

**California MLPA Master Plan Science Advisory Team**  
**Draft Responses to Science Questions Posed during MLPA Public**  
**Meetings and via email in October 2010**  
*Revised November 23, 2010*

This document contains science questions posed to the Marine Life Protection Act (MLPA) Master Plan Science Advisory Team (SAT) during its meeting on October 13-14, 2010, the Blue Ribbon Task Force (BRTF) meeting on October 26-27, 2010, and in writing via [MLPAcomments@resources.dfg.ca.gov](mailto:MLPAcomments@resources.dfg.ca.gov). The SAT will review, revise and potentially approve these questions during their meeting on December 6, 2010.

### Science Questions for the SAT

1. *If the SAT doesn't know the level of tribal take in some areas, how does it create the NCP vs. the SUP evaluations, because there is still some level of take and the SAT doesn't know what it is?*

**Draft Response:** In the north coast study region round 3 evaluations, the SAT provided a supplemental evaluation (SUP) of the NCRSG MPA proposal (NCP). This supplemental evaluation was requested by the BRTF and differed from the standard evaluation in that in addition to all MPAs at moderate-high protection and above, it included MPAs below moderate-high protection if the only proposed uses that reduced the LOP below moderate-high were those intended to accommodate tribal uses. This supplemental evaluation provided the BRTF with valuable information about the habitats included in MPAs that accommodate tribal uses, information that would not otherwise have been readily available. The supplemental evaluation does not, however, specifically evaluate the effects of tribal gathering activities on the marine ecosystem for two reasons:

- 1) the MPAs, as proposed, allow take by all recreational users and thus take is not exclusive to tribes, and
- 2) the LOP decision-making framework does not consider the level of harvest in assigning LOPs because this may vary markedly across space and change through time in unpredictable ways.

Although the supplemental evaluation and LOP assignments do not specifically evaluate the effects of exclusive tribal uses on marine communities, the LOP assignment does provide important information about the *potential* impacts of proposed allowed uses if uses are open to all users and levels of take may be locally intense. With wise management or minimal harvest levels, the realized impacts of harvest activities on the marine ecosystem may be substantially lower than those assessed by the LOP assignment.

2. *What is the measurement for network success in the bioeconomic model?*

**Draft Response:** The bioeconomic model produces two summary statistics describing the performance of the entire MPA network in a region: Total biomass of all species and total fishery yield of all modeled species across the entire study region (i.e., including habitat both inside and outside of MPAs). Because the model explicitly represents connectivity (both due to larval dispersal and adult movement) between habitat inside and outside of MPAs, these statistics reflect the potential for "spillover" from the MPA network to increase biomass and

yield outside of the MPAs. As such, the bioeconomic model addresses the same concept of large-scale connectivity that underpins the size and spacing evaluations, although the model includes an explicit, oceanographic representation of connectivity.

Note that total biomass and total fishery yield are described as measures of "performance." "Success" is a subjective measure of how well a network achieves certain policy goals. Therefore the model cannot evaluate success per se and instead shows results in the context of three scenarios representing alternative fishery management regimes: Conservative, maximum-sustainable yield (MSY)-type, and unsuccessful management. For example, under "MSY-type" and "conservative" fishery management scenarios, the models typically predict that there is a tradeoff between biomass and fishery yield. That is, MPA proposals producing higher biomass have lower fishery yield, and vice versa. In that case, policymakers must weigh the relative benefit of higher biomass vs. reduced yield – the model cannot determine which levels of those two values qualify as "success." However, in some cases, certain MPA proposals are actually predicted to have both higher biomass and higher fishery yield than others (this often occurs in the "unsuccessful" management scenario), in which case it is more straightforward to evaluate success.

Recently, an additional set of calculations has been developed for the model in order to predict changes in genetic connectivity within the network. This could be used as an additional metric of network success. This connectivity metric is intended to evaluate the degree to which the network preserves natural (i.e., unfished) levels of genetic connectivity within the network. However, these calculations do not produce an overall summary statistic for a given network, rather they provide a set of graphical results indicating locations within the MPA network that have reduced connectivity.

To summarize, the models produce two summary statistics of overall network performance and a third metric of connectivity within the network. The two summary statistics describe the degree to which the network is expected to affect total biomass and fishery yield within the study region, while the connectivity metric identifies regions of low connectivity within the network.

**3. *Will the SAT review and approve the urchin adaptive management proposal previously submitted and forward it to the BRTF?***

**Draft Response:** Adaptive management, including research in support of adaptive management, requires consideration during both the design and implementation of a management process (Parma et al 1998). To inform management decisions, such as the spatial design of MPAs, or the activities allowed within MPAs, differences in design criteria need to be explicitly incorporated into the design of an MPA network in a manner that facilitates comparison of the consequences of those differences. In addition to designing networks of MPAs to facilitate adaptive management, monitoring and evaluation studies must be designed and implemented to test the effects of differences in design criteria.

The design of monitoring and evaluation studies is dependent on the design of the MPA network, and is therefore most appropriately addressed subsequent to the creation of the actual network. In the past, the SAT has expressed the value of MPAs for providing unique

research opportunities to inform marine resource management and has offered guidance on how MPAs might be designed to facilitate such research. The SAT has also expressed support for collaborative research and a strong interest in research that informs adaptive management. However, details of the types of research and study designs most effective to support adaptive management should be addressed in greater detail with the appropriate management agencies and input from additional scientific expertise after the implementation of MPAs. Designing studies after MPA implementation will ensure that the questions being asked can be answered within the framework of the actual MPA network. As such, it is inappropriate for the SAT to critique or endorse the specific details of a monitoring proposal until the design of the network has been finalized.

Though the SAT cannot comment on specific details of the design, the general design principles suggested in the attachment to the “urchin adaptive management proposal”<sup>1</sup> describe two alternative and appropriate designs for informing the adaptive management of sea urchin harvest in an MPA network: (1) a single state marine conservation area (SMCA) that allows only urchin harvesting (and possibly other activities that do not confound the effects of urchin harvesting) of sufficient size to include replicate areas with and without urchin harvest, and (2) replicate SMCAs that allow only urchin harvesting (and possibly other activities that do not confound the effects of urchin harvesting) paired with replicate SMRs that do not allow urchin harvesting. Both of these designs provide the key elements for an MPA or a network designed to assess the ecosystem-wide effects of urchin harvest. However, as the attachment indicates and as mentioned above, details of the design (e.g., the number and size of replicate treatment areas within an SMCA or comparisons among whole MPAs) need to be developed further during implementation of the management process.

## **Reference**

Parma, A. M., P. Amarasekare, M. Mangel, J. Moore, W. W. Murdoch, E. Noonburg, M. A. Pascual, H. P. Possingham, K. Shea, C. Wilcox, and D. Yu. 1998. What can adaptive management do for our fish, forests, food and biodiversity? *Integrative Biology, Issues, News, and Reviews* 1:16–26.

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<sup>1</sup> These documents are included in the public comment compilation from October 13, 2010, starting on page 20. Public comments can be found at [http://www.dfg.ca.gov/mlpa/publiccomments\\_nc.asp](http://www.dfg.ca.gov/mlpa/publiccomments_nc.asp).