

**California Marine Life Protection Act Initiative**  
**Methods Used to Evaluate Marine Protected Area Proposals in the**  
**MLPA South Coast Study Region (Draft)**  
**Chapter 10 – Water and Sediment Quality**

*Draft revised March 26, 2009*

## 10.0 WATER AND SEDIMENT QUALITY

**Status of this chapter:** The SAT water quality work group has prepared the draft methods for evaluating water and sediment quality concerns within proposed MPAs for approval by the full SAT.

While water quality is not subject to management under the MLPA, it may be an important consideration in designing MPA proposals. Living marine resources may be substantially affected where water quality is significantly compromised, and may be subject to changes in key population (e.g., abundance, growth, reproduction and mortality) and community (e.g., energetic, diversity, structure and organization) parameters.

### Considering Water Quality in MPA Design

Water bodies that do not meet state water quality standards are placed on California's list of "impaired water bodies" according to Section 303(d) of the federal Clean Water Act. Water quality impairments are designated for a variety of beneficial uses, some of which do not directly affect marine life (e.g., human health due to contact recreation and seafood consumption) and are not a concern for the MLPA (e.g., Santa Monica Bay). The SAT suggests that MPAs may be placed in or near areas of threatened water quality if there are other reasons (e.g., meeting the requirements of habitat representation and replication or MPA size and spacing) to place MPAs in such areas.

Water quality evaluations are not mandated, and should therefore be considered secondary to other MPA design guidelines. Other established SAT guidance, including bioregion criteria, habitat representation and replication, and MPA size and spacing, are recommended to be used as the primary mechanisms to drive the design of alternative MPA proposals. Water quality considerations may be incorporated if other guidelines and criteria have been met.

### Areas of Water Quality Opportunities and Concern

The SAT recommends siting MPAs in areas already designated as an area of special biological significance (ASBS) when designing MPA proposals; ASBSs are a type of state water quality protection area (SWQPA), and provide special protections for the maintenance of natural water quality through stringent limitations and prohibitions of waste discharges. The SAT recommends avoiding, where possible, water quality concern areas, including areas containing or impacted by:

1. cooling water intake sites for power plants,
2. stormwater plumes from larger watersheds and
3. municipal sewage or industrial outfalls.

Both the SWQPAs and water quality concern areas have been identified on Water Quality Maps 1(a-c) through 4(a-c).

Additionally, the SAT has identified the following three specific sites as undesirable locations for MPA placement in the SCSR because they contain water quality and/or sediment conditions that will most likely compromise MPA performance and potentially the ability of an MPA to meet the goals of the MLPA:

- San Onofre Nuclear Power Generating Station (SONGS) intake and discharge pipes (entrainment, impingement and thermal pollution concerns).
- Los Angeles and Long Beach Harbors (large industrial harbors, stormwater discharge concerns, wastewater treatment outfalls, sediment quality concerns, entrainment concerns).
- San Diego Harbor; might also consider avoiding areas in the vicinity of South Bay Power Plant<sup>1</sup> (large industrial harbor, entrainment and sediment quality concerns).

### **Evaluation Methodology**

The SAT determined that the best way to evaluate MPAs with regard to water quality is to allocate scores based on a presence or absence scoring system. This matrix will be established based on whether or not a proposed MPA includes any of the three water quality concern areas. State water quality protection areas will also be included in this matrix, and will act as a positive influence on the score when co-located with MPAs. Final scores for each MPA and the MPA proposal will be an average for each of the category scores. The scores for each water quality concern category are weighted according to the level of concern. Weights are based on the opinion that power plant intakes will have a greater impact on MPA performance than storm water discharges, which in turn have a greater impact than wastewater discharges (see *California MLPA Master Plan Science Advisory Team Draft Recommendations for Considering Water Quality and Marine Protected Areas in the MLPA South Coast Study Region*).

Intakes from power generating facilities are the greatest threat because they operate year round and there is virtually complete mortality for any larvae entrained through the cooling water intake system. Storm runoff is known to be toxic to larvae, but is generally of lesser concern than power plants because the plume extends over an appreciable area only about a dozen or so days per year, following big rainstorms. Nineteen major watershed drainage plumes have been identified that present a noteworthy threat. Wastewater effluents are less of a concern because they are controlled through permits with effluent limitations. However, they still present a pollution threat if effluent limits are violated, and also because sediments in their immediate vicinity sometimes have elevated contaminant concentrations relative to background.

The score for an MPA that is co-located with an area strongly influenced by a power plant

<sup>1</sup> Note: South Bay Power Plant intake may be discontinued in the future due to lease status.

intake anywhere in its boundaries will be reduced by 1.5. Co-location with a major stormwater discharge will reduce the score by 1.0, and co-location with major or intermediate wastewater discharge (either in a major buffer zone or containing an intermediate outfall) will reduce the score by 0.5 (see Table 1).

**Table 1. Scoring table for evaluating MPAs by category (maximum score for each category is 1.0)**

MPA Located in Area of Water Quality Concern	Score Becomes
Power Plant Intake Zone	-1.5
Stormwater Discharge	-1.0
Wastewater Discharge	-0.5
MPA Located in Area of Water Quality Opportunity	Score Increased By
State water quality protection area (including areas of special biological significance)	Between 0 and 1, or fraction thereof (percentage of shoreline coverage)
Overall Scoring	
Final score for each MPA	Average of scores for each category
Final score for MPA proposal	Average of scores for each category across all MPAs

MPAs that do not have water quality areas of concern will receive a score of 1 for each category (power plant intake, storm water or wastewater). MPAs that do have water quality concern areas will have their scores reflect the values in Table 1. Alternatively, an MPA that is co-located with a state water quality protection area scores a maximum of 1.0. This score will be adjusted to match the percentage of shoreline coverage on an MPA from an SWQPA. For example, if 60% of the MPA's shoreline is within the boundaries of an SWQPA, then that MPA will receive a 0.6 score under the SWQPA category. In cases where an MPA totally encompasses a small ASBS (<3 shoreline miles, see Appendix A) then a minimum score of 0.5 will be given. If an MPA is not co-located with a state water quality protection area then it scores 0 for that category. All four categories (power plant intakes, stormwater discharge, wastewater discharge, and SWQPA/ASBS) are then averaged to obtain a final score for each MPA.

Once each MPA receives its final score, the entire proposal is then scored by averaging the scores for each category across all MPAs. In addition to this, each of the four water quality categories will be averaged. The maximum score for each category, individual MPA and MPA proposal is 1.0.

In the example proposal shown in Table 2, MPA One was not placed in any areas of water quality concerns, such as power plant intakes, stormwater discharge or wastewater discharges, therefore a score of 1 was placed under each of these three categories. Additionally, MPA One had a shoreline that was 100% co-located with an ASBS and followed the guidelines listed above for water quality protection area scoring. Therefore, a 1 was placed under that category. MPA One scored the highest possible score or a 1 across all categories. Conversely, MPA Two did not score as well due to co-locating the MPA with a power plant intake zone and with a major or intermediate wastewater discharge. MPA Two also did not receive any additional credit for being co-located with water quality protection areas along its shoreline. Therefore, MPA Two scored low and it may be prudent to revisit the MPA proposal to see if it is possible to adjust the location to better meet the water quality guidelines. In the proposal below, MPA One received the highest possible score (1) while MPA Six received the lowest possible score (-0.75).

**Table 2. Example evaluation for a hypothetical proposal. Values shown are resultant scores for each category and average score for each MPA and entire proposal.**

Example MPAs	Score for Avoiding			Co-Located with a SWQPA	MPA Score (average)
	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/Industrial Discharge Zone		
MPA One	1.0	1.0	1.0	1.0	<b>1.00</b>
MPA Two	-1.5	1.0	-0.5	0.0	<b>-0.25</b>
MPA Three	1.0	-1.0	1.0	0.0	<b>0.25</b>
MPA Four	1.0	-1.0	1.0	0.5	<b>0.38</b>
MPA Five	1.0	1.0	-0.5	1.0	<b>0.63</b>
MPA Six	-1.5	-1.0	-0.5	0.0	<b>-0.75</b>
<b>Scores for Entire Proposal (average)</b>	<b>0.17</b>	<b>0.00</b>	<b>0.25</b>	<b>0.42</b>	<b>0.21</b>

SWQPA = state water quality protection area (which includes areas of special biological significance or ASBSs)

## Appendix A. Existing State Water Quality Protection Areas in the MLPA South Coast Study Region

There are 15 existing state water quality protection areas in the MLPA South Coast Study Region, all designated as areas of special biological significance.

State Water Quality Protection Area Name	Shoreline Coverage (alongshore)
Santa Barbara Island and Anacapa Island ASBS	30.8
Magu Point to Latigo Point ASBS	24.0
San Clemente Island ASBS	58.5
San Miguel, Santa Rosa and Santa Cruz Islands ASBS	194.4
Santa Barbara Island and Anacapa Island ASBS	30.8
San Nicolas Island and Begg Rock ASBS	26.9
Northwest Santa Catalina Island ASBS	20.9
Western Santa Catalina Island ASBS	4.0
Irvine Coast ASBS	3.4
Robert E. Badham ASBS	0.7
Heisler Park ASBS	0.5
San Diego Scripps ASBS	0.6
La Jolla ASBS	1.7
Farnsworth Bank ASBS	0.0
Southeast Santa Catalina Island ASBS	2.9

ASBS = area of special biological significance