

1. Background for Workshop

Traditionally, management of California's marine fisheries focused on single species or groups of species. However, starting with the passage of the Marine Life Management Act (MLMA) in 1998, the focus is shifting to an ecosystem-based management approach. Recognizing the need to broaden ecosystem and habitat protection, the State of California subsequently adopted the Marine Life Protection Act (MLPA) in 1999. The MLPA requires the redesign of the state's existing system of marine protected areas (MPAs) to increase its coherence and effectiveness at protecting and conserving the state's marine life, habitats, and ecosystems. The CDFG served as the lead agency in a recently completed statewide MPA network planning and development process called the MLPA Initiative, and is now focusing on implementation and monitoring activities.

The primary focus of the statewide network of MPAs is to protect marine life, habitats, and ecosystems. While only a few of the MPAs within this network have specific fishery resource objectives, the MPAs are expected to result in various biological, ecological, and socioeconomic effects within and adjacent to their boundaries. As such, there will likely be broad implications for the management of California's marine fisheries. Many consumptive users also have raised concerns about expected effects and the desire to adaptively manage fisheries in response to the MPA network. Therefore, research must be designed to provide information critical for management decisions to optimally balance ecosystems and their impacts.

Understanding both the contribution of the statewide network of MPAs to California's fisheries, and how these fisheries may respond to this network, is necessary for the development of effective fishery management strategies. Fishery resources may respond to protection within MPAs through restored biodiversity and increased fish biomass. However, the effects of a network over a broad geographic scale are less certain, and understanding these effects currently relies on modeling (e.g., larval spillover and bioeconomic models). Fisheries may respond through shifts in fishing effort (i.e., magnitude and distribution). For example, shifts in fishing effort may affect local fishery populations resulting in changes to biomass and its distribution, which may ultimately affect fishery landings; therefore, monitoring needs to cover the biological and ecological effects of MPAs as well as the socioeconomic responses.

California's network of MPAs may prove to be a useful tool in the development of an ecosystem-based fisheries management (EBFM) approach. While EBFM concepts have been advanced in the scientific literature in recent years, the evolution of traditional fisheries management to an EBFM approach at a practical level is still conceptual; and incorporating spatial closures such as MPAs adds to an already complex process. An important initial step for implementation planning, and the purpose of this workshop, was to elicit input from participants on the utility and practicality of using a redesigned network of MPAs to inform fisheries management, potential effects of the MPA network on California's marine fisheries, and how best to monitor for these effects and incorporate them into traditional fisheries management.

The following topics summarize a series of presentations that provided the context for the workshop.

1.1 Intersection between Marine Life Management Act and Marine Life Protection Act

The CDFG is a public trust agency within the California Natural Resources Agency mandated to protect natural resources since 1870. The CDFG's marine region mission is to "protect, maintain, enhance, and restore California's marine ecosystems for their ecological values and their use and enjoyment by the public through good science and effective communication". In recent years, it has been more difficult to support this mission because of advancements in fishing technologies and capacities, coastal development, water pollution, and other human activities that threaten the health of marine habitats and biodiversity. Recognizing these and other management challenges, the State Legislature adopted the MLMA and MLPA. The MLMA, adopted in 1998, is California's primary fishery management framework for managing the State's fisheries using an adaptive management approach and including ecosystem-based considerations to achieve the primary goal of resource sustainability. However, recognizing the need to broaden ecosystem protection, the MLPA was adopted one year later mandating an improved system of MPAs that are managed as a statewide network to protect marine life, habitats, and ecosystems. Now that a statewide network of MPAs has been developed, there is great interest within the CDFG, the California Fish and Game Commission (Commission), and our constituents to begin to explore whether MPAs may change how California's marine fisheries are managed. The goal of this presentation was to identify key points of intersection between the MLMA and MLPA that will improve the CDFG's ability to develop scientific information necessary to integrate MPAs within the broader context of fishery science and management; see the full presentation in Appendix A.

1.2 Marine Life Protection Act Planning Process and Marine Protected Areas Design Guidelines

The MLPA mandated the CDFG the core charge of redesigning the state's system of MPAs into a statewide MPA network to increase its coherence and effectiveness at protecting the state's marine life, habitat, and ecosystems. To accomplish the planning and development of the statewide network of MPAs, the CDFG served as the lead agency in an extensive public-private partnership called the MLPA Initiative. The MLPA planning process was recently completed, and MPAs in three of the four coastal planning regions have been adopted by the Commission. Following the MLPA planning process, the percentage of state waters currently in MPAs is approximately 16%, and about 9% is in state marine reserves¹. Key underlying MPA design guidelines covered in this presentation included the role of individual MPA objectives and the fundamental science guidelines developed in the MLPA planning process. Each MPA in the statewide network has specific objectives that were identified

¹ These calculations include MPAs in the proposed north coast preferred alternative, and therefore may be subject to change depending on the final adoption by the Commission. These calculations also include northern Channel Island MPAs (adopted in 2003), but do not include existing MPAs in the San Francisco Bay or special closures.

by regional stakeholders meant to help achieve the six goals of the MLPA. However, only a few of the MPAs have specific fishery resource objectives despite the fact that the MPA network could affect a large number of marine fisheries and their management. The MLPA Science Advisory Team (SAT) developed a number of science guidelines and associated evaluations for how well MPA proposals achieved the science guidelines and MLPA goals. Nine SAT evaluations were used in the MLPA planning process, and this presentation focused on the five core SAT evaluations including levels of protection, habitat representation, habitat replication, MPA size, and MPA spacing; see the full presentation in Appendix B.

1.3 National Oceanic and Atmospheric Administration Marine Protected Area Science Integration Working Group

Dr. Steve Ralston reported in cooperation with the National Oceanic and Atmospheric Administration (NOAA) National MPA Center and the Pacific Fishery Management Council, among others, the NOAA National Marine Fisheries Service (NMFS) began planning efforts in February 2004 to establish a working group to integrate the science of MPAs with fishery science and management. The overall aim of the working group was to develop scientific information necessary to integrate MPAs within the broader context of fishery science and management, including especially EBFM. An array of scientists with expertise in marine ecology, population ecology, stock assessment, economics, sociology, management, and the private sector were convened for an initial workshop that was held at the NMFS Santa Cruz Laboratory October 6-8, 2004. Following this initial workshop, three individual working groups broke out: 1) Fisheries/ MPAs Ecosystem Modeling, 2) Connectivity, and 3) MPAs for Natural Heritage. An additional two working groups, "Density Ratio" and "Maternal Effects and MPAs" were formed later. The working groups operated mostly independent of each other, each involving a varying number of meetings and written products. The working groups collectively produced over 10 peer-reviewed publications as well as a number of presentations delivered at various conferences and symposiums; see the full presentation in Appendix C.

2. Featured Workshop Fisheries

Nearshore fisheries target a great number of species where MPAs have been established. Nearshore fisheries include finfish as well as invertebrates, and represent a wide range of scientific knowledge, from unassessed data-poor stocks to data-rich assessed stocks. Assessments vary greatly, from relatively simple surveys that track changes in relative abundance to fully assessed stocks that have been evaluated with integrated population models that simultaneously analyze many different types of data to determine the stock status and its ability to support a fishery. Furthermore, some stocks are actively managed under comprehensive Fishery Management Plans (FMPs), while others are regulated with only size, season, and/or bag limits. In order to focus discussions on a manageable subset of species and to maintain a common thread throughout the entire workshop, four species were selected to represent the wide range of life histories, scientific knowledge, and management approaches for fisheries that are expected to be impacted by MPAs: