

**California Marine Life Protection Act Initiative:
Design of MPAs and the MPA Network Section of the Draft Master Plan Framework**

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X.X DESIGN OF MPAS AND THE MPA NETWORK

An important aim of the MLPA is “to modify the existing collection of MPAs to ensure that they are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves” [FGC 2851(h)]. At FGC subsection 2853(a), the MLPA states that “there is a need to reexamine and redesign California's MPA system to increase its coherence and its effectiveness at protecting the state's marine life, habitat, and ecosystems.” These statements of intent reflect the findings of the Legislature that existing MPAs have not effectively protected California’s marine heritage, including its marine biological diversity, marine ecosystems, marine habitats, and marine fisheries [FGC 2851(a-d)].

In referring to the state’s existing and future collection of MPAs, the MLPA uses the terms “system” and “network.” The MLPA requires that the reformed collection of MPAs have such features as clearly identified goals and objectives, and that they be “designed and managed, to the extent possible, as a network” [FGC subsection 2853(b)6]. In FGC subsection 2852(a)2(F), the MLPA requires the selection of “a preferred siting alternative for a network of MPAs.” This preferred alternative will emerge from phased decisions regarding network components of MPAs within regions.

Although neither statute nor legislative history defines "network," the ordinary dictionary usage contemplates *interconnectedness* as a necessary characteristic of the term. The term “reserve network” has been defined as a group of reserves which is designed to meet objectives that single reserves cannot achieve on their own (Roberts and Hawkins, 2000). In general this definition also requires some direct or indirect connection of MPAs through the dispersal of adult and/or larval organisms. In some cases, larval dispersal rates are not known and oceanography or ocean current patterns are combined with larval biology to help determine connectivity.

Network components, however, may differ in each region. The Act also requires that the network as a whole meet the various goals and guidelines set forth by the law and contemplates the adaptive management of that network [Fish and Game Code Section 2857(c)(5)]. In order to meet those goals a strict interpretation of an ecological network across the entire State may not be possible. Biologically, there are separations between various oceanographic regions. Many species would not be expected to cross these separations. While the concept of a network within an oceanographic region is viable, the ultimate goal of the MLPA is to develop a statewide network of MPAs.

Because of the phased approach of the MLPA Initiative, this statewide network will be developed in phases, region by region. Within each region, components of the statewide network will be designed

consistent with the MLPA and with regional goals and objectives. Each component ultimately will be presented as a series of options, developed in a regional process involving a regional stakeholder group and a sub-group of the Master Plan Science Advisory Team, with a preferred alternative identified by DFG. The preferred alternative will become, upon adoption by the Fish and Game Commission, one component of the statewide network called for by the MLPA. In developing alternative regional network components, the aim will be to ensure that the design, management, and monitoring of the individual MPAs within the alternative are closely and explicitly related to one another, to regional goals and objectives, and to the MLPA. To the extent possible, MPAs in a statewide network may also be linked biologically.

This section of the draft master plan framework sets out a process for achieving the MLPA's goal of improving California's system of MPAs. After discussing those sections of the MLPA which relate to a statewide MPA network, this section then describes a process for developing proposals for MPA networks and individual state marine reserves, state marine parks, and state marine conservation areas.

As part of the process of designing the initial set of MPAs in the central coast study region, a regional stakeholder group, the science team's regional sub-group, the science team, and the task force will develop and adopt more specific guidelines on design of MPAs. As these guidelines are developed, they will be incorporated as appendices to the Master Plan Framework and applied in other regions. It is expected that experience in each region will lead to further refinements of the guidelines. In this and other ways, this Master Plan Framework will apply adaptive management to meeting the goals of the MLPA.

The Marine Life Protection Program

The foundation for achieving the aims of the MLPA is a Marine Life Protection Program (MLPP), which must be adopted by the California Fish and Game Commission. The MLPA sets the following goals for the MLPP [FGC subsection 2853(b)]:

- (1) To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.
- (2) To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.
- (3) To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.
- (4) To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value.
- (5) To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.
- (6) To ensure that the state's MPAs are designed and managed, to the extent possible, as a network.

Meeting the goals of the MLPA requires that an MPA network reflect these goals in their own goals, objectives, management, monitoring, and evaluation.

[[These goals will be discussed in greater detail upon completion of a review of possible definitions of key terms.]]

Process for Developing Alternative Statewide MPA Networks

This Master Plan Framework seeks to meet the requirement of the MLPA for the establishment of a statewide network of MPAs by developing components of the statewide network region by region. In general terms, this regional process begins with the development of alternative proposals for MPAs, including marine reserves, in each region, as described generally at FGC subsection 2856(a)(2)(D). From these alternatives, a preferred alternative is selected [FGC subsection 2856(a)(2)(F)].

Getting to this end point requires several intermediate steps identified in the MLPA. Below is a general outline of these steps. Greater detail is available in the “Outline of Information Required for Proposals for Alternative Networks of Marine Protected Areas” in Appendix ??.

Throughout the development of alternative proposals for MPA network components, an emphasis must be placed upon using the best readily available science, as required at FGC subsection 2855(a). The MLPA does not require complete or comprehensive science, but rather the level of science that is practicable.

This process should also draw upon the knowledge, values, and expertise of local communities and other interested parties. At FGC subsection 2855(c)(1)-(2), the MLPA specifically requires that local communities and interested parties be consulted regarding:

- (1) Practical information on the marine environment and the relevant history of fishing and other resources use, areas where fishing is currently prohibited, and water pollution in the state's coastal waters.
- (2) Socioeconomic and environmental impacts of various alternatives.

As described in the “Proposed Interested Public and Stakeholder Involvement Strategies” adopted by the MLPA Blue Ribbon Task Force (Appendix ???), there are a variety of methods and activities for meeting these requirements. More generally, as the process for developing alternatives for MPA network components gets underway in each region, a regional working group of stakeholders will be convened. This group will serve as a focus for regional discussions regarding the major aspects of designing MPA network component alternatives, including setting goals and objectives and developing options on the type, location, size, and boundaries for individual components of the network. In doing so, the regional working group will work closely with a sub-team of the science team, and both of these groups will be provided organizational, process, and scientific support by DFG and the MLPA Initiative staff.

In developing MPA proposals for the Central coast study region, summaries of regional discussions will regularly be reported to the MLPA Blue Ribbon Task Force and the Fish and Game Commission. At major points in the regional process, such as the setting of goals and objectives, recommendations from the regional working group and sub-group of the science team will be presented to the full science team for its review and comment, and forwarded to the MLPA Blue Ribbon Task Force for its review and adoption. These recommendations will then be provided to DFG for review and presentation to the Fish and Game Commission. The intent is to engage all levels at critical stages throughout the MPA network development process.

Once goals and objectives for the initial regional MPA proposal have been adopted, the primary activity of the regional process will be developing alternative approaches to meeting these goals and objectives for the review of the MLPA Blue Ribbon Task Force and the Fish and Game Commission.

The first step in assembling alternative proposals for an MPA network component is to use existing information to the extent possible to identify and to map the habitats that should be represented in the system, including marine reserves [FGC subsection 2856(a)(2)(A)]. The MLPA also calls for recommendations regarding the extent and types of habitats that should be represented in the system, including marine reserves.

In making these recommendations, the basic habitat types identified in the MLPA should be used, as modified by the Master Plan Team convened in 2000. The MLPA identifies the following habitat types: rocky reefs, intertidal zones, sandy or soft ocean bottoms, underwater pinnacles, sea mounts, kelp forests, submarine canyons, and seagrass beds. The Master Plan Team reduced this basic list by eliminating sea mounts, since there are no sea mounts in state waters. The team also identified four depth zones as follows: intertidal, intertidal to 30 meters, 30 meters to 200 meters, and beyond 200 meters. Several of the seven habitat types occur in only one zone, while others may occur in three or four zones. Experience in California and elsewhere demonstrates that individual MPAs generally include several types of habitat in different depth zones, so that the overall number of MPAs required to cover the various habitat types can be relatively small. The Master Plan Team also called for considering adjacent lands and habitat types, including seabird and pinniped rookeries.

Recommending the extent of such habitat that should be included in an MPA network will require careful analysis and consideration of alternatives. These recommendations may vary with habitat and region, but should be based on the best readily available science. One aspect of determining appropriate levels of habitat coverage is the habitat requirements of species likely to benefit from MPAs in a region. At FGC subsection 2856(a)(2)(B), the MLPA requires that the Master Plan identify “select species or groups of species likely to benefit from MPAs, and the extent of their marine habitat, with special attention to marine breeding and spawning grounds, and available information on oceanographic features, such as current patterns, upwelling zones, and other factors that significantly affect the distribution of those fish or shellfish and their larvae.”

DFG prepared a master list of such species, which appears in Appendix ???. This list may serve as a useful starting point for identifying such species in each region during the development of alternative

MPA network component proposals. This regional list then can assist in evaluating desirable levels of habitat coverage in alternative MPA network components.

Existing MPAs may then be evaluated against these recommendations on habitat coverage, against the goals and objectives of the region, the goals of the MLPA, and the design requirements in FGC Section 2857 described below. As stated in FGC subsection 2856(a)(2)(G), this evaluation can help determine “whether any specific MPAs should be consolidated, expanded, abolished, reclassified, or managed differently.”

Current and anticipated human activities that may affect representative habitats should also be described generally and, if possible, spatially. These activities include aquatic activities, such as fishing and diving, as well as terrestrial, such as development and non-point and point-source pollution. Management of any activities that affect the species that may benefit from MPAs as well as representative habitats should then be assessed in relation to the goals and objectives of the MLPA.

Based on these evaluations, habitats and ecosystems that are insufficiently protected, in terms of the MLPA, by existing MPAs or other management activities such as state and federal fisheries management may be identified, and alternative proposals for enhancing existing MPAs and siting new MPAs may be developed. The “Outline of Information Required for Proposals for Alternative Networks of Marine Protected Areas” in Appendix ?? provides guidance on the types of information that constitute a viable alternative as well as specific questions with which alternatives may be evaluated.

The ultimate decision regarding the selection of a preferred statewide MPA network, and each regional network component, rests with the California Fish and Game Commission. The aim of regional efforts should be upon the development of alternatives and, as importantly, their evaluation against regional goals and objectives and the requirements of the MLPA. Evaluation of MPA network component alternatives that is rigorously linked to these considerations will provide the kind of information that will assist the commission in judging among different approaches to meeting the goals of the MLPA.

The Geographical Context of MPA Networks

The vehicle for guiding and implementing the Marine Life Protection Program (MLPP) is a master plan adopted by the Fish and Game Commission [FGC subsection 2855(a)]. The MLPA stipulates that the master plan include several elements. The initial focus of discussion here is the requirement for recommending to the Fish and Game Commission alternative statewide networks of MPAs, including marine life reserves in each biogeographical region that meet the MLPP’s goals listed above as well as guidelines in FGC Section 2857, which will be discussed later in this section [FGC subsection 2856(a)2(D)]. The master plan must also include a preferred alternative for a statewide MPA network, chosen from the above alternatives, that also is consistent with the goals described above and the design guidelines in FGC Section 2857 [FGC subsection 2856(a)2(F)]. This emphasis upon a network design reflects one of the goals of the MLPA—that is, to design and manage the state’s MPAs as a network, to the extent possible [FGC subsection 2853(b)(6)].

In calling for a statewide network of MPAs, to the extent possible, the MLPA also recognizes that the state spans several biogeographical regions, and identified these, initially, as follows [FGC subsection 2852(b)]:

- The area extending south from Point Conception,
- The area between Point Conception and Point Arena, and
- The area extending north from Point Arena.

In the same provision, the MLPA provides authority for the master plan team required by FGC subsection 2855(b)(1) to establish an alternate set of boundaries. The Master Plan Team convened by the Department of Fish and Game in 2000 determined that the three regions identified in the MLPA were not zoogeographic regions; scientists recognize only two zoogeographic regions between Baja California and British Columbia. Instead of the term “biogeographical region,” the team adopted the term “marine region” and identified four marine regions:

- North marine region: California-Oregon border to Point Arena (about 183 linear nautical miles of coastline);
- North-central marine region: Point Arena to Point Año Nuevo (about 156 nautical miles of coastline);
- South-central marine region: Point Año Nuevo to Point Conception (about 203 nautical miles of coastline); and
- South marine region: Point Conception to the California-Mexico border, including the islands of the southern California Bight (about 243 nautical miles of coastline).

These four marine regions will serve as the initial basis for designing a statewide MPA network, unless the science team determines otherwise, as provided by FGC subsection 2855(b)(1). It is these marine regions, not whatever study regions may be adopted for planning purposes, that will be the basis for determining whether adequate coverage of representative habitats and communities occurs in marine reserves [FGC subsection 2857(c)3].

As noted above, the MLPA requires that the master plan include proposals for alternative statewide MPA networks and recognize one of these as the preferred alternative statewide network. This Master Plan Framework phases in the development of alternatives and a preferred alternative, region by region through 2011, as authorized by FGC subsection 2857(e). The timing for the development and adoption of MPA networks in the regions is discussed elsewhere in this Master Plan Framework [INTERNAL REFERENCE].

General Design Features of MPA Networks

In assembling components of a statewide MPA network region by region, this Master Plan Framework seeks to promote the eventual creation of a statewide system by identifying specific design guidelines consistent with the MLPA. Chief among these guidelines are the following.

At FGC subsection 2853(c), the MLPA allows that the Marine Life Protection Program “may include areas with various levels of protection.” These various levels of protection are represented by state marine reserves, state marine parks, and state marine conservation areas as defined in the Marine Managed Areas Improvement Act (see Appendix AA for definitions)

Whether MPAs within a regional component of the statewide network are reserves, parks, or conservation areas, or some combination of the above, the MLPA specifies that all MPAs have certain features. First, the MLPA requires that the MLPP include MPAs that have “specific identified objectives” (FGC subsections 2853[c]2 and 2857[c]1). The MLPA provides some options for what these objectives are. At FGC subsection 2857(c)1, the MLPA says that “[i]ndividual MPAs may serve varied primary purposes while collectively achieving the overall goals and guidelines of this chapter.” At FGC subsection 2857(b), the MLPA also states that MPAs may aim to achieve either or both of the following objectives:

- (1) Protection of habitat by prohibiting potentially damaging fishing practices or other activities that upset the natural ecological functions of the area.
- (2) Enhancement of a particular species or group of species, by prohibiting or restricting fishing for that species or group within the MPA boundary.

Setting goals and objectives for regional components of a statewide network and for individual MPAs within these components will be a critical first step in developing meaningful alternatives for a statewide MPA network and for individual MPAs within those alternatives, in selecting a recommended network of MPAs, and in the design of monitoring and evaluation of regional network components. Assembling and evaluating available information on the biological, oceanographic, socio-economic, and governance features of a region, including existing MPAs, should precede setting regional goals and objectives. Similarly, setting regional goals and objectives should precede setting goals and objectives for individual MPAs and network components as well as designing boundaries and management measures for individual MPAs.

Baseline data needs for MPAs should be drafted for inclusion in the regional MPA management plan described elsewhere in the Master Plan Framework [INTERNAL REFERENCE]. Examples of such baseline information needs are:

- Status of recreational and commercial marine resources in the region
- Status of species in need of restoration
- Analysis of activities affecting living marine resources in the region

Additional types of baseline information needs will be identified during the Central coast study region process.

There are a variety of techniques for setting goals and objectives. No one technique is likely to suit the diverse situations in all regions.¹ Deciding upon a process for setting goals and objectives should be an early focus for regional discussions. In fashioning goals, the following characteristics should be kept in mind (Pomeroy et al. 2004). A goal is a broad statement of intent that is:

- brief and clearly defines the desired long-term vision and/or condition that will result from effective management of the MPA;
- typically phrased as a broad mission statement; and
- simple to understand and communicate.

An objective is a more specific measurable statement of what must be accomplished to attain a goal. Usually, attaining a goal requires accomplishing two or more objectives. Useful objectives have the following features:

- Specific and easily understood;
- Written in terms of what will be accomplished, not how to go about it;
- Realistically achievable;
- Defined within a limited time period; and
- Can be being measured and validated.

In developing regional goals and objectives, attention should be paid as well to other complementary programs. For instance, like the MLPA, the Marine Life Management Act (MLMA) takes an ecosystem-based approach to management. The Nearshore Fishery Management Plan (NFMP) required by the MLMA identified MPAs as an important tool in achieving its goals and objectives. While the NFMP deferred to the MLPA process in designing and establishing networks of MPAs, it also identified key features of MPA networks that would contribute to the goals and objectives of the NMFP and the MLMA. Other fishery management plans should be reviewed for similar linkages.

Once developed, regional goals and objectives can be matched with the goals of the different types of MPAs, as defined by the Marine Managed Areas Improvement Act (MMAIA) at PRC Section 36700 and in the MLPA. The MMAIA defines the goals for the three types of MPAs as shown in Table 1.

Table 1

Purpose	State Marine Reserve	State Marine Park	State Marine Conservation Area
Protect or restore rare, threatened, or endangered native plants, animals, or habitats in marine areas.	X		X

¹ Reviews of MPAs around the world have identified common types of goals and objectives that may be helpful in designing individual regional networks and individual MPAs. A summary of these appears in Appendix BB.

Protect or restore outstanding, representative, or imperiled marine species, communities, habitats, and ecosystems.	X	X	X
Protect or restore diverse marine gene pools.	X		X
Contribute to the understanding and management of marine resources and ecosystems by providing the opportunity for scientific research in outstanding, representative, or imperiled marine habitats or ecosystems.	X	X	X
Provide opportunities for spiritual, scientific, educational, and recreational opportunities		X	
Preserve cultural objects of historical, archaeological, and scientific interest in marine areas.		X	
Preserve outstanding or unique geological features.		X	X
Provide for sustainable living marine resource harvest.			X

Although the MLPA does not identify specific goals and objectives for marine parks and marine conservation areas, it does identify possible functions, which may be considered as goals, for marine reserves. At FGC subsection 2851(f), the MLPA says that marine reserves:

- protect habitat and ecosystems,
- conserve biological diversity,
- provide a sanctuary for fish and other sea life,
- enhance recreational and educational opportunities,
- provide a reference point against which scientists can measure changes elsewhere in the marine environment, and
- may help rebuild depleted fisheries.

As mentioned above, the MLPA recognizes that individual MPAs within a statewide network may have several goals and objectives, such as protection of biological diversity and enhancement of recreational opportunities. In these instances, special care should be taken in designing management measures, such as restrictions as well as data collection and monitoring, which will maximize the different objectives and quantify whether different objectives are being met.

The benefits from MPA designation of an area may also be increased, and potential negative socio-economic impacts may be decreased, through zoning. For instance, a core zone within a candidate area

may be designated a marine reserve, while the adjacent area is designated a marine park or a marine conservation area, thereby serving as a buffer and as a reference area for the core zone and other purposes (Salm et al. 2000; Kelleher and Kenchington 1992).

The Design of MPAs

As described above, the process of designing MPAs within an MPA network regional component begins with an evaluation of habitats within a region, identification of threats, setting of regional goals and objectives, and identification of gaps in habitat coverage. In the next stage of the MLPA Initiative, the focus of attention narrows to specific study areas that include representative habitats and other resources that would benefit from inclusion within one or a combination of MPA types and that would contribute to the requirements of the MLPA for protection of representative habitats in marine reserves.

Once a study region has been identified, it then is necessary to determine what MPA type or combination of MPA types might be appropriate. The MLPA recognizes the role of different types of MPAs in achieving the objectives of the Marine Life Protection Program [FGC subsection 2853(c)]. The MMAIA defines three types of MPAs: state marine reserve, state marine park, and state marine conservation area. Depending upon these goals and objectives, the appropriate type or combination of MPA types may be selected for development based on the purposes summarized above.

Besides somewhat different purposes, each type of MPA represents a different level of restriction on activities within MPA boundaries. These restrictions and purposes suggest how each designation can be used effectively in a system of MPAs.

- A state marine reserve prohibits taking living, geological, or cultural resources and must maintain the area “to the extent practicable in an undisturbed and unpolluted state” [PRC subsection 36710(a)]. The responsible agency may permit research, restoration, or monitoring. Such activities as boating, diving, research, and education may be allowed, to the extent feasible, so long as the area is maintained “to the extent practicable in an undisturbed and unpolluted state.” Such activities may be restricted to protect marine resources.
- A state marine park prohibits commercial use of living or nonliving marine resources. Other uses that would compromise the protection of living resources, habitat, geological, cultural, or recreational features may be restricted. All other uses are allowed, consistent with protecting resources.
- In a state marine conservation area, activities that would compromise the protection of species of interest, the natural community, habitat, or geological features may be restricted. Research, education, and recreational activities, as well as commercial and recreation catches may be permitted.

State Marine Reserves

While the MLPA alludes to other types of MPAs [FGC subsection 2853(c)], it highlights the use of state marine reserves, hereafter called “marine reserves.” Within this general scheme, the MLPA emphasizes

the role of marine reserves in several ways. First, the MLPA requires that the Marine Life Protection Program include “an improved marine life reserve component” consistent with the guidelines that will be discussed later [FGC subsection 2853(c)(1)]. Second, the Legislature cited several reasons for focusing upon marine reserves, as stated above [FGC subsection 2851(e)-(g)]. The MLPA then states the following:

- (g) Despite the demonstrated value of marine life reserves, only 14 of the 220,000 square miles of combined state and federal ocean water off California, or six-thousandths of 1 percent, are set aside as genuine no take areas.
- (h) For all of the above reasons, it is necessary to modify the existing collection of MPAs to ensure that they are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves.²

At FGC subsection 2853(c)(1), the MLPA also calls for an improved “marine life reserve component.”

Finally, in its definition of a “marine life reserve” at FGC subsection 2852(d), the MLPA sets a high standard of protection when it requires that “the area shall be maintained to the extent practicable in an undisturbed and unpolluted state.” Similarly, at FGC subsection 2857(c)(4), the MLPA states that reserves “shall be designed, to the extent practicable, to ensure that activities that upset the natural ecological functions of the area are avoided.”

Given this emphasis within the MLPA, marine reserves must be considered as foundational elements of regional MPA network components, although they are not the only elements. Indeed, the design of MPA network components may generate the greatest benefits by combining core zone marine reserves with the less restrictive designations of marine park and marine conservation area, as mentioned above.

The MLPA sets other requirements for the use of marine reserves. At FGC subsection 2857(c)(3), the MLPA requires “[s]imilar types of marine habitats and communities shall be replicated, to the extent possible, in more than one marine life reserve in each biogeographical region.” Consistent with this approach, this Master Plan Framework foresees that in each region, all of the above habitat types and depth zones identified by the Master Plan Team in 2000 are included in at least two marine reserves. As mentioned above, several of the seven habitat types occur in only one depth zone, while others may occur in three or four depth zones. Experience in California and elsewhere demonstrates that individual MPAs generally include several types of habitat in different depth zones, so that the overall number of marine reserves required to cover the various habitat types can be relatively small.

Marine reserves may be designed to accomplish several goals and objectives or combinations of these. Taken together, the MLPA and MMAIA define three general categories of goals for marine reserves:

² The MLPA uses the terms “sealife reserve” once and “marine life reserve” elsewhere. The MLPA defined “marine life reserve” in the same way that the Marine Life Management Areas Improvement Act does. Therefore, the two phrases can be considered synonymous.

- Protecting and restoring marine habitats, ecosystems, and biological diversity;
- Enhancing recreational and educational opportunities; and
- Increasing the understanding of marine systems.

Proposals for marine reserves should clearly articulate how their goals and objectives are consistent with these general guidelines as well as with regional goals and objectives.

Besides reflecting the MLPA and regional goals, the goals and objectives for individual marine reserves and other types of MPAs should reflect the views of stakeholders and the judgment of the science team, using the best readily available science, through an iterative process.

Once set, goals and objectives will influence crucial design decisions regarding size, location, and boundaries. For instance, a marine reserve whose primary goal is protection of biological diversity may well have a different configuration than a marine reserve whose goal is enhancement of depleted fisheries (Nowlis and Friedlander 2004). Benefits for conservation of biological diversity appear to increase directly rather than proportionally with the size of reserves (Halpern 2003).

For reserves with fisheries benefits as a primary objective, size and location also will be influenced by the choice of focal species and their life history characteristics. There is a growing literature regarding the relationship between the life history of focal species and the size and location of marine reserves, and by extension, other types of MPAs (NRC 2001; Botsford et al. 2003; NFCC 2004; Nowlis and Friedlander 2004). In general, such marine reserves need to be scaled to the movements of their focal species during various life history stages (Gell and Roberts 2003), which are often strongly associated with the distribution of habitats.

The effectiveness of a marine reserve, as well as other types of MPAs and entire MPA networks, will depend also upon effective plans for monitoring and evaluation, enforcement, and management as the MLPA requires at CFG subsections 2853(b)(5), 2853(c)(2) and (3), and 2856(a)(2)(H) and (I). These aspects of marine reserve design are taken up in sections [INTERNAL REFERENCE] of this Master Plan Framework.

State Marine Parks and State Marine Conservation Areas

As noted in Table 1 and elsewhere above, state marine parks and state marine conservation areas, hereafter called “marine parks” and “marine conservation areas,” differ from marine reserves to different degrees in their purposes as well as the type of restrictions. Unlike marine reserves, these two types of MPAs allow some level of fishing. The types of commercial and/or recreational restrictions on fishing may vary with the focal species, habitats, and goals and objectives of an individual MPA within a network. Where a goal is biodiversity conservation, restrictions on fishing may be different from those in an MPA where the primary goal is enhancing recreational opportunities.

Marine parks and marine conservation areas have an especially valuable role to play in designing MPAs that accommodate a spectrum of uses (NRC 2001; Salm et al. 2000). Zoning plans that use all three types of MPAs make it possible to separate incompatible uses and to define management areas that protect ecosystem attributes of concern while allowing compatible uses (NRC 2001). For instance,

zoning might buffer a marine reserve with a marine park in which some types of recreational fishing are regulated but allowed or a marine conservation area in which both commercial and recreational fishing are allowed but certain types of gear are not.

Zoning can be particularly useful as an element in adaptive management (NRC 2001). Different restrictions in different areas can help in determining the impact of different activities and in determining the relative effects of fishing, environmental degradation, and other factors.

In developing alternatives for the initial central coast study region MPA network component, the regional working group, the full science team and its regional sub-group, and the MLPA Blue Ribbon Task Force will develop guidance regarding the design of individual MPAs, MPA network components, and zoning that can later be incorporated into this Master Plan Framework for application in the development of MPA network components in other regions.

Enforcement and Public Awareness Considerations in Setting Boundaries

Regardless of the amount of enforcement funding, personnel or equipment available the enforceability and public acceptance and understanding of marine protected areas will be enhanced if a number of criteria are considered when they are being designed and sited. While the complexities of the California coastline and locations and distributions of habitats and resources which are being protected make using the same criteria at each location difficult, an effort should be made to include as many of these considerations as possible.

Marine protected area boundaries should be clear, well-marked, recognizable, measurable and defensible. Selecting known, easily recognizable landmarks or shoreline features, where possible, as starting points for marine protected area boundaries will provide a common, easily referenced understanding of those boundaries. Marine protected area boundaries should be straight lines that follow North-South and East-West coordinates while avoiding fractional latitude or longitude lines wherever possible. Likewise, any offshore corners or boundary lines should be located at easily determined coordinates. This is especially true if installation and maintenance of boundary marker buoys is not cost effective or feasible. Using depth contours or distances from shore as boundary designations should be avoided, if possible, due to ambiguities in determining exact depths and distances.

Siting marine protected areas in locations that are accessible and/or observable, either from the shore or the water, can increase the likelihood that potential illegal activities will be observed and reported, discourage such activities because they might be observed and increase public awareness of the MPA. Siting marine protected areas within, or near, locations under special management (national marine sanctuaries and parks, state and local parks and beaches, research facilities, museums and aquaria, etc) may provide an added layer of enforcement, observation and public awareness. This is especially true if there are shore-side facilities and personnel based at the site.

Designing marine protected areas to include “buffer” zones surrounding core habitat or resource areas can lessen the chance that intentional or unintentional violations of the protective regulations in the core

area might occur. A buffer could be an area of lesser protection surrounding the core area. Simply designing marine protected areas to cover fewer, but relatively large areas rather than many smaller ones may not only improve the public's recognition of the site, but also allow enforcement personnel to more easily determine when a potential violation may be occurring.

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Appendix AA: Definitions of Marine Protected Areas

The Marine Management Areas Improvement Act (Public Resources Code Section 36700), defines six classifications of marine managed areas. Three of these are marine protected areas, which are defined as follows:

(a) A "state marine reserve" is a nonterrestrial marine or estuarine area that is designated so the managing agency may achieve one or more of the following:

- (1) Protect or restore rare, threatened, or endangered native plants, animals, or habitats in marine areas.
- (2) Protect or restore outstanding, representative, or imperiled marine species, communities, habitats, and ecosystems.
- (3) Protect or restore diverse marine gene pools.
- (4) Contribute to the understanding and management of marine resources and ecosystems by providing the opportunity for scientific research in outstanding, representative, or imperiled marine habitats or ecosystems.

(b) A "state marine park" is a nonterrestrial marine or estuarine area that is designated so the managing agency may provide opportunities for spiritual, scientific, educational, and recreational opportunities, as well as one or more of the following:

- (1) Protect or restore outstanding, representative, or imperiled marine species, communities, habitats, and ecosystems.
- (2) Contribute to the understanding and management of marine resources and ecosystems by providing the opportunity for scientific research in outstanding representative or imperiled marine habitats or ecosystems.
- (3) Preserve cultural objects of historical, archaeological, and scientific interest in marine areas.
- (4) Preserve outstanding or unique geological features.

(c) A "state marine conservation area" is a nonterrestrial marine or estuarine area that is designated so the managing agency may achieve one or more of the following:

- (1) Protect or restore rare, threatened, or endangered native plants, animals, or habitats in marine areas.
- (2) Protect or restore outstanding, representative, or imperiled marine species, communities, habitats, and ecosystems.
- (3) Protect or restore diverse marine gene pools.
- (4) Contribute to the understanding and management of marine resources and ecosystems by providing the opportunity for scientific research in outstanding, representative, or imperiled marine habitats or ecosystems.
- (5) Preserve outstanding or unique geological features.
- (6) Provide for sustainable living marine resource harvest.

Note that the MLPA defined “marine life reserve” as follows [FGC subsection 2852(d)]:

"Marine life reserve," for the purposes of this chapter, means a marine protected area in which all extractive activities, including the taking of marine species, and, at the discretion of the commission and within the authority of the commission, other activities that upset the natural ecological functions of the area, are prohibited. While, to the extent feasible, the area shall be open to the public for managed enjoyment and study, the area shall be maintained to the extent practicable in an undisturbed and unpolluted state.

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Appendix BB: Common Goals and Objectives for Marine Protected Areas

Conservation of biodiversity and habitat

Protect depleted, threatened, rare, or endangered species or populations
Preserve or restore the viability of representative habitats and ecosystems
To gain better information about marine ecology and human impacts on it
To address issues surrounding species of special concern
Biological diversity protected
Habitat protected
Individual species protected
Degraded areas restored
Marine resources sustained or protected
Maintain genetic/species diversity
Conserve habitat and biota
Protect rare/important species
Recolonize exploited areas
Protect coastlines
Marine resources sustained or protected

Fishery management

Control exploitation rates
Protect critical stages of the species' life history
Reduce secondary fishing impacts
Ensure against possible failures of conventional regulatory systems
Conserve life-history traits and genetic diversity
To act as a tool to regulate levels of natural resource harvest
Marine resources sustained or protected
Individual species protected
Protect rare/important species

Scientific knowledge

Provide a source of baseline data
To provide a testing ground for management
Environmental awareness and knowledge enhanced
Promote research
Allow for baseline monitoring

Educational opportunities

Environmental awareness and knowledge enhanced
Allow creation of education and training areas

To gain better information about marine ecology and human impacts on it

Enhancement of recreational activities and tourism

Promote tourism and recreation
Preserve aesthetic value
Protect intrinsic and/or absolute value of an area

Sustainable environmental benefits

Non-monetary benefits to society enhanced or maintained
Promote sustainable development
Protect intrinsic and/or absolute value of an area
Allow for alternative economic development

Protection of cultural heritage

Compatibility between management and local culture maximized
Protect historic cultural sites

General governance - new category

Effective management structures and strategies maintained
Effective legal structures and strategies for management maintained
Effective stakeholder participation and representation ensured
Management plan compliance by resource users enhanced
Resource use conflicts managed and reduced
Exert political influence or assert jurisdiction
To buffer against unforeseeable future management mistakes (precautionary principle)
To provide a sense of place that people can relate to and in which they can take ownership
To empower local users to have a collective voice in decision-making about resource use and allocation

Stakeholder (local and/or general) capacity building - new category

To provide a sense of place that people can relate to and in which they can take ownership
To empower local users to have a collective voice in decision-making about resource use and allocation
Food security enhanced or maintained
Livelihoods enhanced or maintained
Benefits from the MPA equitably distributed
Environmental awareness and knowledge enhanced
Allow for alternative economic development

Sources: Agardy 1995, Jones 1994, NRC 2001, Pomeroy et al. 2004, Salm et al. 2000.

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