

Integration of Marine Protected Areas Science and Fisheries Science and Management



Why is integration of science needed?

Marine protected areas (MPAs) have been used for decades to manage the nation's marine resources and to conserve both ecosystems and fisheries production. There is still considerable disagreement, however, among fisheries scientists and conservation biologists about the effectiveness of MPAs at meeting fisheries and/or biodiversity conservation goals. Consequently, there is an urgent need for scientists across disciplines to integrate their specialized knowledge and expertise to create a multi-disciplinary approach for the development of joint ecosystem and fishery tools to effectively design and manage MPAs and monitor their effects on ecosystems and fisheries. Furthermore, a more systematic and integrative approach to understanding how fisheries impact ecosystem function within MPAs, and conversely, how MPAs impact fisheries objectives, would greatly improve the dialogue between agencies and programs focused on ecosystem integrity and those responsible for managing sustainable fisheries.

To address these complex issues, NOAA's Southwest Fisheries Science Center lab in Santa Cruz and the National Marine Protected Areas Center have jointly convened a group of fisheries and conservation biologists, sociologists, and economists to develop scientific information to integrate MPAs with conventional fisheries management strategies. Using in-depth analysis and synthesis, the working group is developing a rational approach for integrating today's dominant, yet divergent, scientific and management approaches that have their roots in single-species population dynamics of conventional fisheries and multi-species ecosystem dynamics of MPAs.

How is the working group tackling the integration effort?

The working group formed three teams to address separate topics and objectives that are linked to each other to varying degrees, through their shared interests and analytical inputs and outputs. The topics and main objectives of each team are as follows:

- **Fisheries – MPA/Ecosystem Team:** develop and compare indicators for fisheries and ecosystems (as a proxy for MPAs) to evaluate the costs, benefits, and trade-offs between various management approaches. For example, this team is interested in evaluating how implementation of a "no take" MPA, or marine reserve, compared to more conventional tools, might impact yield and stock assessment inputs and assumptions, such as spawning biomass and movement rates.
- **Connectivity Team:** synthesize existing information on movements of fishermen and marine organisms to evaluate the influence of connectivity on the effectiveness of individual MPAs and MPA network design.
- **Natural Heritage Team:** develop guidance and measurable objectives for the design and evaluation of an MPA implemented for natural heritage purposes. This team is attempting to develop measurable targets for MPAs that have biodiversity conservation goals. Measurable conservation targets can then be evaluated against fishery targets to determine the trade-offs for each management system.

Who are the members of the science integration working group?

The working group consists of more than 20 members, who are scientists and managers from NOAA programs, other government programs, academia, the fishing industry and the Pacific Fisheries Management Council, the conservation community, and the MPA Federal Advisory Committee. Each has appropriate expertise in marine ecology, fishery science, and management.

Deliverables for 2006-2007:

- A series of peer reviewed papers and reports.
- Novel analytical approaches and models for integrating the science and management of fisheries and MPAs.
- Special symposia at the annual meetings of the American Fisheries Society and American Association for the Advancement of Science focused on working group products.
- Integration of working group products and concepts into the Pacific Fisheries Management Council process.
- A conceptual framework to improve the integrative management of fisheries and MPAs.

For more information:

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