

Integrating Marine Reserves Science into the Fisheries Management System

A proposal from:

The National Fisheries Conservation Center

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Introduction

Marine protected areas (MPAs), or marine reserves, are in use throughout the world for a variety of purposes. In the U.S., MPAs have been established by numerous agencies to achieve a variety of objectives. Their sizes, shapes, and purposes are as diverse as their designations. National marine sanctuaries, fishery management zones, national seashores, national parks, national monuments, critical habitats, national wildlife refuges, national estuarine research reserves, state conservation areas, state reserves, and local parks perform as sites for research and education, as biodiversity reserves, as tools to conserve historic or cultural marine resources, as designations to reduce user conflicts, and to manage natural resources.

The federal government's MPA program defines marine protected areas as "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein" (E.O. 13158, Federal Register, 2000). Conservation advocates and others have defined them as protected or reserved areas where there is no consumptive use, no removal of marine resources, and where little if any use or human disturbance is permitted. The World Conservation Union defines a marine protected area as "any area of the intertidal or subtidal terrain, together with its overlying water and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" (IUCN, 1988; Kelleher, 1999). One fishery management council has defined marine reserves as "specific areas of marine environment managed for the primary purpose of aiding in the recovery of overfished stocks and to insure the persistence of healthy fish stocks, fisheries, and habitats" (South Atlantic Fishery Management Council, 2000).

Ocean resource managers at a variety of levels in the U.S. are considering marine protected areas to accomplish targeted objectives, particularly recovery of depleted fish populations. Fishery management councils in the Gulf of Mexico, South Atlantic, and Pacific are examining and debating the use of MPAs as fishery management tools, but there is no clear consensus about their efficacy in different regions, for variously managed fisheries, and for populations of fish with diverse life histories. As program managers in National Marine Sanctuaries perform their periodic reviews and evaluations, MPAs are being suggested as proposed management measures in sanctuary management plans. State managers in Florida and Oregon are grappling with the effects of such designations on activities they manage in state waters, and in California managers are proposing more designations within their waters.

Each proposed line on a chart, every suggested change or curtailment of human activity in the marine environment engages user groups, managers, and scientists in the debate over the purpose, effectiveness, and evaluation of marine protected areas as a resource management tool. This in turn highlights the need for improved knowledge of the effectiveness of marine reserves for different purposes and more concrete criteria for their design and implementation. This proposal offers a methodology to focus specifically on a thorough and systematic examination of how marine reserves should best be integrated with traditional fisheries management approaches.

Project Objectives

The National Fisheries Conservation Center, as part of a larger consortium of interested parties (see Appendix), proposes a 2-day workshop to improve the integration of marine reserves science

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and traditional fisheries management. A consensus statement by 161 scientists, released at the February 2001 annual meeting of the American Association for the Advancement of Science (AAAS), and subsequent important review articles clarified the potential benefits of marine reserves. In particular, they found that reserves can lead to larger and more numerous fish, along with higher diversity, within reserve boundaries, and the spillover of fish beyond reserve boundaries. However, these studies did not assess the relationship of reserve effects to existing fisheries management practices, nor did they suggest how reserves should be integrated with, or traded off against, traditional fisheries management tools.

As a result, several recent discussions involving stakeholders and interested scientists have made clear that there remain important differences between fisheries scientists and managers on the one hand and marine reserves ecologists on the other in terms of basic assumptions about ecological processes, the conceptual and mathematical models used to make predictions and analyze data, and the interpretation of available evidence. These differences affect, for example, conclusions and judgments about:

- Whether marine reserves will increase yields in ways that existing management tools cannot
- Whether marine reserves and existing management tools are equivalent in terms of controlling fishing effort
- The extent to which larvae and/or adults will spill over reserve boundaries and the impact of such spillover on fishery yields
- The means for accounting for existing management constraints on fishing efforts in the design of marine reserves
- Methods for dealing with congestion externalities.

While fishery scientists and managers, marine reserves ecologists, conservation organizations, and fishing industry representatives have almost universally agreed on the need for resolving such issues, there has been little systematic effort focused in this area. As a result, the consideration of whether and how marine reserves should be used in fishery management remains mired in conflict.

NFCC and its cosponsors believe that for marine reserves to receive a fair trial, and to be fully integrated into the fishery management system, such issues must be addressed in an open and objective manner. We believe that a structured discussion of these issues, in a moderated public format, would have several important benefits. It would significantly improve:

- Stakeholders' understanding of key scientific issues
- Managers' appreciation of the uncertainties involved in reserve design and implementation
- Attempts to better integrate reserve design with existing fishery management tools
- Stakeholders' awareness of the tradeoffs involved in decisions about how to integrate marine reserves into the management process
- The focus and effectiveness of the debate about the role of marine reserves in fisheries management.

Methods

We propose a 2-day workshop with the goals of:

- Identifying and exploring key differences in scientific points of view about the use of marine reserves in fisheries management
- Defining the implications of these differences for decision making

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- Identifying where scientific uncertainty is greatest (i.e., what key questions should be answered)
- Describing a set of studies needed to resolve these uncertainties (i.e., how to answer these questions).



We are basing the format of this proposed workshop on that used for the National Institutes of Health's (NIH) Consensus Development Conferences and their companion State of the Science Conferences. A detailed description of the planning and format of such conferences can be found at: <http://consensus.nih.gov/about/process.htm>. In summary, the process includes the following steps (adapted from the above website):

1. A conference planning committee is assembled to select the review panel, prepare the literature review, and craft the questions the review panel will consider.
2. A broad-based, nonadvocacy review panel is assembled to give balanced, objective, and knowledgeable attention to the topic. Panel members are carefully screened to exclude anyone with scientific or commercial conflicts of interest.
3. Invited experts present data to the panel in public sessions, followed by inquiry and discussion. The panel then meets in executive session to prepare the consensus statement.
4. A number of specific advance questions determine the scope and direction of the conference. These questions are widely circulated and are known to all conference participants. The principal job of the review panel is to develop responses to them.
5. A systematic literature review is prepared for use by the review panel in addressing the questions.
6. Near the end of the conference a draft consensus statement is prepared by the review panel in executive session and is then presented in plenary session. Following public discussion and any revisions deemed appropriate by the review panel, the statement is adopted formally and stands as the record of the conference.
7. The consensus statement is widely disseminated to achieve maximum impact on policy development and/or the direction of future research initiatives.

As described on the NIH website, these conferences are usually held over a 2-day period. The first day and a half consists of a plenary session in which invited speakers present evidence, followed by open discussion among speakers, panelists, and the audience. On the evening of the first day, the panel meets in executive session to begin to draft the consensus statement, which is a response to the conference questions. On the afternoon of the second day, the panel again meets in executive session and completes a draft of the consensus statement. The following morning the draft statement is presented in a public session for audience comment. On the basis of these comments the statement is modified by the panel in a final executive session held the same day.

Appendix 1 shows that several scientists who have been prominent in the discussion of marine reserves as a management tool have expressed an interest in presenting evidence or serving on the review panel. We have also begun discussions with a few preeminent ecologists, who are neutral on the marine reserves issue, who would be candidates to chair the review panel. In addition, the Aquarium of the Pacific, in Long Beach, CA, has offered to host the conference and to provide staff time to assist with planning and logistics.

We emphasize that we do not believe that a single conference can completely resolve the outstanding issues related to the design and implementation of marine reserves and their successful integration into the fisheries management system. Rather, we think that such a

conference can effectively identify and prioritize the key scientific issues and reach agreement on the data and studies needed to resolve them.

Products

This process will produce a combination of several tangible and intangible benefits and products, including:

- A framework for continued discussion of the science and policy surrounding marine reserves
- Concise statements of the major questions facing marine reserves policy making
- Responses to these questions, based on the best available current knowledge
- Prioritized recommendations for additional research needed to improve decision making related to marine reserves.

In an October 2002 action, the California Fish and Game Commission set aside 175 square miles of ocean around the Channel Islands as a permanent, no-fishing marine reserve. Scientific advice about the potential for rebuilding diminished rockfish populations in the area fueled the decision. Not only was the vote controversial because it has the potential to create economic hardship on some recreational fishing operations, some scientific controversy remains about the assumptions behind the arguments for the reserve. Future action on a much larger reserve in federal waters adjoining the state protected area will consider more than 400 additional square miles for protection. The debate on the larger area will include scientists, fishermen, reserve advocates, federal and state managers and the interested public.

Moreover, both state and federal fishery managers from the Caribbean to Alaska have been examining marine protected areas as a tool for recovering depleted fish populations. Protection of essential fish habitat has been the subject of litigation and ongoing discussion under federal fishery law. About half of the 13 national marine sanctuaries have begun required periodic reviews of their management plans, and use of MPAs is high on the list of priority issues.

It is crucial that during these discussions managers, decision-makers and stakeholders have a sound basis for deliberation. Ongoing decision processes to conserve and sustain ocean and coastal resources can only benefit from good scientific advice about the use of reserves, including recommendations for needed research, direction on intelligent experimentation, and strategic tools to shape the debate and lower the temperature of the rhetoric. Participation and support for this conference from a broad range of interests and co-sponsors could provide the basis for a more cohesive approach to policy making.

Qualifications

The National Fisheries Conservation Center (NFCC), and its cosponsors (see Appendix), have a long and substantial record of direct involvement in the science and policy of marine reserves. They represent the broadest possible cross section of involved interests, from fisheries and marine reserves scientists, to leaders of fishing industry and conservation advocacy organizations, to agencies responsible for developing and implementing fisheries and reserves policies. Thus, the sponsors of this effort have direct experience with all aspects of the marine reserves issue and its relationship to fisheries management.

The NFCC is ideally suited to act as lead sponsor for this effort. Its board contains a broad range of science, industry, and conservation interests whose experience and points of view assure a balanced approach. NFCC's basic mission is to find fisheries conservation and management approaches that work, both for the oceans and the people who depend on them (www.nfcc-fisheries.org). We believe that there is a common ground and that it can be found. We believe that there is a shared goal and that it can be reached.

In addition to facilitation and mediation, NFCC has a track record of serving as a fact finder and a trusted resource for unbiased and accurate information on fisheries issues. A moderated scientific discussion of MPAs is in keeping with our history of contributing to informed discussions that lead to the collaborative resolution of common problems. On numerous topics, including marine reserves, NFCC has provided factual, reliable, and objective information that includes the full range of perspectives held by fishery interest groups, thus helping to cut through the rhetoric and misinformation that often polarizes discussions between these groups.

In one of three topic areas on our website, MPAs were the focus of information in different forms:

1. Informative background papers that detail the facts and key issues associated with each topic;
2. A series of opinion papers solicited from leaders in the field that present the range of views on key issues; and
3. An electronic dialogue center that highlights current developments in each topical area, as well as questions and comments advanced by others who are interested in the successful resolution of key issues associated with these topics.
4. A live, on-line chat with decision-makers and experts on marine reserves.

In addition, the NFCC has a well-deserved reputation for thoroughness, scientific rigor, and procedural fairness and objectivity, along with a history, extending over the past several years, of organizing and facilitating a wide variety of discussions, forums, workshops, and problem-solving efforts directly related to marine reserves.

Budget and Schedule

Task	Background Materials	Committee Meetings	Logistics & Publicity	Conference	Publish Results	Project Management
Labor						
NFCC lead analyst(s)	7,500	10,000	1,250	5,000	2,000	2,500
Committee members		15,000		15,000	3,000	
Researcher	5,000	1,000			4,000	
Logistics support		1,000	4,000	1,200		
Technical writer/editor				1,000	1,000	
Labor subtotal	12,500	27,000	5,250	22,200	10,000	2,500
Direct costs						
Airfare		8,000		5,000		
Lodging		2,000		2,000		
Meals		1,080		18,950		
Phone, postage	100		50	500		50
Conference materials					500	
Publication costs						
Fisherman stipend		11,080		24,000		
Direct costs subtotal	100	11,080	50	50,450		
Task totals	12,600	37,080	5,300	72,650	10,500	2,550
PROJECT TOTAL	\$141,680					

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Labor cost justification

Labor hours will be billed as follows:

NFCC lead analysts:	\$125/hr
Committee members:	\$125/hr
Researcher:	\$50/hr
Logistics support:	\$50/hr
Technical writer:	\$100/hr

We assume that the background research must include a comprehensive review of current research findings on the effects of marine reserves, as well as a description of how this science has been used in various policy arenas.

We assume that the review committee will consist of six scientists and that two one-day meetings of the committee will be needed prior to the conference. Ten hours are budgeted for each meeting to include some allowance for travel time. In addition, we assume that the researcher will need to prepare materials specifically for the two meetings.

While the Aquarium of the Pacific has offered to contribute on-site logistical support, additional effort will be required to identify and contact potential participants; arrange travel, lodging, and meeting sites for the committee meetings; publicize the conference; and handle off-site aspects of the conference.

We assume that the conference will involve two ten-hour days for NFCC analysts, the committee members, and the writer, who should attend the conference to ensure he/she understands the material. We assume the logistics support person will spend 24 hours related to conference arrangements and direct support of the committee's work.

We have allocated 40 hours for the writer to prepare the summary workshop documents, four hours each for the committee members to review a draft, and 16 hours for NFCC analysts to assist in preparing the workshop summary. In addition, we have budgeted 20 hours for the researcher to fill any last-minute holes in the documents.

We have budgeted 20 hours for project management, which will involve tracking schedules and budgets, contracting with project staff, and interacting with sponsors and funding sources.

Direct cost justification

We assume that airfare will average \$500 per round-trip ticket, and that airfare will be required for 8 persons (6 committee members and 2 NFCC analysts) to the committee meetings, and for ten persons (6 committee members, 2 NFCC analysts, writer, logistics support) to the conference.

We assume that lodging will cost \$125 per night and that lodging will be required for one night for each committee meeting and for two nights for the conference.

Meals are budgeted at \$45 per day. We assume that each committee meeting will involve 1 ½ day. Meals for the conference will include continental breakfast and lunch on the first day, and a

continental breakfast on the second day, all estimated at \$15 per person for 200 people. In addition, we have budgeted for a seafood reception at the end of the second day, estimated at \$25 per person for 200 people. Finally, we have budgeted \$45 for each of the ten project staff to cover food expenses while traveling to and from the conference.

The fisherman stipend is a large item and we recognize that is a relatively unique request. It includes funds for 40 fishermen to cover two days of time (at \$125/day), travel costs of \$100 per fisherman, and lodging for two nights at \$125 per night. The rationale for this item is that fishermen assert, with justification, that they are not paid to attend conferences such as this, although the outcome may directly affect their livelihood. Unlike other stakeholder groups (e.g., management agencies, environmental advocacy groups), they have no source of funds, other than their personal savings, to pay for travel and other related expenses and to compensate for lost income. Therefore, in order to create as level a playing field as possible, we are budgeting for a stipend to fund the attendance of 40 fishermen at the conference.

Appendix: Cosponsors

The following have expressed an interest in helping to sponsor a conference on the science of integrating marine reserves with the fisheries management system. "Cosponsorship" may mean anything from an agreement to lend financial and/or in-kind support, to participation in presenting evidence or as a member of the review panel, or simply to adding an individual's or organization's name in support of this effort. Some of the individuals below indicated support as individuals and others for their organization. We're still sorting that out at this point. In addition, this list will be expanded as we continue contacting interested parties.

Contact	Organization
Bob Bailey	Oregon Ocean Management Program
Jennifer Bloeser	Pacific Marine Conservation Council
Loo Botsford	University of California, Davis
Mark Carr	University of California, Santa Cruz
Steve Gaines	University of California, Santa Barbara
Paul MacGregor	At-Sea Processors Association
Chris Harrold	Monterey Bay Aquarium
Marc Hershman	University of Washington
Ray Hilborn	University of Washington
George Leonard	COMPASS Program, Monterey Bay Aquarium
Marc Mangel	University of California, Santa Cruz
Steve Murawski	National Marine Fisheries Service
Vicki Nichols	Save Our Shores
Robin O'Malley	H. John Heinz Center for Science, Economics, and the Environment
Holly Price	Monterey Bay National Marine Sanctuary
Steve Ralston	National Marine Fisheries Service
Mike Ricketts	Alliance of Communities for Sustainable Fisheries
Steve Schroeter	California Coastal Commission
Jerry Schubel	Aquarium of the Pacific
Peter Shelley	Conservation Law Foundation
Rick Starr	California Sea Grant
Charlie Wahle	NOAA's MPA Science Center
Bob Warner	University of California, Santa Barbara
Brad Warren	Pacific Fishing Magazine

