MPA Needs Assessment Monterey Bay National Marine Sanctuary

Summary

This report was commissioned because sport and commercial fishers and other stakeholders who had participated on the Monterey Bay National Marine Sanctuary's marine protected areas workgroup (MPAWG) were extremely disappointed with the lack of information provided on (1) the status and trends of regional fish and shellfish populations (2) the effect of recent regulations on fisheries based on these populations and (3) a description of the current regulatory framework that has been established to maintain healthy populations, fisheries and ecosystems and (4) the total absence of population analyses or models that could be used to assess either the effect of present regulations or the need for additional protections; including but not limited to marine protected areas (MPAs).). After five years of meeting, it was clear to many stakeholders that the MBNMS MPAWG process was not going to conduct a scientific analysis of the key question: "Does the MBNMS need additional MPAs to assure ecosystem health and to meet the conservation goals of the National Marine Sanctuaries Act?"

Fishing stakeholders were also concerned that the Sanctuary staff was attempting to engage in adaptive ecosystem management using only a single tool, MPAs, and that this attempt was not being coordinated with either the Pacific Fishery Management Council (PFMC) or the California Fish and Game Commission. The reason that co-ordination is so important is that there has been a transformation in fishery and ecosystem management on the west coast and California. The transformation has been primarily the result of (1) increases in knowledge of marine resources due to extensive monitoring, data analyses and modeling activities and (2) political transformation of the scientific results into effective management strategies. The principal strategy adopted was the use of annual catch quotas based on the size of populations as determined by timely stock assessments. Species considered to be overfished have been assigned very small quotas, and in addition, species at very low levels had large portions of their habitat placed in rockfish conservation areas (RCAs) where directed fishing for all bottomfishes was prohibited.

The PFMC also created an extensive network of Essential Fish Habitat Areas (EFH Areas). Presently 64% of the MBNMS area from Cambria to Pigeon Point (i.e. the "Study Area") is in fishing restricted MPAs. This does not include the Davidson Seamount area, an 775 square miles slated to be added to the MBNMS, where no fishing is allowed at or near the bottom. In addition, several specialized set and drift gillnet fisheries have been stopped entirely (due to bycatch of marine birds, mammals and reptiles), vessel buyouts to reduce fleet size occurred in the trawl fishery, and the State of California nearshore fishery management plan was enacted.

Traditional and Ecosystem-based fishery management

In addition to the transformation in federal ecosystem management a complex management structure of traditional State of California fishery management regulations is in effect. A full description of traditional fishery management regulations is presented in the report. Briefly stated, traditional fishery management regulations in effect in the MBNMS study area provide

extensive protection from overfishing and the many layers of regulations from the different management agencies prevents a large number of exploitable species from being fished at any appreciable level. This is particularly true of species in soft bottom areas of the nearshore and shelf habitats, the shelf break habitat, the deep slope habitat and the rise habitat. In federal waters a small number of species are presently being fished at moderate to optimum exploitation levels and the few species that were overfished in the past are now in rebuilding plans and their habitat has been heavily protected by the RCA and newly created essential fish habitat areas and state MPAs. Presently there are no known species in the federal water portion of the study area that are being exploited at rates greater than that which produces maximum sustainable yield (MSY) for the species.

The effect of the extensive increase in protective regulations over the last decade has collapsed the fishery at Monterey and nearly collapsed the fisheries at Santa Cruz and Morro Bay; 2006 Monterey landings were only 1% and landings at Santa Cruz and Morro Bay were only 16% of the landings in 1996 (Table 1s). Landings at Moss Landing doubled over the same time period; however the increase was entirely due to greatly increased landings of sardine and anchovy. The value of the landings had extensive reductions at all ports in the area; reductions were largest at Monterey and least at Princton-Halfmoon Bay where the landings are dominated by salmon and Dungeness crab that were not heavily affected by regulatory changes.

Table 1s. Decadal change in the landings at central California ports.

	Tons 1996	Tons 2006	% of 1996	Value 1996	Value 2006	% of 1996
Princeton-Halfmoon Bay	2,656	1,398	52.6%	$6,354	$4,786	75.3%
Santa Cruz	896	147	16.4%	2,178	622	28,6%
Moss Landing	12,493	29,646	237.3%	10,233	4,877	47.7%
Monterey	12,383	179	1.4%	6,037	868	14.4%
Morro Bay	2,675	434	16.2%	6,471	1,906	29.5%

The total landings at ports within the MBNMS (Santa Cruz, Moss Landing and Monterey) increased from 25,774 tons in 1996 to 29,969 tons in 2006 (Table 2s). This increase was due to greatly increased landings of two pelagic species, sardine and anchovy (from 12,722 to 27,939 tons). The landings of all other species with landings greater than 100 tons had major declines, and 18 out of 20 species with landings between 10 and 100 tons also declined. Pelagic species, which are little protected by MPAs, comprised about 96% of the landings in 2006, rising from about 80% in 1996. Shelf break rockfish species, which were most affected by the federal RCA, had enormous declines in landings with 2006 bocaccio, widow and chilipepper landings being only 2% of their 1996 landings. The species most likely to be affected by additional MPAs in federal waters are those dwelling on the continental slope. As a group the landings of slope species declined by a factor of 4, with total 2006 landings of only 806 tons. With pelagic species and slope species removed the landings of all other species declined by more than a factor of 5, from 2,068 tons in 1996 to only 372 tons in 2006.

Table 2s. Landings in the Monterey Port Area (i.e. Santa Cruz, Moss Landing and Monterey) in 1996 and 2006, and 2006 landings as a percentage of 1996 landings.

	1996	1996	2006	2006	% of 1996
TOTAL Landings	25,774		29,969		116%
Total pelagic species	20,482	79.5%	28,812	96.1%	141%
Total slope species	3,228	12.5%	806	2.7%	25%
Total everything else	2,068	8.0%	372	1.2%	18%

In addition to the regulations enacted prior to 2006 extensive state and federal MPAs have been created in the study area, and the state no trawling area was greatly enlarged. Major areas that were open to fishing for demersal and littoral species in 2006 are now closed to fishing for these species and landings would be expected to decline further due to the additional regulations.

The increase in regulatory protections had the intended affect on population sizes of exploited species. Total biomass from stock assessments of the most significant groundfish species declined from about 2.4 million tons in 1950 to slightly less than 50% of hypothetical unfished value by the early 1990s (Figure 1s). In the last decade, primarily due to federal limitations on fishing, the biomass has been trending upwards to about 60% of the unfished value at present.

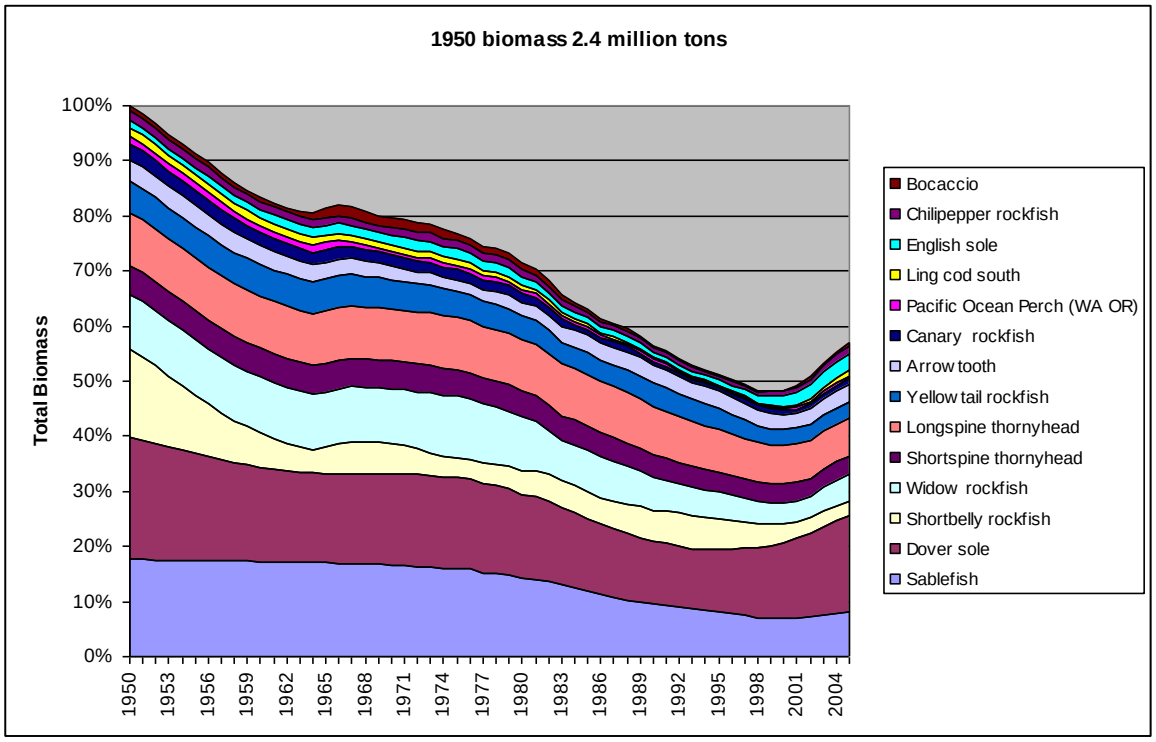

Figure 1s. Trends in abundance of groundfish stocks off the west coast of the U.S.

There seems to be little understanding of the consequences of combining management through the direct regulation of the volume of the catch (i.e. annual quotas with bimonthly catch limits) with enactment of MPAs. When fishery management is based on annual quotas MPAs will have little affect on annual landings; although they will alter the geographical distribution of the take and the resulting biomass. It does not require a complicated population model to know that if

the landings are not altered by the enactment of MPAs the increase in biomass inside of MPAs will be roughly balanced by the decrease in biomass outside. The principal result of this combination of management regulations will be the increased costs and fishing effort required to catch the annual quotas at the lower densities caused by the MPAs. In contrast, very little population alteration will occur due to the addition of MPAs as total catch will continue to be controlled by quotas. This points out that it is going to be very difficult to achieve profitable and sustainable fisheries if the several regulatory agencies continue to develop uncoordinated and/or counterproductive management measures.

Ecosystem consequences of MPAs for the Monterey Bay National Marine Sanctuary

The MBNMS ecosystem is a rich and diverse one that has been seriously impacted by fishing. Present fisheries management policies are extremely conservative, and should allow rebuilding of heavily impacted species over the next few decades. Potential fisheries production in the system is concentrated in mobile, pelagic species like sardine and hake. Sedentary species, mainly rockfishes, have high natural biomass but low production, so they were able to contribute substantially to overall fishery yields only by depleting stock sizes; on a sustainable basis, the sedentary species represent only a small proportion of total ecosystem production and potential yield.

MPAs in the MBNMS will not offer significant protection from potential future fishery management for any of the mobile species that represent most of the ecosystem biomass and production, since the area of protection is small compared to the dispersal-migration ranges of such species. However, protected areas could offer significant protection to a variety of inshore, sedentary species that have been historically impacted severely by fishing. If federal and state management policies are not coordinated, continued protection of offshore waters may lead to inshore shifts in fishing activity that could severely impact inshore species and threaten sources of larval seeding and recruitment within any inshore protected areas and sanctuaries. In such a scenario, fishing pressure increases dramatically inshore as offshore areas are closed. Since the RCAs and EFH closures have been in effect for several years, such an inshore shift in fishing effort should have already occurred. We have seen no data that suggests such a shift has occurred, but data on fishing effort has been limited.

The simulations show that the impacts of protected areas is confined to the benthic communities and specifically to the sedentary species within the benthic communities. Recognizing that the pelagic components of the community are highly mobile, neither any proposed MPAs or RCAs affect the pelagic community, nor the lower trophic levels in any significant way. Thus evaluation of the potential impact of MPAs within the MBNMFS is really an evaluation of the population dynamics of some individual, sedentary species because the species that are mobile, or dominantly deeper will be unaffected by MPA proposals.

The ecosystem model also shows that it is critical to coordinate state and federal management policies that may impact onshore-offshore distributions of fishing effort and differentially protect species that spend parts of their life cycles in State vs Federal waters (e.g. young fish in inshore nursery areas, older fish offshore in Federal waters). Lack of coordination could result in rapid depletion of inshore species/life stages if all the offshore effort were to shift inshore.

Socio-economic analyses

Several federal mandates require that thorough socio-economic analysis is conducted in conjunction with, and at the same scale and excellence as, natural science analysis in support of environmental decision making, management, and monitoring. If it is determined that there is a need for MPAs in the MBNMS, this chapter provides guidance on the scope and methods that should be used in a socio-economic analysis. First, the current, historical, and projected use patterns among all commercial and recreational uses should be analyzed, along with an understanding of the historical, economic, political, social, regulatory and ecological forces that underlie use patterns, with particular attention to the displacement effects of MPAs. Spatial use pattern analysis would be greatly improved if preliminary biological analyses were performed to assess the likely response of different species to the proposed MPAs. This kind of preliminary modeling can inform the socio-economic analysis, and increase the participation of stakeholders. Second, MPA planning processes should attempt to fully integrate the perceptions, attitudes, and beliefs of the range of stakeholders in order to create a shared sense of problems and opportunities, improve stakeholder attitudes about management, and enhance stakeholder compliance with the resulting regulations. Third, the costs and benefits of market and non-market values should be considered in establishing and evaluating an MPA. Spatial analyses of economic indicators, use patterns, and ecological data can allow planners to maximize the ecological benefits of MPAs while minimizing social and economic impacts. Fourth, the social and economic linkages between primary stakeholders, secondary actors, and surrounding communities should be accounted for in an assessment or evaluation of proposed or existing MPAs. Fifth, the legislative intent of the National Marine Sanctuary Act, the extent to which the MBNMS may regulate fisheries, and the legality of the cumulative economic effects of multiple, overlapping regulations should be analyzed. Finally, social science methods and genuine public participation should be engaged in the planning, implementation, monitoring, and evaluation of MPAs. There is not a one-size-fits-all methodological approach to collecting social science data for MPAs, but social science data must be collected systematically and reliably through valid methodologies. In relation to all of these areas of social science inquiry, the collection and analysis of data must be conducted with the utmost respect to the privacy and trust of stakeholders. Furthermore, a positive, transparent, efficient, and trusting relationship between social scientists and stakeholders is imperative to effective outcomes.

MPAs and Research Needs within the Monterey Bay National Marine Sanctuary.

Recently twenty-nine California central coast MPAs (effective 21 September, 2007) were incorporated into a state nearshore reserve system. The new federal EFH network of MPAs includes three federal MPAs inside the MBNMS (1,435 sp. mi.) and the Davidson Sea Mount (775 sq mi.). More than 60% of the MBNMS study area is now protected by MPAs. Therefore, it is a critical time to consider the potential success of any MBNMS MPAs, as well as, ensuring the proper assessment of the system's effectiveness in those endeavors. Within the 4,217 sq. mi. MBNMS study area, reserves and closures occupy a predominance of nearshore rocky habitat, in addition to shelf, shelf break, slope, and abyssal regions. Thus, the existing Sanctuary, and especially with the addition of the Davidson Seamount, encompasses the important habitats in the MBNMS region. Administrators of MBNMS are faced with the already enormous task of prioritizing and implementing research objectives. Baseline physical and biological information on habitats and species should be assessed before MPAs become established. Accommodations

that facilitate fisheries resource monitoring and stock assessment should be identified and implemented. Also, there is substantial uncertainty regarding the appropriate size and spacing, implementation and effectiveness of MPAs in general. MBNMS administrators should assess the effectiveness of existing MPAs and closed areas prior to designating additional MPAs.

The record on funding MPA monitoring and research in California is not good. In 1993 three reserves were enacted in California, two of these had extensive surveys and monitoring in the first year (Punta Gorda), or first couple of years (Big Creek) after the reserves were established. To date, there has been no follow up monitoring, repeat of surveys or analyses on the success of the reserves in protecting individual species or any analysis of ecosystem effects of MPAs (which is far more difficult than assessment of trend of individual species). Based on the number of MPAs in the South/Central phase of the State MLPA process and the Channel Islands process; the expected number of MPAs in California is expected to exceed 100 by the time the MLPA process is completed. In addition an extensive network of reserve areas (EFH) was recently established by the Pacific Fisheries Management Council. It is clear that there will soon be intense competition for funds to study MPAs and other reserves, it is unlikely that funding will be anywhere near the amount necessary to adequately monitor or research the reserves and MPAs expected to be in existence in California by 2010. It is clear that the limiting factor will be funding for monitoring and research, not availability of MPAs.

Based upon this examination of MBNMS research needs, three points should be restated regarding research objectives: First, given the extent of the existing MBNMS protected areas, funding and other logistical constraints are likely to limit the ability to implement basic research needs. Second, sufficient baseline information must be collected in a timely fashion at multiple sites (already large in number) before permanent research and monitoring regimes are established. Third, given the uncertainties which surround the designation and management of MPAs, there is a responsibility to assess effectiveness of existing MBNMS protected areas prior to summarily restricting use of more ocean area.

Finally, no additional MPAs are required within MBNMS to accomplish the research and monitoring objectives reviewed and outlined here. These include biological community structure surveys, assessments of density and overall stock size, collection of life-history information for both commercially exploited and unexploited marine resources, research on movement patterns of adult, juvenile, and larval stages of important species, and collection of fisheries-based data.

CONCLUSIONS

The marine resources of the MBNMS region are heavily protected by existing federal, state, and local regulations and programs and the effects of the transformation in management that has occurred over the last decade are clearly seen in the extensive decreases local landings and the increasing biomass of groundfishes.

Very extensive federal and state networks of marine protected areas were recently established in central California. No assessment of the affects of these networks, which presently occupy 64% of the MBNMS study area have been made. A full assessment of the affects of these MPA networks should be made before any additional MPAs are considered in the area.

The near collapse of the fisheries at ports in the MBNMS area appears to be primarily caused by recent regulatory action rather than recent declines populations of fishes and invertebrates. Management action by the several federal and state regulatory agencies shows little coordination. The MBNMS should play a major role in strengthening the coordination of ecosystem and fishery management. At present the major needs are for assessment of present management, development of tactics to achieve both healthy fisheries and a healthy ecosystem, and public discussion of ecosystem protection and healthy fisheries.