a RAP meeting, to request that the RAP provide individual, and a collective, opinion as to the need for MPAs within federal waters of MBNMS for unmet research needs

Chris Harrold reviewed the RAP's involvement in the sanctuary's MPA process to date.

Discussion ensued. No consensus emerged regarding the individual and collective opinion that Steve Scheiblauber is seeking. Rather, this discussion blended into the next discussion item.

STAFF/SAC REQUESTS TO RAP

Info Request: RAP's role in MBNMS Federal MPAs Initiative and Beyond (Paul Michel/MBNMS)

Paul Michel highlighted the RAP's involvement in the MPA issue

- RAP has addressed the MPA issue many times over the years
- MBNMS will continue to solicit RAP's input on process
- MBNMS is still in the beginning stages of this new process
- MBNMS is faced with managing the Sanctuary using an ecosystem-based approach
- The sanctuary intends to form an MPA Working Group, and a Science Panel
- The sanctuary hopes the RAP will:
 - Help refine the disciplines on the Science Panel
 - Continue to have this item on the RAP agenda
 - Review products from the Science Panel
 - Provide input on research questions for the MPA proposals

Harrold presented a potential list of Working Group disciplines, and Science Panel disciplines (using input from November 2008 RAP meeting).

Mike Eng gave a brief overview of the NEPA process that the sanctuary will follow in the MPA process.

Extensive discussion ensued, and touched on: composition of the working groups, coordination with fisheries agencies, enforcement, and authority, process and timeline.

There was consensus that the RAP should be involved in the MPA process in a more intimate way than has been the case to date. The sanctuary's MPA process will be a standing RAP agenda item. Chris will bring a "straw man" proposal of RAP involvement to the next RAP meeting.

Recognition of Greg Cailliet for Extraordinary Service to the RAP

- Greg Cailliet (Deep-sea Ecology, Moss Landing Marine Laboratories) was recognized for his long-term leadership and participation in the RAP, and for surpassing an attendance record of more than 100 meetings
- Andrew DeVogelaere presented Greg with a jacket with MBNMS logo; and a tasseled-fez with the monogram, “Grand Poobah, 100, Sanctuary RAP”

Info Request: Sanctuary Characterization Image Display (SCID): Visualizing the Sanctuary (James Lindholm)

- Following a research cruise, the Sanctuary has the goal of sharing summary info (e.g., images, video) with the public as soon as possible
- Lindholm presented the SCID project: Sanctuary Characterization Image Display; a web-based method of presenting geo-referenced images and video clips on an interactive map
- Partners:
 - Institute for Applied Marine Ecology at CSU Monterey Bay
 - SIMoN/MBNMS
- Source Data: camera sled video transects (2006, 2007, 2008)
 - North Bay/Soquel Canyon area
 - Point Lobos Area
 - Point Sur area
 - Piedras Blancas area
- In the future, Delta Sub and ROV video may be incorporated into SCID
- Products:
 - Portal to view images that is non-threatening to data analysis
 - Images, video clips
 - Species lists
- Website will reside on CSUMB server (indefinitely)
- SCID will soon be available on SIMoN website
- Info available at: <http://sep.csUMB.edu/iame/s/index.html>
- **Request:** RAP was asked to contribute relevant videos to the SCID project
- Storlazzi: mentioned USGS’s “usSEABED” database; which could be a warehouse for SCID’s georeferenced seabed information
 - usSEABED is a queryable database, for all of the U.S.
 - USGS is interested in any kind of geo-referenced seabed data (currently USGS is mining data back to ‘60s)
 - Openly accessible to all
 - <http://walrus.wr.usgs.gov/usseabed/>
 - Principal Investigator: Jane Reid (jareid@usgs.gov)

Info Request: Compiling MLPA monitoring information (Andrew DeVogelaere/Gary Conley)

- The Sanctuary/SIMoN is interested in monitoring information, and wants to know what role they can play in the MLPA monitoring effort
- Gary presented new SIMoN map, including existing National Registry and SIMoN projects that occur in MPAs
- MBNMS is looking for researchers/institutions with data to contribute to this effort, along with providing associated info for SIMoN Project Pages
- http://www.sanctuariesimon.org/monterey/sections/reserves/mpa_projectsmap.php
- RAP was concerned socio-economic data was not included; MBNMS staff are interested in including

DISCUSSION ITEMS

Sanctuary Currents Research Posters and Awards (Erica Burton/MBNMS)

- Erica provided an update on the Sanctuary Currents Symposium
 - Saturday, April 18, 2009 at Hyatt Regency, Monterey
 - Theme: Back to the Future: Preserving the Sanctuary by Exploring its Past
- The Call for Research Posters was announced via email (12/18/08), and abstracts are now being accepted by Steve Choy via email (Sea Grant Fellow, steve.choy@noaa.gov)
- Instructions for Research Posters is on the SIMoN website (<http://www.sanctuariesimon.org/monterey/posters/>)
- RAP members were reminded to send their votes for the two science awards to Erica Burton via email by 1/15/09

SUGGESTED FUTURE AGENDA ITEMS

Future Agenda Items (running list):

- Water Quality
 - Findings on tracking pathogens in sea otters and connection to FW flows (CDFG, UC Davis?)
 - Critical coastal areas presentation (ASBS, areas water quality impaired, areas in good state; Ross Clark)
- SIMoN
 - SIMoN: future monitoring (JMPR or beyond)
 - SIMoN Special Status Species Project (Jennifer Brown)
 - Linking SIMoN to management (Amber Szoboszlai)
 - SIMoN accomplishments or future plans, partnerships (per Curt Storlazzi)
- MPAs
 - MPA science synthesis – MLPA (Mark Carr)
 - MPA monitoring projects (Jason Vasques)
- Coastal armoring and coastal erosion (Ed Thornton)
- Communication Partnership for Science and the Sea (COMPASS)

- Wave Model Development and Implementation (Paul Wittmann/Fleet Numerical)
 - Data integration across monitoring programs (e.g., water quality, PISCO, MARINe, IOOS), and availability to the public
 - Santa Cruz Visitors Center update by Lisa Uttal (schedule when NMFS is RAP host)
 - MARS cable (per Kildow, speaker = Marcia or other, schedule when MBARI hosts)
 - Recent event: Supreme Court allows Navy Sonar (per John Hunt)
 - NOAA Twin Otter plane comes to Monterey
 - Zeppelin capabilities for research
- *RAP identified priority of Future Agenda topics (9/12/08):*
1. *SIMoN*
 2. *MPA Science Synthesis – MLPA (Mark Carr)*

2009 RAP Meeting Schedule and Locations (Revised 3/27/09)

Date	Host	Location
January 9	Lindholm	CSU Monterey Bay
March 13	Harrold	Monterey Bay Aquarium
May 8	Grimes/Yoklavich	NOAA Fisheries, Santa Cruz
July 10	Carr	Long Marine Lab, UC Santa Cruz
September 11	Micheli/Epel	Hopkins Marine Station
November 13	Kildow	MBARI



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary
299 Foam Street
Monterey, California 93940

February 15th, 2008

Dear Members of the MPA Working Group and Sanctuary Advisory Council,

As you know, the time has come for a decision on the need for marine protected areas (MPAs) in federal waters of the Monterey Bay National Marine Sanctuary (MBNMS). I want to begin by thanking you for contributing your perspectives and knowledge to the consideration of this important issue. Your involvement over the last five years has been invaluable to increasing our understanding of the issue. The presentations and discussions we had at the December Advisory Council meeting were especially helpful and I commend you for your thoughtful input.

The National Marine Sanctuary Program (NMSP) has broad congressional direction to protect marine ecosystems. While the scope of this mandate allows for the management flexibility needed to protect dynamic sanctuary environments, charting the best course of action often takes time and patience. This is due to both the complexity of ocean issues and the NMSP's emphasis on extensive public input. In 2001, the MBNMS solicited this input from the public as part of a review and rewrite of its management plan. Over a five year period, the MBNMS received thousands of comments, held over a hundred meetings, and with the help of the SAC, identified 26 priority action areas that represent the future of Sanctuary management. Of these 26, the highest priority was the issue of marine protected areas in the Sanctuary. Given the complexity and diversity of opinions on this topic, the MBNMS convened a multi-stakeholder working group to develop a plan for evaluating the utility and potential siting of MPAs. As the State of California was re-focusing on MPAs in state waters through the Marine Life Protection Act, the MBNMS working group focused its attention on MPAs in the Sanctuary's federal waters (beyond 3 miles).

Over the last five years MBNMS staff and the members of the MPA working group have compiled data layers, completed a resource assessment, conducted socioeconomic studies, sponsored workshops, and developed a web-based decision support tool. However, while the working group was able to compile and consider all of this information, it was not able to agree on the fundamental question of whether there is a need for MPAs in federal waters. It was the MBNMS's hope that consensus on the question of need could be reached, or that by focusing on specific areas, all sides might be able to live with particular MPA configurations. However, in the absence of consensus on this question it is the MBNMS's responsibility to consider the arguments on both sides and make a decision regarding whether to move forward with a process to propose new MPAs. To that end, in December 2007, the MPA working group members presented their arguments for and against federal water MPAs to the Sanctuary Advisory Council, which in turn gave its advice to the MBNMS. Since then, we have received about twelve thousand comments on this issue and I have continued to meet with stakeholders and partners to explain the process and solicit input.



With the benefit of the community's advice, input from partner agencies, and the last six years of consideration, the MBNMS has concluded that there is a need for MPAs in the federal waters of the Sanctuary. The following pages discuss the reasons in support of this decision.

The Role of the National Marine Sanctuaries Act (NMSA)

The NMSA is unique in that the primary purpose is to set aside nationally significant areas of the marine environment for their permanent protection and to provide comprehensive ecosystem management to achieve this goal. As such, the NMSA provides broad authority for management actions focused on the protection and conservation of the full spectrum of biological diversity at a sanctuary. It can also fill gaps in protection that other authorities, such as the Magnuson-Stevens Fishery Conservation Act (MSFCA), Marine Mammal Protection Act, or Endangered Species Act, are not able to address. Through the NMSA, Congress mandated that national marine sanctuaries be managed to maintain the habitats and ecological services of the natural assemblage of living resources that inhabit these nationally significant marine areas. Among the purposes and policies of the NMSA is provision of authority for comprehensive and coordinated management to maintain the natural biological communities and to protect, restore, and enhance natural habitats, populations, and ecological processes. In specifying the management of "natural biological communities," "natural assemblages of living resources," and "natural habitats," rather than focusing on species populations *per se*, Congress essentially mandated that national marine sanctuaries be managed to protect and conserve ecosystem structure and function.

The Benefits of MPAs

As has been described to the Advisory Council in the past, the MBNMS has used zoning, or spatial management, extensively since its designation in 1992. The MBNMS has zones where:

- A harmful human activity otherwise prohibited throughout the Sanctuary is allowed (motorized personal watercraft, harbor dredge disposal, jade collecting)
- A harmful human activity is specifically prohibited (shark chumming, low over-flights)

These areas have proven effective in the context of managing the Sanctuary ecosystem by restricting or otherwise managing human activities.

Scientific research has shown that carefully crafted MPAs can be effective tools for conserving the diversity of animals and plants, protecting habitats, and increasing both numbers and individual sizes of some species. Recent studies have shown that an MPA, in which the removal or alteration of marine life is prohibited or restricted, generally contains a greater abundance of species, higher diversity of species, and larger fish within its boundaries relative to similar habitats outside the protected area. These larger fish produce many more young than do smaller fish, and studies for some species have shown that their young are healthier and more likely to survive. MPAs have also been shown to be a useful tool for preventing, slowing, or reversing the degradation of ocean habitats and maintaining the diversity and abundance of species inhabiting them.

Ocean ecosystems worldwide are threatened because of pollution, overfishing, habitat destruction or coastal development. In response, many governments, scientists, conservation organizations, commercial groups and citizens are increasingly discussing the idea of establishing new, well-designed MPAs to complement existing ocean management strategies.

In the United States, both the U.S. Commission on Ocean Policy and Pew Oceans Commission recently declared that our oceans are in trouble, and are calling for MPAs to be used as a management tool to support the protection of ocean ecosystems.

Existing Spatial Management Efforts in the MBNMS

Interest in implementing a system of marine protected areas has increased in California too. In 1999, the Legislature and Governor approved the Marine Life Protection Act (MLPA) mandating the state to design and manage an improved network of marine protected areas in state waters to protect marine life and habitats, marine ecosystems, and marine natural heritage. Currently the California Resources Agency and California Department of Fish and Game are partnering with others to achieve the goals of the MLPA, with initial efforts focused on developing a MPA network for California's central coast region. In September 2007, after an intensive public processes in ocean governance, the first round of 29 new state MPAs (204 square miles) went into effect on the central coast. 27 of the 29 areas are within the MBNMS.

In the federal waters of the Sanctuary, there are other spatial management measures in place that protect Sanctuary resources from extraction. For example, in 2002, as a means of protecting depleted groundfish species such as bocaccio and canary rockfishes, the Pacific Fishery Management Council and NOAA Fisheries imposed depth-based restrictions on the trawl and non-trawl groundfish fisheries termed Rockfish Conservation Areas (RCAs). Furthermore, in June of 2006, NOAA Fisheries published the final rule designating and protecting Essential Fish Habitat (EFH) for Pacific groundfish. The action closed large areas of the west coast, primarily to bottom trawling.

However, while the existing spatial management measures in state and federal waters of the Sanctuary provide valuable protections from fishing impacts in certain habitats. Those habitats further offshore are either not adequately represented in existing MPAs, or not fully protected by the gear based restrictions associated with EFH or the temporary RCAs.

The Need for MPAs in the MBNMS

The MBNMS has three principal reasons for moving forward with MPAs in the federal waters of the Sanctuary: 1) There is a need for areas where the natural ecosystem structure and function are restored and maintained; 2) there is a need for research areas to examine human impacts to the marine environment; and 3) there is a need to preserve some areas in their natural state for future generations. Additional detail in support of these reasons is provided below. Further, the MBNMS, in consultation with NOAA Fisheries, will be releasing shortly an ecosystem analysis in support of this decision.

1) There is a need for areas where the natural ecosystem structure and function is restored and maintained.

The environmental condition of the Sanctuary is subject to major alterations that are largely due to the effects of human activities. Threats to Sanctuary resources, such as water quality or habitat complexity, fall into two general categories: 1) those that involve exploitation of resources above a certain level or threshold and 2) those that destroy or degrade marine habitats

and their associated biological communities. Exploitation includes both directed harvest and incidental take of marine life. Threats to habitat include activities leading to physical alteration, various sources of pollution, coastal development, and introduction of alien species. Many of these threats are interrelated and have cumulative impacts.

The Sanctuary ecosystem has been impacted from human activity (e.g., fishing activities) to a degree where the MBNMS believes that it is appropriate to set aside some areas in federal waters where these impacts are minimized. These impacts include altered size and age structure of fish and invertebrate species, altered habitats, altered species assemblages and biodiversity, reduced abundance, and altered ecosystem function. Where appropriate, it is envisioned MPAs in Federal waters could build off of and supplement the state MPAs established under the MLPA in the Sanctuary. While there are other management measures in place such as those under the MSFCA, their stated purpose is to manage fisheries and are not designed to provide areas where the natural ecosystem structure and function are restored and maintained throughout the Sanctuary's representative habitats.

It is important to reiterate that the primary purpose of any action taken by the MBNMS to establish MPAs in the Sanctuary is the conservation of Sanctuary ecosystem structure and function. This action would not be taken for the purpose of managing any single human activity or impact, but rather to manage for the protection of the Sanctuary ecosystem from a wide variety of existing or potentially new threats.

2) There is a need for research areas to examine human impacts to the marine environment.

Setting aside areas of the Sanctuary as MPAs can provide critical research opportunities in offshore habitats in order to more fully understand the effects of fishing and other uses on the Sanctuary environment. Even though the Sanctuary is one of the better understood marine areas in the world, there is a need to better distinguish human induced change from natural variability. In its 2001 publication entitled "Marine Protected Areas – Tools for Sustaining Ocean Ecosystems," the National Research Council characterized the need for MPAs to help understand marine ecosystems:

Understanding the influence of human actions on marine systems is critical to evaluating the need for and effectiveness of management actions, but differentiating between natural and anthropogenic events is extremely difficult. Any indicator of change in a system must be compared to a well-defined natural standard, or benchmark, against which the magnitude of the change can be evaluated to determine its cause and significance. Without control areas, such as MPAs, that are relatively free from human influence to compare with areas altered by human activities, explaining the sources of variability becomes even more difficult... There is a significant need for fishery-independent sampling programs that include areas closed to fishing and other activities that disturb fish populations and habitats.

While the new MPAs in state waters do afford the opportunity to distinguish human induced change from natural variation and fluctuation, offshore habitats are not represented. These

deeper water habitats are distinct from those nearshore as is their likely response to fishing impacts. Understanding impacts in these commercially important offshore areas is not only critical to effective Sanctuary management, but is also potentially key to effective ecosystem based fisheries management.

The Marine Life Protection Act was intended in part to help the State understand the marine environment by providing the opportunity to study areas that are not directly impacted by fishing. Having comparable areas in federal waters, potentially adjacent to state MPAs, would have the benefit of not only providing a greater range of habitat types in which to study the effects of fishing, but larger contiguous areas could provide better control sites and enhanced opportunity for complementary federal and state research efforts.

3) There is a need to preserve some areas in their natural state for future generations.

Section 301(a)(4)(c) of NMSA states that the National Marine Sanctuary System will maintain for future generations the habitat, and ecological services, of the natural assemblages of living resources that inhabit national marine sanctuaries (16 U.S.C. 1431(a)(4)(c)). There are certain areas of the Monterey Bay National Marine Sanctuary environment with extraordinary features or attributes, such as habitat, biological diversity, or sensitivity, and warrant a higher level of protection than is currently provided by MBNMS regulations or those of other authorities, so that those features remain conserved for future generations in as close to a natural state as possible. This rationale of “wildernesses of the sea” (areas of the marine environment that, like their counterpart on land, have inherent or intrinsic value due solely to their unique and/or exceptional qualities and receive the maximum level of protection) received strong support during the public comments periods on this process, as well as during the comment period for the Joint Management Plan Review.

In addition, affording these areas with an elevated level of protection will provide them security against currently unknown human and environmental impacts and threats that may arise in the future. Changes in technology to a wide variety of marine-dependent human activities, such as energy development, communication systems, desalination, or aquaculture often result in significant deviations from how the activity had been previously conducted. In many cases, although these technological changes occur quickly, it takes several years for their impacts to be fully understood. Although the impacts of these activities may not immediately be known, it is the NMSP’s responsibility to steward our sanctuaries and to ensure, as much as possible, that they are enjoyed and appreciated by the American public in the future. Providing certain areas of the Sanctuary with elevated protection, while continuing to allow compatible uses elsewhere, furthers this goal.

Furthermore, by managing these areas with additional protections in place, the MBNMS seeks to reduce the effects of cumulative impacts from human activities or from large scale environmental changes, such as climate change that are already occurring or may occur in the future. Restricting extractive or invasive human activities in these areas is expected to limit the effects on their special qualities to only those impacts that may occur as part of environmentally-driven events. Marine protected areas, by controlling for impacts for extractive human activities, will allow the MBNMS to assess the nature and severity of these events over time.

Conclusion

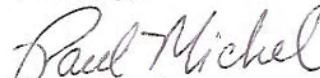
While this decision comes after years of public process and stakeholder input, much work remains ahead. Over the next several months, MBNMS staff will be asking the Sanctuary Advisory Council and the Pacific Fishery Management Council for input on how best to build on the efforts of the MPA working group to ensure an effective and timely public process.

In deciding to move ahead, the NMSP is committing to dedicate the resources necessary to fully capitalize on the community's continued input as well as to adequately understand the ecological and socioeconomic impacts of any proposed action.

Any regulatory action proposed by NOAA to designate MPAs in Federal waters, whether under the NMSA, MSFCA or both, to specifically designate areas will be accompanied with a full environmental analysis per the requirements of the National Environmental Policy Act and the Administrative Procedure Act.

Thank you again for your valuable time and advice, and willingness to help chart the course.

Sincerely,

A handwritten signature in cursive script that reads "Paul Michel".

Paul Michel
Superintendent



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary

299 Foam Street
Monterey, California 93940

April 15, 2008

Dear Sanctuary Advisory Council Members,

As you recall from my presentation at the February 15, 2008 meeting of the Sanctuary Advisory Council (SAC), the National Oceanic and Atmospheric Administration's (NOAA) Office of National Marine Sanctuaries (ONMS) has decided to move forward with a process to propose marine protected areas (MPAs) in federal waters of the Monterey Bay National Marine Sanctuary (MBNMS or Sanctuary). This letter provides additional information and rationale on this decision and clarifies the role of the National Marine Sanctuaries Act (NMSA) in managing the national marine sanctuaries from an ecosystem-based approach. I look forward to your continued participation, support, and advice on this important issue.

1.0 Background

The decision to move forward with a process to propose MPAs in the Sanctuary is based on advice from the regional community, input from partner agencies, and deliberations over the last five years by the MBNMS marine protected areas working group. If action is taken by the ONMS to establish MPAs in federal waters of the Sanctuary, the primary purpose for this action is to protect biodiversity and protect natural habitats, populations, biological communities and ecological processes (in this document collectively referred to as protection of ecosystem components). This action would not be taken for the purpose of managing any single human activity or impact, but rather to protect biodiversity, and protect components of the ecosystem within the Sanctuary using ecosystem-based approaches to management. Under the NMSA, the ONMS's responsibility for natural resource protection and ecosystem-based management is among the most comprehensive of all federal programs. Sections 1.1 and 1.2 provide further context on the ONMS's goal of marine resource protection and why MPAs are considered an essential ecosystem-based tool to address specific objectives within the broad goal of resource protection.

1.1 Statutory context of proposed action

The NMSA, of which the primary purpose is resource protection, is unique in that it allows management actions focused on the protection and conservation of the full spectrum of biological diversity and can serve as an important complement to tools focused on single species management, such as the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the Endangered Species Act (ESA), and the Marine Mammal Protection Act (MMPA). NOAA's National Marine Fisheries Service (NOAA Fisheries) manages individual species of economic importance under MSFCMA, the nation's primary law regulating fishing in federal waters. The MSFCMA requires regional fishery management councils to develop fishery management plans (FMP) with goals of optimum sustainable yield to manage targeted populations. The MSFCMA also requires management of essential fish habitat and habitat areas of particular concern, but management actions must be focused on specific spatial and temporal attributes that support populations of species managed as part of an FMP. The ESA provides for



broad protection of species listed as threatened or endangered, including recovery plans and the designation of critical habitat. The MMPA provides protections to marine mammals by prohibiting take of marine mammals and having a goal that individual marine mammal species or stocks remain at, or above their optimum sustainable population level. "Take" under the MMPA is defined as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect.

While there are thousands of documented species in the Sanctuary, and many that remain unknown, only a small percentage is protected under the MSFCMA, ESA, and MMPA. Among the findings, purposes, and policies of the NMSA is the finding "while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment." The NMSA is unique in that it allows for coordinated and comprehensive management actions focused on the protection and conservation of the full spectrum of biological diversity at a sanctuary rather than single species populations, which is the focus of other resource specific legislation. Congress found that national marine sanctuaries are areas of the marine environment that have special national significance and provides they be managed "to maintain the natural biological communities.....and to protect, restore, and enhance natural habitats, populations, and ecological processes."

Another provision of the NMSA (Section 301(b)(6)) addresses the tension between resource protection and human uses and/or activities of sanctuary resources, and states a purpose of the NMSA is "to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities." This provision of the NMSA identifies when facilitating public and private uses of sanctuary resources, resource protection is the primary objective and therefore takes precedence. Human uses should be facilitated only when compatible with resource protection. The MBNMS facilitates some form of compatible human use in vast portions of the Sanctuary. Such uses are sometimes facilitated under relevant legislation, such as the NMSA and the MSFCMA. Only small nearshore portions within MPAs implemented by the state of California prohibit all, or most forms of extractive activity. The purpose of facilitating human uses compatible with the primary objective of resource protection will be fully evaluated with the process to consider establishing MPAs in federal waters of the MBNMS.

In managing for biodiversity protection and ecosystem component protection, the authorities and protection measures afforded by all relevant statutes will be brought to bear in addressing the issues identified in sections 2.1, 2.2, and 2.3 below. Furthermore, given the distinctions made above among relevant governing statutes, it is reasonable to anticipate that the ONMS would advocate for higher levels of protection for certain areas of the Sanctuary than would be applied throughout the whole of the Sanctuary. By pursuing a process to consider further protections, the MBNMS is not characterizing the current management of habitats, economically important species, listed species, or marine mammals in the Sanctuary as inadequate under their respective regimes. Instead, the existing management actions designed for individual species or stocks are not designed to fully meet the ecosystem component protection and biodiversity protection goals of the MBNMS under the NMSA.

1.2 The ecosystem and MPA effects on components of the ecosystem

The Monterey Bay National Marine Sanctuary is within the California Current Large Marine Ecosystem (CCLME), which has been subject to major alterations due to a combination of climatic and oceanographic variation and human activities (Chavez *et al.* 2003). The CCLME is subject to natural fluctuations in environmental conditions, typified by alternating climate regimes that differ in temperature, circulation, nutrient availability, and productivity over multiple time scales. For example, anchovy and sardine stock abundances have responded to these regime shifts over the last two millennia by cycling in or out of phase with environmental conditions (Finney *et al.* 2002). Typically, when anchovies are abundant, sardines are less abundant, and vice versa. During the downswing of one of these stocks, an anthropogenic or natural impact, such as overfishing or global warming, may alter their response to natural regime shifts and slow their recovery rate (Chavez *et al.* 2003, Palumbi *et al.* 2008). Ed Ricketts in 1946 suggested that this might have occurred to the sardine stocks that were heavily exploited in the Monterey Bay (Rodger 2002).

The ONMS's ability to accurately evaluate the scale and consequences of change in the state of the Sanctuary's natural resources is often challenged by an inadequate knowledge of historic baselines to compare with present conditions. A number of global studies have recorded substantial decreases in abundances of large consumers, such as whales, turtles, sharks and pelagic fish (Jackson *et al.* 2001, Myers and Worm 2003). The following historic baselines of the ecosystem off the California central coast region concur with this global phenomenon. For example, Jean Francois de la Perouse described in 1792 what are believed to be the abundance of gray whales and stated, "it is impossible to describe the number of whales..... they blowed every half minute within a pistol shot from our frigate." Blue, right, gray and humpback whales were subsequently hunted to the edge of extinction. Despite full protection by the International Whaling Commission in 1947 for the California gray whale, their current numbers only represent 28-56% of their original historical abundance for the east Pacific population (Alter *et al.* 2007).

Shallow rocky reefs off the California coast often exist in alternative states comprised of kelp forests or urchin barrens (Tegner and Dayton 2000), depending on many environmental variables, but chiefly on the presence of urchin predators, such as spiny lobsters and sheephead in southern California or sea otter populations in central California. Hunted for their fur in the 1800s, sea otters were nearly extirpated before laws protecting otters were enacted. Sea otters have the potential for regulating kelp forest communities and the number and diversity of fishes resident in these nearshore communities (Estes and Palmisano 1974). As early as 1850, trophic cascades brought about by sea otter exploitation led to population explosions of two herbivorous invertebrates, abalone and sea urchins. Had it not been for the thriving abalone fishery led by the Chinese in the area, more serious impacts on kelp forest and the associated ecosystem might have been experienced. Although the size or location of any proposed MPAs in federal waters of the Sanctuary would be inappropriate for protection and restoration of whale or sea otter populations, these examples serve to demonstrate how the natural state of certain species within the CCLME and the Sanctuary have shifted to a fraction of their historical abundances. Marine fauna have undergone substantial population changes due to climatic influences and human activities. These examples support the need for long-term datasets to distinguish natural ecosystem variation inherent in the CCLME from anthropogenic forcing.

The basic diversity of marine life and the patterns and processes controlling distribution and abundance of marine organisms in the Sanctuary are still not well understood, especially in offshore waters and deeper habitats. At the same time, new technologies (e.g., geographic information systems or GIS) and conceptual advances (e.g., theoretical models) in ecosystem-based management allow the ONMS to implement research and management approaches that seek to reveal a more complete understanding of ecosystem components of the Sanctuary's deepwater communities.

Protecting biodiversity and ecosystem components is central to the implementation of ecosystem-based management, an evolving approach that stresses management of the Sanctuary in context of its ecosystem, including all habitats and species populations, biological communities, and all human activities. Both ecosystem-based management and MPAs offer an integrated approach to marine resource management (NRC 2001, MPA FAC 2006). Numerous advisory panels, such as the U.S. Commission on Ocean Policy and the Pew Oceans Commission as well as many marine scientists, believe that management of marine resources in U.S. waters would be most effective if implemented explicitly from an ecosystem perspective (NOAA 2005; Francis *et al.* 2007). The goal of ecosystem-based management is to achieve healthy and resilient ecosystems so that they can provide services humans need and want, such as water and air purification, seafood, recreation, and spiritual connections (MPA FAC 2006). MPAs promote an ecosystem-based approach to managing and understanding marine resources by protecting geographical areas, including resident organisms and their biophysical environment (Lubchenco *et al.* 2003).

MPA effects on ecosystem components range from habitat and population level responses to community level responses. For example, in areas less impacted by bottom-contact gear, particularly trawl gear, benthic habitats were topographically and structurally more complex, providing increased shelter for juvenile fish and reducing their vulnerability to predation (Kaiser *et al.* 2002). Engel and Kvitek (1998) compared highly trawled areas to lightly trawled areas in the Sanctuary and found lightly trawled areas to contain more heterogeneous sediments, more detritus, and higher abundances of opportunistic species.

In a global study by Halpern (2003) of 89 no-take MPAs, the increased protection inside these particular MPAs yielded, on average, increases in species number, size, and diversity. Improvements in size and age structure of fish populations may improve reproductive capacity, for older fish may produce larger, healthier, and more fit larvae (Berkeley *et al.* 2004a). A broad spectrum of age classes may also buffer a population against long periods of recruitment failure and unfavorable conditions induced by natural or anthropogenic sources (Berkeley *et al.* 2004b). These improvements in habitat and population variables have been shown to provide benefits to economically important species (Murawski *et al.* 2000).

At the community scale within the Sanctuary, natural refugia from human activities had higher abundances of large rockfishes (*Sebastes* spp.) than areas utilized by humans (Yoklavich *et al.* 2000). Shifts in community composition may disrupt direct and indirect ecological processes inherent in food webs and alter community trophic interactions and energy flow. A few studies of MPAs have shown to reverse these trends inside their boundaries by increasing predator abundances and restoring their top-down role in trophic cascades (e.g., Shears and Babcock

2003), and by increasing species richness and functional diversity (Micheli and Halpern 2005). Food web structures are complex and their influence on ecosystem states even more complex. A study of coral reef interactions inside a large marine reserve revealed increased levels of grazing by herbivorous fishes despite increases in predator abundances, which in turn reduced algal cover and increased live coral cover (Mumby *et al.* 2006).

At the ecosystem scale, MPAs have higher biodiversity, which plays a role in ecosystem productivity and stability. Worm *et al.* (2006) conducted a global comparison of regional biodiversity and argued that ecosystems with higher regional species richness appeared more stable, showing lower rates of extinction of economically important fishes and invertebrates over time. The same study reviewed how increased biodiversity in no-take MPAs and fishery-based MPAs were associated with large increases in productivity among economically important species.

Therefore, MPAs are considered an effective ecosystem-based tool for protecting biodiversity and ecosystem components. In addition, MPAs may also contribute to human uses, such as ecotourism and bolstering depleted stocks. Benefits of MPAs in the federal portions of the Sanctuary are most likely to be detected inside the boundaries of the MPA over many years to decades, particularly for sedentary species. Benefits beyond the MPA boundaries will be much harder to detect, but could include spillover of adults (McClanahan and Mangi 2000; Gell and Roberts 2003) and larval dispersal into adjacent areas (Murawski *et al.* 2000). It is important to note that even well-managed MPAs will require continued conservation efforts beyond their boundaries to be effective at promoting biodiversity and conserving ecosystem components (Murray *et al.* 1999).

2.0 Management Objectives for MPAs in Federal Waters of the MBNMS

Marine zones, such as MPAs that offer protections complementing those currently afforded to the Sanctuary as a whole, are tools of spatial management. Marine zones are not a new endeavor for the ONMS or the MBNMS. In fact, the MBNMS has used zoning since the Sanctuary was designated in 1992. Currently, the MBNMS has zones where:

- Certain human activities, otherwise prohibited throughout the Sanctuary, are allowed (such as motorized personal watercraft, harbor dredge disposal, or jade collection);
- Certain human activities are specifically prohibited (such as shark chumming or low over-flights by airplanes).

Through restricting or redirecting potentially harmful or disruptive human activities, these marine zones have improved management and protection of the Sanctuary's ecosystem components. There are three principal management objectives for moving forward with MPAs as additional marine zones in the federal waters of the Sanctuary:

1. Preservation of unique and rare areas in their natural state for the benefit of future generations;
2. Preservation of areas where natural ecosystem components are maintained and/or restored;

3. Designation of research areas to differentiate between natural variation versus human impacts to ecological processes and components.

Supporting information and reasoning for each of these management objectives is detailed below.

2.1. Preservation of unique and rare areas in their natural state for the benefit of future generations

In section 301(a)(4)(C) of the NMSA, Congress finds that the National Marine Sanctuary System will “maintain for future generations the habitat, and ecological services, of the natural assemblages of living resources that inhabit these areas.” There are certain areas of the Sanctuary environment with extraordinary features or attributes, such as unique habitats, biological diversity, or sensitivity, warranting a higher level of protection than currently provided by MBNMS regulations and other authorities. These areas of inherent or intrinsic value, due solely to their unique and/or exceptional qualities, may be considered analogous to land areas that are cherished and protected solely for their superlative beauty and untamed wildlife. There are similar wildlife areas in the Sanctuary, teeming with mysterious and stunning life, such as deep sea coral and sponge communities (NOAA 2008) or chemosynthetic biological communities that are vulnerable to human activities and deserve special protections. The concept of protecting “special places” within the Sanctuary of intrinsic value received strong support during the public comment for the Joint Management Plan Review (approximately 50% of comments), as well as comments received when considering the decision to pursue the action of establishing MPAs to manage resources in the federal portions of the Sanctuary (> 95% of comments).

By providing additional protections to areas of intrinsic value, the MBNMS can provide defense against unforeseen impacts and threats from technological advances in marine activities. Changes in a wide variety of marine technologies such as desalination, energy development, or aquaculture may result in unintentional deviations from how the activity had been previously conducted and potentially negatively affect natural resources of the Sanctuary. In many cases, although these technological changes occur quickly, it can take many years to decades for their impacts to be fully understood. The ONMS therefore, can proactively steward special places within the Sanctuary and seek to ensure they are protected for the public now and in the future.

2.2. Preservation of areas where natural ecosystem components are maintained and/or restored

Section 301(b)(3) of NMSA guides the ONMS “to maintain the natural biological communities in the national marine sanctuaries”, and “to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological process.” In an effort to achieve this goal, current MBNMS regulations protect Sanctuary resources and attributes from a variety of human activities that can have adverse impacts on the ecosystem. Examples include regulatory prohibitions on oil and gas development, resource extraction, discharge of harmful materials, and seafloor alterations.

To provide for additional protection of the natural components of the ecosystem, other human activities could be restricted or prohibited within any federal waters MPAs designated in the

Sanctuary. Activities that may require further regulation in federal waters include installation of cables, construction of offshore wave energy facilities, commercial and recreational extraction, extractive research, offshore aquaculture, and other types of bottom-contact activities. The effects of most of these activities are currently not well defined, with the exception of fishing. Fishing is one of the most studied human activities of the marine environment with a wide variety of data and sources analyzing its effect on components of marine ecosystems.

The ONMS does not regulate fishing in the Sanctuary and does not consider the establishment of MPAs for MBNMS objectives as a tool for fisheries management. However, any potential MPAs implemented by the MBNMS and existing or future zones designated by fisheries management agencies (hereafter referred to as fishery-based MPAs) may complement each other by contributing to the objectives of ecosystem conservation and sustainable production, respectively. The fishery-based MPAs implemented by the Pacific Fishery Management Council (PFMC) within the Sanctuary are rebuilding overfished populations (Rockfish Closed Areas, RCA) and protecting essential fish habitat (EFH: bottom trawl closed areas within the Sanctuary and bottom contact closed areas over Davidson Seamount). The RCAs provide seasonal protection to groundfish assemblages of "weak and strong stocks" by prohibiting the take of overfished species (weak stocks) that co-occur with healthy species (strong stocks). Recent stock assessments show notable improvement to the status of the overfished stocks, likely due to the RCAs and conservative total allowable catch (TAC) limits for the west coast groundfish fishery. The fishery-based MPAs thus contribute, in part, to the objective of "restoring ecosystem components" by rebuilding overfished stocks. However, the focus of these particular fishery-based MPAs is to rebuild individual stocks and will presumably be discontinued when stocks have been rebuilt (timeline: 2 – 80 years). The performance of designated EFH areas is currently being evaluated. For example, the MBNMS has partnered with Dr. James Lindholm to evaluate the recovery trajectory of a non-trawled area (EFH), compared to a trawled area (J. de Marignac, personal communication).

Fishing activities have altered marine resources and components of the ecosystem globally (NRC 2006) and within the Sanctuary (Yoklavich 2000; Levin *et al.* 2006). Examples of general effects include alterations to population abundances, size and age structure of fishes and invertebrate species, habitats, and species diversity. The dramatic decline of some rockfish species (*Sebastes* spp.) and the lengthy projected periods to rebuild to target levels are sufficient evidence that components of the groundfish community and habitats have been strongly impacted by fishing activity (Ralston 2002). Furthermore, based on two decades of bottom trawl surveys of the California Current, Levin *et al.* (2006) found evidence for broad-scale changes in community composition of groundfishes.

How these changes to groundfish populations and community composition ultimately affect the community interactions of the Sanctuary is thus far unknown. However, studies of temperate communities, both in central California and other regions, show that removal of predators can have cascading impacts to lower trophic levels. As alluded to earlier, the structure of kelp forest communities along the west coast from Alaska to southern California is strongly influenced by the relative abundance of predators (e.g., killer whales, sea otters, lobsters, sheephead) and prey (e.g., sea urchin, abalone) (Estes and Palmisano 1974, Estes *et al.* 1998, Steneck *et al.* 2002, Halpern *et al.* 2006). Other predator-prey examples from the North Atlantic and Baltic Sea

demonstrate how the demise of a predatory fish has led to substantial increases in the abundance of its prey (Worm and Meyers, 2003; Zabel *et al.* 2003). When community interactions are included in a model for design of no-take MPAs for west coast rockfish, two alternative community states are predicted as a consequence of initial densities of predator and prey fish species: one where the overfished rockfish predators dominate and one where the prey dominates (Baskett *et al.* 2006).

Declines in functional species or groups, such as the demise of key predators and herbivores, may also represent a loss of ecological redundancy, reducing ecosystem resilience and rendering the ecosystem vulnerable to additional anthropogenic threats or climatic change (Palumbi *et al.* 2008). Coral reef communities in Jamaica, for example, shifted from predominantly coral cover to algal cover due to serial loss of functional herbivores. Fishing had removed predatory and herbivorous fishes, and once a disease wiped out the remaining principal herbivore (the long-spined sea urchin), the reef community shifted to one dominated by fleshy algae. Nutrient input from sedimentation and sewage further contributes to the persistence of algal dominated reefs (Hughes *et al.* 1999). Recovery from alternative ecosystem states can be delayed by complex and often indirect interactions among species and the environment (Peterson *et al.* 2003).

On the west coast, the PFMC's groundfish FMP establishes a goal of reducing exploited populations to 40% of their unfished size (Ralston 2002). With few exceptions, the direct and indirect effects of removing this quantity of biomass from the ecosystem are poorly understood at an ecosystem level. The initial recovery of some overfished stocks on the west coast and the absence of trophic cascades as a consequence of their removal would suggest that fishing activities have not irreversibly perturbed the ecosystem. However, even though local data are lacking, ecological principles coupled with theoretical models and empirical studies from other regions would strongly advocate for using a precautionary approach. Risk-averse approaches are essential when uncertainty is high and the costs of error may produce irreversible damage. A precautionary approach is central to ecosystem-based tenets (Francis *et al.* 2007) and it is also applied by the PFMC and NOAA Fisheries, who utilize a precautionary approach in promoting sustainable fisheries, particularly when data are poor or lacking for managing economically important species. Because data are limited on the ecosystem-level effects of fishing and other human activities, this approach would dictate establishing areas where human activities are minimized, as a means to hedge against scientific and management uncertainty. These areas would help maintain and restore ecosystem components, and serve as research areas to study and better distinguish natural variation from anthropogenic impacts.

Setting aside certain areas of the Sanctuary as MPAs would also prepare the MBNMS for future management challenges. By establishing MPAs as areas with additional protections, the MBNMS can provide security against cumulative impacts, and unforeseen human and environmental threats by maintaining intact ecosystem components that are better able to recover, resist and reverse natural and human disturbances (Palumbi *et al.* 2008). The importance of resilient ecosystem components is one purpose of the NMSA, which states “develop and implement coordinated plans for the protection and management of [national marine sanctuaries] with...interests concerned with the continuing health and resilience of these marine areas.”

2.3 Designation of research areas to differentiate between natural variation versus human impacts to ecological processes and components

Section 301(b)(5) of the NMSA addresses the importance of research by stating “support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas.” Developing an understanding of the interactions and interdependence of living marine resources in a natural environment is key to effective management. As with the protection of any natural resource, information on the status and natural variability of resource components, species, and interactions is essential for the informed management of an area as extensive as the Sanctuary. In order to adequately differentiate between anthropogenic and natural changes and to further determine how those changes might affect other components of the ecosystem, a baseline set of ecosystem measurements should be established and monitored over subsequent years. As these data are gathered and analyzed, scientists and managers can determine with greater confidence how much variability is natural in a system and how much may be the result of anthropogenic influence. With a better understanding of the factors that influence ecosystem components, managers can support both improved protection of the resource and a more rapid and appropriate response to natural and/or human-induced perturbations.

Control areas, places where extractive or disruptive anthropogenic activities are minimized, are critical for the MBNMS in order to determine the responses of key resources to human influence. By comparing changes in key resources in a control area to other areas of the Sanctuary, MBNMS management would have better information to address the needs of research, protection, and constituent use of the resources.

The research conducted in MPAs could be done in partnership with, or individually by, other managing agencies (e.g., NOAA Fisheries, PFMC, and the State of California), academic institutions, the fishing community, and conservation groups. The type of questions that can be addressed by establishing MPAs for research purposes include, but are not limited to, the following:

- What variability is inherent in the natural ecosystem components and what changes may be the result of human influence?
- What are the effects of extractive activities on ecosystem components?
- How would benthic communities change in response to a further reduction in human activity?
- What are the recovery trajectories in disturbed habitats?
- Where along the continuum of community structure does the protected area fall compared to unprotected or heavily used areas?
- What is the functional role of deep-sea biogenic habitats, such as deepwater corals, sponges, and chemosynthetic biological communities in regulating community structure?

In addition, the Marine Life Protection Act was intended, in part, to help the State of California understand the nearshore marine environment by providing the opportunity to study areas that are not directly impacted by human activities. Having similar research areas in federal waters, where results can be compared to those found in state waters, is not only critical to effective management of the Sanctuary, but is also key to effective ecosystem-based management.

2.4 Other considerations

The MBNMS recently evaluated the number and type of MPAs currently located within the boundaries of the Sanctuary to determine their role in addressing MPA objectives 2.1 thru 2.3. The state-implemented MPAs meet all three objectives, but only for the nearshore environment. The fishery-based MPAs (EFH and RCA), in part, meet objectives 2.2 and 2.3 for components of deepwater communities. Thus, fishery-based MPAs are complementary, but not sufficient in meeting the MBNMS objectives for MPAs in federal waters of the Sanctuary. The fishery-based MPAs protect some economically important species and their associated habitats, but do not adequately protect other non-economically important species or habitats. Nor are the protections permanent or year-round. In addition, fishery-based MPAs cannot restrict other potentially harmful human activities, such as construction of energy farms (wind or wave generated), unless they impact managed fishery species or fishing activities themselves. The target of any MPA that may be implemented on behalf of the ONMS is to protect biodiversity and ecosystem components, which is distinct from the targets for fishery-based MPAs. Additional measures that may be complementary to the fishery-based MPAs are required to address these differences among management approaches.

Additions to existing fishery-based MPAs may be an option to achieve multiple, yet separate, objectives of the MSFCMA and NMSA. For example, there may be merit in considering a few select areas for long-term protection of spawning biomass, age structure, and community structure for some of the more vulnerable habitats and species. These options would be considered as part of an open, transparent, and inclusive process with MBNMS partners, stakeholders, and constituent groups.

3.0 Conclusion

The natural resources of the Sanctuary and the environmental services they provide to the United States are unique, nationally treasured, and internationally recognized. However, certain human and natural impacts to the Sanctuary ecosystem have either become more severe or more apparent since the designation of the Sanctuary in 1992. MPAs are a promising tool for reducing and reversing some of these impacts within discrete areas of the Sanctuary. Current protections either do not cover offshore habitats in federal waters (state MPAs) or only provide limited protection based on target species or activities (EFH and RCAs).

The ONMS's responsibility to manage and protect special marine areas of the nation's public domain is clearly defined in the NMSA. Given this responsibility, coupled with ecosystem-based management principles, the ONMS determined it is appropriate to consider setting aside some areas in representative habitats of the Sanctuary where human impacts can be minimized and the natural ecosystem components of these areas may be restored and maintained. Considering establishment of these areas is compatible with ONMS's ecosystem-based approach to the management of NOAA trust resources and is responsive to public appeals for increased protection.

As such, the ONMS is initiating a process to propose designating MPAs in the federal waters of the Sanctuary, with goals of preserving unique and rare areas in their natural state for the benefit of future generations, preserving areas where natural ecosystem components are maintained and/or may recover, and serving as research areas to differentiate between natural variation

versus human impacts to ecological processes and components. There are many approaches ONMS can take to meeting these goals, and no determination has been made regarding the authority under which any new MPAs would be implemented. This decision will be an integral part to the process of establishing MPAs in the Sanctuary and will be made in close consultation with NOAA Fisheries, the PFMC, and other regulatory and resource management agencies.

Moving forward with a process will also involve focused stakeholder and public involvement and the MBNMS encourages public participation throughout. Further, the MBNMS will be seeking additional input from its Sanctuary Advisory Council, the PFMC, NOAA Fisheries and other regional resource management partners regarding the process to establish MPAs in federal portions of the Sanctuary.

Sincerely,

A handwritten signature in cursive script that reads "Paul Michel". The signature is written in dark ink and is positioned above the printed name and title.

Paul Michel

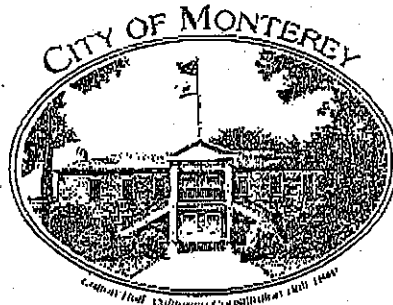
Sanctuary Superintendent

Literature Cited

- Alter SE, Rynes E, Palumbi SR (2007) DNA evidence for historic population size and past ecosystem impacts of gray whales. *Proceedings of the National Academy of Sciences* 104(38):15162-15167
- Baskett ML, Yoklavich M, Love MS (2006) Predation, competition, and recovery of overexploited fish stocks in marine reserves. *Canadian Journal of Fisheries and Aquatic Sciences* 63:1214-1229
- Berkeley SA, Chapman C, Sogard SM (2004a) Maternal age as a determinant of larval growth and survival in a marine fish, *Sebastes melanops*. *Ecology* 85:1258-1264
- Berkeley SA, Hixon MA, Larson RJ, Love MS (2004b) Fisheries sustainability via protection of age structure and spatial distribution of fish populations. *Fisheries* 29:23-32
- Chavez FP, Ryan J, Lluch-Cota SE, Niquen MC (2003) From anchovies to sardines and back: multi-decadal change in the Pacific Ocean. *Science* 299:217 - 221
- Engel J, Kvitek R (1998) Effects of otter trawling on a benthic community in Monterey Bay National Marine Sanctuary. *Conservation Biology* 12:1204-1214
- Estes JA, Palmisano JF (1974) Sea otters: their role in structuring nearshore communities. *Science* 185: 1058-1060
- Estes JA, Tinker MT, Williams TM, Doak DF (1998) Killer whale predation on sea otters linking oceanic and nearshore ecosystems. *Science* 282:473-476
- Finney BP, Gregory-Eaves I, Douglas MS, Smol JP (2002) Fisheries productivity in the northeastern Pacific Ocean over the past 2,200 years. *Nature* 416:729-733
- Francis RC, Hixon MA, Clarke ME, Murawski SA, Ralston S (2007) Ten commandments for ecosystem-based fisheries scientists. *Fisheries* 32:217-233
- Halpern BS (2003) The impact of marine reserves: do reserves work and does reserve size matter? *Ecological Applications* 13:S117-S137
- Halpern BS, Cottenie K, Broitman BR (2006) Strong top-down control in Southern California kelp forest ecosystems. *Science* 312:1230-1232.
- Gell FR, Roberts CM (2003) The fishery effects of marine reserves and fishery closures. WWF Washington DC, USA 90 pp
- Hughes T, Szmant AM, Steneck R, Carpenter R, Miller S (1999) Algal blooms on coral reefs: what are the causes? *Limnology and Oceanography* 44:1583-1586
- Jackson JBC, Kirby MX, Berger WH, Bjorndal KA, Botsford LW, Bourque, BJ, Bradbury RH, Cooke R, Erlandson J, Estes JA, Hughes TP, Kidwell S, Lange CB, Lenihan HS, Pandolfi, JM., Peterson CH, Steneck RS, Tegner MJ, Warner RR (2001) Historical overfishing and the recent collapse of coastal ecosystems. *Science* 293:629-638
- Kaiser MJ, Collie JS, Hall SJ, Jennings S, Poiner IR (2002) Modification of marine habitats by trawling activities: prognosis and solutions. *Fish and Fisheries* 3:114-136
- Levin PS, Holmes EE, Piner KR, Harvey CJ (2006) Shifts in a Pacific Ocean fish assemblage: the potential influence of exploitation. *Conservation Biology* 20:1181-1190

- Lubchenco J, Palumbi SR, Gaines SD, Andelman S (2003) Plugging a hole in the ocean: the emerging science of marine reserves. *Ecological Applications* 13:S3-S7
- McClanahan TR, Mangi S (2000) Spillover of exploitable fishes from a marine park and its effects on the adjacent fishery. *Ecological Applications* 110:1792-1805
- Micheli F, Halpern BS (2005) Low functional redundancy in coastal marine assemblages. *Ecology Letters* 8:391-400
- MPA FAC (Marine Protected Area Federal Advisory Committee) (2006) Marine protected areas: a fundamental tool for ecosystem-based management. Silver Spring, Maryland
- Mumby PJ, Dahlgren CP, Harborne AR, Kappel CV, Micheli F, Brumbaugh DR, Holmes KE, Mendes JM, Broad K, Sanchirico JN, Buch K, Box S, Stoffle RW, Gill AB (2006) Fishing, trophic cascades, and the process of grazing on coral reefs. *Science* 311: 98-101
- Murawski S, Brown R, Lai HL, Rago PJ, Hendrickson L (2000) Large-scale closed areas as a fisheries management tool in temperate marine systems: the Georges Bank experience. *Bulletin of Marine Sciences* 66:775-798
- Murray SN, Ambrose RF, Bohnsack JA, Botsford LW, Carr MH, Davis GE, Dayton PK, Gotshall D, Gunderson D, Hixon MA, Lubchenco J, Mangel M, MacCall A, McArdle DA, Ogden JC, Roughgarden J, Starr RM, Tegner M, Yoklavich MM (1999) No-take reserve networks: sustaining fishery populations and marine ecosystems. *Fisheries* 24(11):11-25
- Myers RA, Worm B (2003) Rapid worldwide depletion of predatory fish communities. *Nature* 423:280-283
- NOAA (National Oceanic and Atmospheric Administration) (2005) New priorities for the 21st Century - Updated for FY 2006-FY 2011
- NOAA (National Oceanic and Atmospheric Administration) (2008) Report to Congress on the implementation of the deep sea coral research and technology program. Silver Spring, Maryland
- NRC (National Research Council) (2001) Marine protected areas: tools for sustaining ocean ecosystems. National Academies Press, Washington, D.C. 288 pp.
- NRC (National Research Council) (2006) Dynamic changes in marine ecosystems: fishing, food webs, and future options committee on ecosystem effects of fishing: phase II - assessments of the extent of change and the implications for policy. National Academies Press, Washington, D.C. 160 pp.
- Palumbi SR, McLeod KL, Grunbaum D (2008) Ecosystems in action: lessons from marine ecology about recovery, resistance, and reversibility. *Bioscience* 58(1):33-42
- Peterson CH, Rice SD, Short JW, Esler D, Bodkin JL, Ballachey BE, Irons DB (2003) Long-term ecosystem response to the Exxon Valdez oil spill. *Science* 302:2082-2086
- Ralston S (2002) West coast groundfish harvest policy. *North American Journal of Fisheries Management* 22:249-250
- Rodger KA (2002) Renaissance man of Cannery Row: the life and letters of Edward F. Ricketts. University of Alabama Press, Tuscaloosa

- Shears NT, Babcock RC (2003) Continuing trophic cascade effects after 25 years of no-take marine reserve protection. *Marine Ecology Progress Series* 246:1-16
- Tegner MJ, Dayton PK (2000) Ecosystem effects of fishing in kelp forest communities. *ICES Journal of Marine Science* 57:579-589
- Steneck RS, Graham MH, Bourque BJ, Corbett D, Erlandson JM, Estes JA, Tegner MJ (2002) Kelp forest ecosystems: biodiversity, stability, resilience and future. *Environmental Conservation* 29:436-459
- Worm B, Myers RA (2003) Meta-analysis of cod-shrimp interactions reveals top-down control in oceanic food webs. *Ecology* 84: 162–173
- Worm B, Barbier EB, Beaumont N, Duffy JE, Folke C, Halpern BS, Jackson JBC, Lotze HK, Micheli F, Palumbi SR, Sala E, Selkoe K, Stachowicz JJ, Watson R (2006) Impacts of biodiversity loss on ocean ecosystem services. *Science* 314:787-790
- Yoklavich MM, Greene HG, Cailliet GM, Sullivan DE, Lea RN, Love MS (2000) Habitat associations of deep-water rockfishes in a submarine canyon: an example of a natural refuge. *Fishery Bulletin* 98:625-641
- Zabel RW, Harvey CJ, Katz SL, Good TP, Levin PS (2003) Ecologically sustainable yield. *American Scientist* 91:150-157



November 21, 2008

HARBOR/MARINA DIVISION

Chris Harrold, Chairman
Research Advisory Panel
Monterey Bay National Marine Sanctuary
299 Foam Street
Monterey, CA 93940

Dear Chris,

I'm writing to request ten minutes of time on the January 2009 Research Advisory Panel agenda to make a request to the RAP from the City of Monterey. Specifically, I wish to request that the RAP provide individual, and a collective opinion, as to the need for any new, reconfigured, or more restrictive marine protected areas within the federal waters of the Monterey Bay National Marine Sanctuary for currently unmet research needs. I will ask the RAP to evaluate this need relative to the Statement of Need that the Monterey Sanctuary has created and which is attached. I will also ask them to evaluate this relative to the research opportunities provided by the State MPAs that currently exist within this region, and including the Davidson Seamount, the Essential Fish Habitat areas, and the Rockfish Conservation Area. I'm making this request from the City of Monterey because the City has gone on record stating the Sanctuary should make resource management decisions based on the best scientific advice possible.

Thank you for your consideration of this request.

Sincerely,

Stephen B. Scheiblaue
Harbormaster

Enc.

C: Paul Michel, MBNMS
Chuck Della Sala, Mayor
Monterey City Council
Don Hansen, PFMC

2.3 Designation of research areas to differentiate between natural variation versus human impacts to ecological processes and components

Section 301(b)(5) of the NMSA addresses the importance of research by stating "support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas." Developing an understanding of the interactions and interdependence of living marine resources in a natural environment is key to effective management. As with the protection of any natural resource, information on the status and natural variability of resource components, species, and interactions is essential for the informed management of an area as extensive as the Sanctuary. In order to adequately differentiate between anthropogenic and natural changes and to further determine how those changes might affect other components of the ecosystem, a baseline set of ecosystem measurements should be established and monitored over subsequent years. As these data are gathered and analyzed, scientists and managers can determine with greater confidence how much variability is natural in a system and how much may be the result of anthropogenic influence. With a better understanding of the factors that influence ecosystem components, managers can support both improved protection of the resource and a more rapid and appropriate response to natural and/or human-induced perturbations.

Control areas, places where extractive or disruptive anthropogenic activities are minimized, are critical for the MBNMS in order to determine the responses of key resources to human influence. By comparing changes in key resources in a control area to other areas of the Sanctuary, MBNMS management would have better information to address the needs of research, protection, and constituent use of the resources.

The research conducted in MPAs could be done in partnership with, or individually by, other managing agencies (e.g., NOAA Fisheries, PFMC, and the State of California), academic institutions, the fishing community, and conservation groups. The type of questions that can be addressed by establishing MPAs for research purposes include, but are not limited to, the following:

- What variability is inherent in the natural ecosystem components and what changes may be the result of human influence?
- What are the effects of extractive activities on ecosystem components?
- How would benthic communities change in response to a further reduction in human activity?
- What are the recovery trajectories in disturbed habitats?
- Where along the continuum of community structure does the protected area fall compared to unprotected or heavily used areas?
- What is the functional role of deep-sea biogenic habitats, such as deepwater corals, sponges, and chemosynthetic biological communities in regulating community structure?

In addition, the Marine Life Protection Act was intended, in part, to help the State of California understand the nearshore marine environment by providing the opportunity to study areas that are not directly impacted by human activities. Having similar research areas in federal waters, where results can be compared to those found in state waters, is not only critical to effective management of the Sanctuary, but is also key to effective ecosystem-based management.

**SANCTUARY ADVISORY COUNCIL
RESEARCH ACTIVITIES PANEL
MONTEREY BAY NATIONAL MARINE SANCTUARY
299 FOAM STREET
MONTEREY, CA 93940**

November 24, 2008

Mr. Stephen Scheiblaue
Office of the Harbormaster
City Hall
Monterey, CA 93940

Dear Steve,

This letter is in response to your letter dated November 21, 2008.

First, you are more than welcome to join the Research Activities Panel (RAP) at its next meeting (January 9, 2009, CSUMB), and we can set aside 10 minutes for you to address the RAP. However, please keep in mind that the RAP is a working group of the SAC and the RAP's objectives are, among other things, to provide advice to the sanctuary staff on conservation science issues that influence policy, and to review research issues and documents for the SAC and sanctuary staff. (See http://montereybay.noaa.gov/intro/advisory/rap_objectives.html for more details about the RAP's purpose, procedures and protocols.) The RAP does not undertake research or develop evaluations or opinions in response to individuals or entities outside the sanctuary staff or SAC. Requests such as yours, which would entail significant investment of time and effort on the part of RAP members and the RAP as a whole, should come through the sanctuary staff or SAC. You might consider having the commercial fishing seat bring this request before the SAC.

Having said that, I'd like to address your specific requests. You requested an opinion as to the need for any new, reconfigured or more restrictive marine protected areas within the federal waters of the sanctuary for currently unmet research needs. This need was identified by sanctuary management at the regional and national levels, articulated in memos dated 2/15/08 and 4/15/08 from Sanctuary Superintendant Paul Michel, and was based on input from a broad spectrum of stakeholders and experts, including the RAP. The RAP has been engaged in the issue of MPAs since the issue first arose during the Joint Management Plan review process. While the RAP as a whole did not play a formal role in advising the sanctuary, RAP members most familiar with the science of MPAs (Drs. Rick Starr and Mark Carr, and I) were members of the sanctuary's MPA working group. The RAP felt that since these members were the most knowledgeable about the science of MPAs of all the RAP members, the RAP could offer relatively little additional advice to the sanctuary. The RAP did review and comment twice on versions of the presentation I gave to the SAC on the scientific value of marine reserves in achieving ecosystem protection goals at

the December 2007 SAC meeting. The topic of MPAs has been on the RAP's agenda over 60 times since January 2001. The nature of this agenda item has ranged from simple updates of recent developments to focused discussion and sharing of differing opinions. At least two and often several sanctuary staff members, including the sanctuary's research coordinator Dr. Andrew DeVogelaere, are present at every RAP meeting. As a result, the sanctuary staff has benefitted from the range of opinions and the scientific discourse related to the role of MPAs in ecosystem protection generally and in the MBNMS in particular. The RAP has assumed that these discussions have guided the sanctuary's policy development related to MPAs. The sanctuary has made a decision to move forward with a process to propose MPAs in federal waters of the sanctuary, in part to address unmet research needs. In my opinion as RAP chair, it is not the RAP's role to question this decision. Our job now is support the scientific underpinnings of the process moving forward.

Your second question, related to the research opportunities provided by existing state MPAs, Davidson Seamount, Essential Fish Habitat areas and the Rockfish Conservation Area, is a good question and should be addressed in the sanctuary's process moving forward. As you know, the sanctuary is proposing to establish a stakeholders' working group and a science panel to inform and advise this process. I would certainly expect that the value and potential role of currently established MPAs in addressing unmet research needs would be on the Science Panel's agenda. While it isn't clear at this time how the RAP will engage in this process, suffice it to say the RAP is very interested in participating with the Science Panel and other entities associated with the sanctuary's MPA process. Asking the RAP to address these questions now would pre-empt the sanctuary's plans for a full, open and well-informed process.

Let me know if you'd like a 10-min. slot on the 1/9/09 RAP agenda.

Sincerely,

Chris Harrold, PhD
Chair, Sanctuary Advisory Council and Research Activities Panel
Monterey Bay National Marine Sanctuary

Cc: Paul Michel, MBNMS
Chuck Della Sala, Mayor of Monterey
Monterey City Council
Don Hansen, PFMC

January 14, 2008

To: Paul Michel

From: Chris Harrold, SAC Research representative

Re: Summary of 12/14/08 [*sic; correction=12/14/07*] comments on MPAs in the sanctuary

Cc: Research Activities Panel

This letter summarizes the comments I made during the SAC discussion of MPAs in sanctuary waters, held on December 14, 2007, related to the issue of establishing new MPAs in federal waters of the sanctuary. I'm addressing your question, should the sanctuary re-engage in a stakeholder process to consider MPAs in federal waters of the sanctuary. As I stated at the SAC meeting, these comments don't necessarily reflect the views of the Research Activities Panel or the scientific community of the MBNMS in general. I'm basing my comments on my understanding of the science underlying ecosystem protection and MPAs, discussions I've had with RAP members and scientists on the sanctuary's MPA working group, and on my philosophy and opinions regarding human activity and marine resource protection.

Marine protected areas provide benefits beyond traditional fisheries management measures. In my opinion, there is solid scientific evidence to support the idea that marine protected areas, including marine reserves, can contribute to the ecosystem protection goals of the Monterey Bay National Marine Sanctuary. I presented this evidence in my talk at the 12/13/07 session of the SAC meeting. I also believe that the intended benefits of marine protected areas are distinct from those of traditional fisheries management tools. The argument has been made that the conservative, even draconian, fisheries management measures that have been implemented in the state and federal waters of California and beyond over the past 10 years provide all the resource protection that is required. Further, it is argued that since pelagic species don't respond to MPAs and targeted groundfish stocks appear to be recovering, MPAs offer no added protective value. The problem with this argument is that there are real, measurable and unavoidable ecosystem impacts of fishing activities, even in perfectly managed fisheries. The most important of these are the unintended and often unknown ecological consequences resulting from the reduction in biomass of targeted fish stocks. Other unavoidable ecosystem impacts of fishing are: reduction in abundance and diversity of marine organisms resulting from bycatch; habitat destruction from fishing gear, especially trawling; and life history modification of targeted stocks, especially age and size truncation. These impacts cannot be mitigated by fisheries management alone; they can be solved by a combination of sound fisheries management and well-designed networks of marine protected areas, including marine reserves.

Marine protected areas can improve fishing opportunities over the long term. I'd like to address the idea that MPAs will be the straw that breaks the camel's back of the commercial fishing enterprise in the MBNMS, an idea that has been raised by commercial fishing interests. According to this scenario, the commercial fishing endeavor in this region is but a fraction of the level of 10 to 20 years ago, in terms of number of vessels fishing and landings. Fishing is currently so heavily regulated that it's difficult for fishermen to make a living. The lost fishing opportunities from new MPAs will push commercial fishing over the brink, the industry will collapse and the sanctuary will lose its fishing heritage. While I'm sympathetic to the economic plight of the commercial fishing industry, neither logic nor available information supports this scenario. Evidence presented by Dick Parrish and Steve Ralston show that groundfish populations are recovering as a result of restrictive fisheries regulations. These regulations will become less restrictive as populations recover, leading to increased opportunities for commercial fishermen. Fisheries for crab, sardines, squid, and other pelagics appear to be healthy. Therefore, it seems unlikely that the commercial fishing industry in the sanctuary will collapse simply because a small percent of sanctuary waters is closed to extractive activity. Furthermore, preliminary data from the Channel Islands in southern California show that landings have increased in the 3 years since the establishment of MPAs around the Channel Islands. Of course we don't know if landings and MPAs are related in this case, but the point is that landings didn't *decrease*, as the commercial fishing interests have assured us will happen. In fact, I have yet to see a single paper or report that shows fisheries collapse or significant, negative socioeconomic impacts resulting from the establishment of MPAs. To the contrary, there is a vast literature showing improvements in both fisheries performance and socioeconomic conditions resulting directly from implementation of MPAs.

Marine protected areas preserve the unknown.

A real threat to marine ecosystem health is the loss of marine species and entire communities that we don't even know we have. We continue to discover new species and new communities right in our own back yard. Cold-seep chemoautotrophic bivalve communities and bone-digesting invertebrate fauna on whale carcasses were both discovered in the deep waters in or near the MBNMS within the past 15 years and both revealed species and lifestyles previously unknown to science. MPAs and marine reserves are the only way to prevent the loss of life forms we don't yet know exist.

Marine protected areas provide research platforms to answer vital ecological questions. Despite the millions of dollars that have been invested in marine research over the past 100 years, we remain essentially ignorant about the likely ecological outcomes of human activities in the oceans. We are conducting vast, uncontrolled ecological experiments whose outcomes we can't possibly imagine. Establishing marine reserves for experimental research and baseline monitoring is the only way to gain a predictive understanding of marine ecosystem function. We need replicate, undisturbed (to the greatest extent possible) control sites that can be compared with replicate sites where ecosystem elements have been manipulated. For example, scientists were confounded in their efforts to ask even the simplest questions (what is the impact of

trawling activity on benthic communities?) because undisturbed control sites with otherwise similar conditions could not be found.

Marine protected areas are well-regarded tools for protecting public trust

resources. We can't ignore the strong public sentiment that sanctuary waters should be more protected from extractive activity than they are now. If I recall correctly, over 8,000 comments favoring more MPAs in sanctuary waters were received during the public scoping process of the Joint Management Plan review process. During the public comment period at the 12/13/07 SAC meeting, 32 speakers supported MPAs in sanctuary waters; 7 speakers opposed and 4 speakers were neutral. While it's difficult to extrapolate from such a small sample size, both state and national public opinion polls show the same trends. In my opinion it's undeniable that establishing marine protected areas in federal waters of the sanctuary waters has widespread public support that numerically dwarfs public opposition. This is important, since ocean resources are a public trust and not an entitlement to a select few.

For all these reasons, it's my opinion that the sanctuary should re-engage in a stakeholder process to consider implementing a network of MPAs in federal waters of the sanctuary. However, it is critical that the process moving forward is a different and improved process. To this end, I ask that you to keep the following things in mind. First, now is the ideal time to undertake this exercise. We are not in a crisis mode but we have evidence and trends suggesting current protections are inadequate. In other words, the issue is important, but not urgent. We have time to think this through and do it right.

Second, we have to ask the right questions and answer them as best we can. The presentations on 12/13/07 were a beginning.

Third, we need to address the socioeconomic issues, with credible experts who all stakeholders trust and with defensible data. The socioeconomic research should be retrospective as well as prospective. What does history tell us about the socioeconomic consequences of implementing MPA networks?

Fourth, we must avoid a process that can be held hostage by the threat of veto or walk-out by any stakeholder group. Any such process will surely fail.

Fifth, the process should be facilitated by a professional with strong conflict resolution skills and who is trusted by all stakeholders.

Finally, the process should have an end-goal and a timeline agreed to by all stakeholders.

We are participating in an assault on the resources and ecosystems of this planet that is unprecedented in human history. Evidence of marine ecosystem stress, and in some cases failure, is all around us. We can debate the details, but in the big picture the trends are pretty clear. Is it asking too much, is it taking too great a risk, to engage in a stakeholder process to implement effective tools for restoring and sustaining our ocean environment?

Thanks for the opportunity to weigh in on this important issue.