

10. 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 marine protected areas (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 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 determined that MPAs may be placed in or near areas of threatened water quality (see above) 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 by the MLPA, and should therefore be considered secondary to other MPA network design guidelines. Other established SAT guidance, including bioregion criteria, habitat representation and replication, and MPA size and spacing, should be used as the primary mechanisms to drive the design of alternative MPA proposals. Water quality considerations should be incorporated if other guidelines and criteria have been met.

Areas of Water Quality Opportunities and Concern

Where possible the SAT recommends siting MPAs in areas already designated as areas of special biological significance (ASBSs) when designing MPA network 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:

- Cooling water intake sites for power plants,
- Storm water plumes from larger watersheds, and
- Municipal sewage or industrial outfalls.

- Both the SWQPAs and water quality concern areas have been identified on Maps 1(a-c) through 4(a-c) at the end of this document.

Additionally, the SAT has identified the following three specific sites as undesirable locations for MPA placement in the SCSR because they contain water quality 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; in addition you might consider avoiding areas in the vicinity of South Bay Power Plant¹ (large industrial harbor, entrainment and sediment quality concerns).

Evaluation Methodology

The SAT determined that the best way to evaluate MPAs in regards to water quality is to allocate scores based on a presence or absence scoring system. A matrix will be established based on whether or not a proposed MPA includes any of the three water quality concern areas listed above. 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 network 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 or over many months 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 their 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. An impact zone of 0.5 mile radius should be given for major wastewater outfalls and 0.25 mile radius for intermediate wastewater outfalls.

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

The score for an MPA that is co-located with an area strongly influenced by a power plant intake anywhere in its boundaries will be -1.5. Co-location with a major stormwater discharge plume will reduce the score by 1.0, and co-location with an impact zone around a major or intermediate wastewater discharge outfall will reduce the score by 0.5. MPAs that do not include water quality concern areas will receive a positive score of 1.

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. If an MPA is not co-located with a state water quality protection area then it scores 0 for that category. Table 1 summarizes the scoring system for each category.

Table 1. Scoring table for evaluating MPAs by category. Maximum score for each category is 1.0.

Water Quality Concern Area	Co-located with Water Quality Concern Area Scores	Not Co-located with Water Quality Concern Area Scores
Power Plant Intake Zone	-1.5	1.0
Stormwater Discharge	-1.0	1.0
Wastewater Discharge	-0.5	1.0
Water Quality Protection Area	Co-located with SWQPA	Not Co-located with SWQPA
SWQPA/ASBS	Between 0 and 1, based on the % of shoreline coverage	0
Final score for each MPA	Average of scores for each category, weighted by multiplying by ratio of MPA shoreline to regional proposal total shoreline	
Final score for regional MPA proposal	Average of scores for each category across all MPAs	

Each of the four water quality categories will be averaged for each individual MPA and will be weighted by a ratio of its coastal length to the coastal length of the entire proposal; this will result in a final score for each MPA. Once each individual MPA receives its final score the entire proposal is then scored by averaging the scores for each category and the individual MPA final score across all MPAs.

In the example proposal below (Table 2), Example 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, Example 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. Example MPA One scored the highest possible score or a 1 across all categories. Conversely, Example 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. Example MPA Two also did not receive any additional credit for being co-located

with water quality protection areas along its shoreline. Therefore, Example 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, Example MPA One received the highest score (21) while Example MPA Six received the lowest score (0).

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

MPAs	Shoreline Length	Score for Avoiding			Co-Located with an SWQPA/ASBS	MPA Score Weighted Average ¹
		Power Plant Intake Zone	Stormwater Discharge Zone	Wastwater Discharge Zone		
Example MPA One	5	1.00	1.00	1.00	1.00	21
Example MPA Two	3	-0.50	1.00	0.50	0.00	3
Example MPA Three	4	1.00	0.00	1.00	0.00	8
Example MPA Four	5	1.00	0.00	1.00	0.5	13
Example MPA Five	3	1.00	1.00	0.50	1.00	11
Example MPA Six	4	-0.50	0.00	0.50	0.00	0
Scores for Entire Proposal (avg.)	24	0.50	0.50	0.75	0.42	9

¹ The final weighted average score is the average across all four categories, multiplied by the ratio of the individual MPA shoreline length to the total shoreline length in the entire regional proposal. This score is then multiplied by 100 to reach a whole number.

Appendix A. Names and shoreline lengths of water quality protection areas in the MLPA South Coast Study Region.

State Water Quality Protection Area/ASBS Name	Shoreline Coverage (Alongshore Span)
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 (offshore, no shore line)	0.0
Southeast Santa Catalina Island- ASBS	2.9