California MLPA Master Plan Science Advisory Team
Draft Comments on the July 2007 Draft North Central Coast Regional Goals and Objectives as Developed by SAT Work Groups
Revised September 12, 2007

At its July 10-11, 2007 meeting, the MLPA North Central Coast Regional Stakeholder Group (NCCRSG) completed a draft regional goals and objectives document, with a number of questions the group asked to be addressed by the MLPA Master Plan Science Advisory Team (SAT). Following are comments and summarized email discussions from the work groups established by the SAT to address the NCCRSG's questions related to the July 2007 version of the draft regional goals and objectives.

Based on provisional SAT work group input at the NCCRSG's August 22-23, 2007 meeting. the goals and objectives were revised; therefore, the work group comments in this document may not be applicable to the August 23, 2007 version of the draft goals and objectives.

Review of the Measurability of the Draft Regional Objectives

Draft response: See specific goals and objectives below; these are primarily addressed in review of specific goals and objectives.

Goal 1, Objective 1 (Sarah Allen, Mark Carr, Steve Gaines)

***SAT workgroup recommendation*:** Include areas of high species diversity and representative habitats in order to protect NATIVE species diversity and abundance consistent with natural fluctuations.

Authors Notes
Comment on wording of Objective 1: Perhaps because Goal 1 includes the terms "area" and various features of communities and populations, the RSG was concerned about the concept of "protecting areas". It is a reasonable and measurable objective to protect a habitat (e.g., a rocky reef, oyster reef, kelp forest, coral reef) and a biological community or population from human perturbations. It is less clear how one would achieve or measure protection of an "area". The rationale behind this goal as described here and meant by the previous RSG, was to *include* habitats within a protected area in order to *protect* the habitats and communities of species that depend upon them. Therefore, the motivation of the NCCRSG to alter wording in these two objectives makes sense and clarity could be brought to these two objectives either by the existing application (although, note the reordering) "Include/protect", or by stating even more directly " Include areas of high species diversity to protect that diversity and species abundance, consistent with natural fluctuations…"

But the other peculiar aspect of this objective is that it seems to mix particularly diverse communities with "populations in representative habitats". Particular and representative are different objectives, both of which contribute to protecting the overall biodiversity in a region. Therefore, in order to stay within the single sentence structure of these objectives, we recommend the following rewording:

"Include areas of high species diversity and representative habitats in order to protect native species diversity and abundance consistent with natural fluctuations."

Comment on measurability of Objective 1: How well the objective of *including* representative habitat is achieved can be measured when the evaluation of habitat representation is made by the SAT during the design process. Two of the key questions will be the amount of habitat included and its quality since the amount and quality of habitat will affect the number of individuals of species that depend on the habitat. Habitat area is relatively easily measured. Habitat quality is usually measured indirectly by surveying species that depend on this habitat. Assessment of whether species diversity is high in areas identified for MPAs can be made either from existing data or when surveys are conducted that measure species diversity within the proposed MPAs (e.g., the baseline monitoring surveys). Because different habitats and habitat features (e.g., vertical relief) are known to support different levels of species diversity, occurrence of these habitats within proposed MPAs can be used to estimate diversity in alternative MPA proposals. Protection of diversity can be measured by monitoring the level of diversity (these are straightforward calculations) inside and outside MPAs and testing whether diversity increases or remains higher in an MPA compared to areas of comparable habitat outside an MPA. These are variables that we are currently monitoring in existing and pending central coast MPAs.

Goal 1, Objective 2 (Sarah Allen, Mark Carr, Steve Gaines)

***SAT work group recommendation*:** Include areas with diverse habitat types in close proximity to each other.

Authors Notes
Comment on wording of Objective 2: As stated above, areas are included, not protected. In recognition that different habitats support different species, the greater the number of habitats included in a protected area can increase the number of species protected in that area if each of the habitats is sufficiently large. Thus, simply stating “Include areas with diverse habitat types in close proximity to each other.” will create MPAs with greater species diversity.

Comment on measurability of Objective 2: Diversity of habitats included in an MPA can be measured (same calculations used to measure species diversity), if not during the design phase, then during the baseline assessment phase. The ability to measure habitat types, habitat area and estimate habitat diversity during the design phase will depend on the resolution of habitat data provided to the process by the staff.

Goal 2, Objective 2 (John Largier, Steven Morgan; this work group also asked Dr. Loo Botsford of the University of California, Davis to provide input into the draft response)

***SAT work group recommendation*:** Sustain or increase *reproduction by* species most likely to benefit from MPAs through retention of large, mature individuals, protection of larval source areas *or* protection of breeding, foraging and rearing areas.
Note: *An increase in lifetime egg production will be an important quantitative measure of an improvement of reproduction.*

Authors Notes

Original version

Protect larval sources and restore reproductive capacity of species most likely to benefit from MPAs through retention of large, mature individuals.

Recommended revision by NCCRSG

Sustain or increase reproductive capacity of species most likely to benefit from MPAs through retention of large, mature individuals, protection of larval source areas and/or protection of breeding, foraging and rearing areas.

A question arose during the NCCRSG meeting regarding the meaning of reproductive capacity and how it might be measured. In response, the RSG included protecting larval sources as part of protecting reproductive capacity and described additional quantifiable aspects of reproductive capacity, including breeding, foraging and rearing areas. The NCCRSG also changed “protect” to “sustain or increase,” which was considered to be more measurable.

The aspect of reproduction that determines equilibrium population level and sustainability, which is caused by fishing and reversed by MPAs is lifetime reproduction. This is the same concept that tells us human populations will remain constant if each couple has only 2 children. For fish populations, we describe it in terms of lifetime egg production (LEP), and we commonly express it as a fraction of the natural, unfished value, FLEP. The SAT approves of the original language but also agrees with the RSG that it would be useful to include “breeding, foraging and rearing areas” along with reproductive capacity and larval sources as needing protection. Therefore, the SAT recommends that “reproductive capacity” be changed to “reproduction,” which includes all of these factors. In addition the SAT recommends that following note be added: "An increase in lifetime egg production will be an important quantitative measure of an improvement of reproduction."

The NCCRSG proposed changing “protect” to “sustain or increase.” Protection is a clear, easily understood goal of MPAs, and the SAT prefers the original language. However, the SAT also understands the desire of the NCCRSG to describe objectives in terms of expected outcomes that can be measured. Thus, the SAT has no objection to substituting “protect” with “sustain or increase.”

The NCCRSG used “and/or” in revisions to this and other objectives. The SAT notes that this phrasing is grammatically unsound. The word “or” alone implies that “and” is a possibility. The SAT recommends that “and/or” be changed to “or” throughout the document to be grammatically correct.

Recommended revision by SAT

Sustain or increase *reproduction by* species most likely to benefit from MPAs through retention of large, mature individuals, protection of larval source areas *or* protection of breeding, foraging and rearing areas. *An increase in lifetime egg production will be an important quantitative measure of an improvement of reproduction.*

Goal 3, Objective 2 (Chris Costello, Caroline Hermans, Gerry McChesney, Astrid Scholz)

***SAT workgroup recommendation*:** Protect or enhance cultural and recreational experiences, including collecting and/or recreational fishing by ensuring the fulfillment, to the best extent possible, of the following: improved catch rates of species explicitly protected by MPAs, ability to fish species not protected by and deriving no benefit from MPA designations, accessibility/convenience (measured by distance to port, availability of boat ramp, access to pier, and/or other access), high scenic value, limited commercial use, less congestion, weather and/or water conditions, suitability for several different types of recreational fishing/collecting, increased size and/or abundance of species.

Goal 4, Objective 1 (Mary Gleason, Dominic Gregorio, Pete Raimondi)

SAT workgroup recommendation: Include within MPAs the following habitat types: estuaries, and the intertidal/subtidal waters around the Farallon Islands.

Authors Notes
For Goal 4, Objective1 - The NCCRSG asked the SAT to identify "unique habitats" in the study region. For purposes of representing unique habitats with important marine resources in the region, the stakeholders should include estuaries and the intertidal/subtidal waters around the Farallon islands.

While estuaries are found along the California coast, the north central coast study region has about 20 square miles of estuaries of several different types. Tomales Bay, for example, is relatively unique due to its long narrow shape (originating along a fault zone), protected waters and varied habitats (deep waters, extensive eelgrass, and mudlfats).

The Farallons are truly unique as offshore islands surrounded by deepwater habitat, located offshore of the outlet of San Francisco Bay, and in an area bathed by nutrient-rich upwelled water from the Pt. Arena-Pt. Reyes upwelling system. They contain a globally significant and unique combination of marine mammal and seabird breeding colonies and have intertidal communities that are distinctly different than on the mainland.

In addition to these two habitats identified as unique and warranting representation in marine protected areas, there are two other features of the region worth considering during MPA planning. First, it should be recognized that intertidal and subtidal habitats north and south of Point Reyes have different biological assemblages (there's a biogeographic break at Point Reyes). Secondly, the freshwater plumes in the region are important for their influence on nearshore communities and for their role as migratory corridors for anadromous fish (salmon, steelhead, sturgeon). The output of San Francisco Bay at the Golden Gate is the largest outflow of estuarine freshwater in the entire state, draining 40% of the California including the Sacramento and San Joaquin Rivers.