

**Note: This evaluation has not been updated to reflect the revised SCRSG proposals and IPA**

**California MLPA Master Plan Science Advisory Team**  
**Summary of SAT Water and Sediment Quality Evaluation of Round 3**  
**SCRSG MPA Proposals for the MLPA South Coast Study Region**  
*(Draft revised October 7, 2009)*

**Overview of MPA Proposal Evaluations Regarding Water and Sediment Quality**

While water quality is not subject to management under the Marine Life Protection Act (MLPA), it may be an important consideration in designing marine protected area (MPA) proposals. Where water quality is significantly compromised, living marine resources may be substantially affected, being subject to changes in key population parameters, such as abundance, growth, reproduction, and mortality, and community parameters such as energetic, diversity, structure and organization. Quality of water and sediment is a concern in the MLPA South Coast Study Region (SCSR) and should be considered during the MPA planning and design process. However, it is important to remember that water-quality evaluations are not mandated by the MLPA, and should therefore be considered secondary to other MPA design guidelines. Water-quality considerations should be incorporated if other guidelines and criteria have been met.

All of the proposals in Round 3 did very well in adhering to the MLPA Master Plan Science Advisory Team's (SAT) water-quality guidelines within the constraints posed by the highly developed southern California coastline. The differences among proposals with respect to water quality are minor relative to other criteria established by the SAT, and should not be a substantive factor in choosing among them.

This document discusses evaluation considerations and compares results for existing MPAs (Proposal 0 [P0]) and for the MLPA South Coast Regional Stakeholder Group (SCRSG) MPA proposals (SCRSG MPA Proposal 1 [P1], SCRSG MPA Proposal 2 [P2], and SCRSG MPA Proposal 3 [P3]).

***Evaluation Considerations***

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. The scoring system gives a range of values with 0.0 being the least desirable, and the range of 0.75 to 1.0 considered the most desirable. The upper range is influenced by the co-location of MPAs with areas of special biological significance (ASBSs). For example, MPAs that are absent any areas of water-quality concern and are completely within an ASBS would receive 1.0, the highest possible score. MPAs that are absent any areas of water-quality concern and are *not* co-located with an ASBS would score a 0.75. This 0.75 score is the upper threshold that a score could get without the presence of an ASBS, or in other words, 0.75 is a very favorable score. Anything less than 0.75 indicates MPA co-location with an area having one or more water-quality concerns. Methods for these analyses are described in an associated document: *Draft Methods Used to Evaluate Marine Protected Area Proposals in the South Coast Study Region* ("Evaluation Methods Document"). The scoring tables in the appendices can also be used as a reference if clarification is needed.

On September 10, 2009, the SCRSG finalized three Round 3 draft MPA proposals that were advanced for evaluation. All three draft proposals, and Proposal 0 (existing state MPAs), were

evaluated for water quality. This evaluation was based on the presence or absence of the following scoring categories:

- Cooling-water intake sites for power plants
- Stormwater plumes from larger watersheds
- Municipal sewage or industrial wastewater outfalls
- Co-location with an ASBS (State Water Quality Protection Areas)

This summary document focuses on comparisons among all four proposals described above and their scores based on the four scoring categories.

All proposals include bays, estuaries or lagoons, due to the important role these systems play in the marine ecosystem and because they include one or more of the many SAT-defined key habitats that should be included in MPA proposals. These embayments are productive and essential to the marine system as a whole largely because of their enclosed, protected nature at the mouths of coastal streams. Their productivity is related to natural nutrient deposition from coastal streams. However, the influence of developed watersheds also makes them vulnerable to pollution, and the runoff zones associated with many of the coastal streams have been identified as areas of water-quality concern. Anthropogenic eutrophication from developed watersheds can upset the natural nutrient balance in these embayments. Toxic pollutants, also derived from watershed runoff and from anthropogenic activities on the shoreline, adhere to the sediments in bays and estuaries. Therefore, the greater the number of bay and estuary MPAs included in a proposal, the greater the chance that the proposal's overall score will be reduced. However, not all bay and estuary MPAs are considered impacted enough to receive a reduced water-quality score. Appendix A provides maps of sediment quality in those embayments included in the proposals; each station result provides information on the relative status of sediment toxicity, sediment chemistry, and benthic community condition.

The SAT also discovered an idiosyncrasy with the scoring system that unequally weights scores for bays and estuaries relative to the open coast. Per unit of area, semi-enclosed bays and estuaries have shoreline lengths roughly double those of straight shorelines along the open coast. Therefore, shoreline lengths for bays and estuaries were reduced by half to make the weighting more proportional to the actual MPA area. In addition, there are no ASBSs currently designated in enclosed bays and estuaries. For all these reasons, the SAT decided it would be clearer and more informative to provide, within each proposal, separate evaluations of open coast MPAs and of MPAs located in bays and estuaries.

### ***MPA Proposals Evaluated***

All of the proposals in Round 3 did very well in adhering to the SAT's water-quality guidelines within the constraints posed by the highly developed southern California coastline. The

differences among proposals with respect to water quality are minor relative to other criteria established by the SAT for establishing MPAs.

All proposals did well at avoiding power plant intakes in both coastal MPAs and in MPAs located in bays and estuaries. All proposals did have some MPAs that will be impacted by stormwater discharge. Most of these MPAs were located in the southern half of the study region near San Diego. Likewise, MPAs located at Mugu Lagoon also received a reduced score due to the concern associated with the Calleguas Creek discharge system. All proposals avoided major wastewater or industrial plant outfalls. However, all three proposals had MPAs that intersected the outer edges of two intermediate wastewater treatment plants' quarter-mile buffer zones, while one proposal had an intermediate outfall completely contained within the MPA. It should be stressed that intermediate wastewater outfalls have the lowest associated concern. Proposal 1 and Proposal 2 included MPAs that intersect the outer edge of the City of Avalon's outfall buffer zone (Lover's Cove SMCA). Proposal 1 included an MPA near the outer edge of the Aliso Creek outfall's buffer zone (Dana Point SMCA). Proposal 3 included an MPA near the San Elijo outfall's buffer zone (Swami's SMCA), and Laguna Beach SMR, which contained the Aliso Creek outfall completely within the MPA.

On another note, there were several instances where proposals did a good job of avoiding areas of water-quality concern by either 1) not extending the MPAs offshore, thus avoiding overlap with municipal discharge zones, as at the Tijuana River Mouth MPAs, or 2) placing boundaries just short of a municipal discharge zone as at MPAs near the Goleta outfall). All proposals did well to avoid the San Onofre Nuclear Generating Station's intake zone, the Los Angeles Harbor, San Diego Bay, and both the Portuguese Bend landslide and the EPA superfund site on the Palos Verdes peninsula. Proposal 0 scored slightly higher than all new proposals; this is due to the very small size of MPAs with water-quality concerns; also, small MPAs are less likely to encounter water-quality concern zones than MPAs meeting the SAT's size guidelines.

The inclusion of the 13 Northern Channel Islands (NCI) MPAs equally in all proposals helped to improve overall weighted scores due to co-location with large ASBSs at those island MPAs (Figure 1). In addition to being co-located with ASBSs, none of the NCI MPAs are co-located with areas of water-quality concern. Therefore all of the NCI MPAs receive the highest score of 1.0 (Table 1). Non-inclusive of the NCI MPAs, the various proposals included between 7 and 10 ASBSs in coastal<sup>1</sup> MPAs.

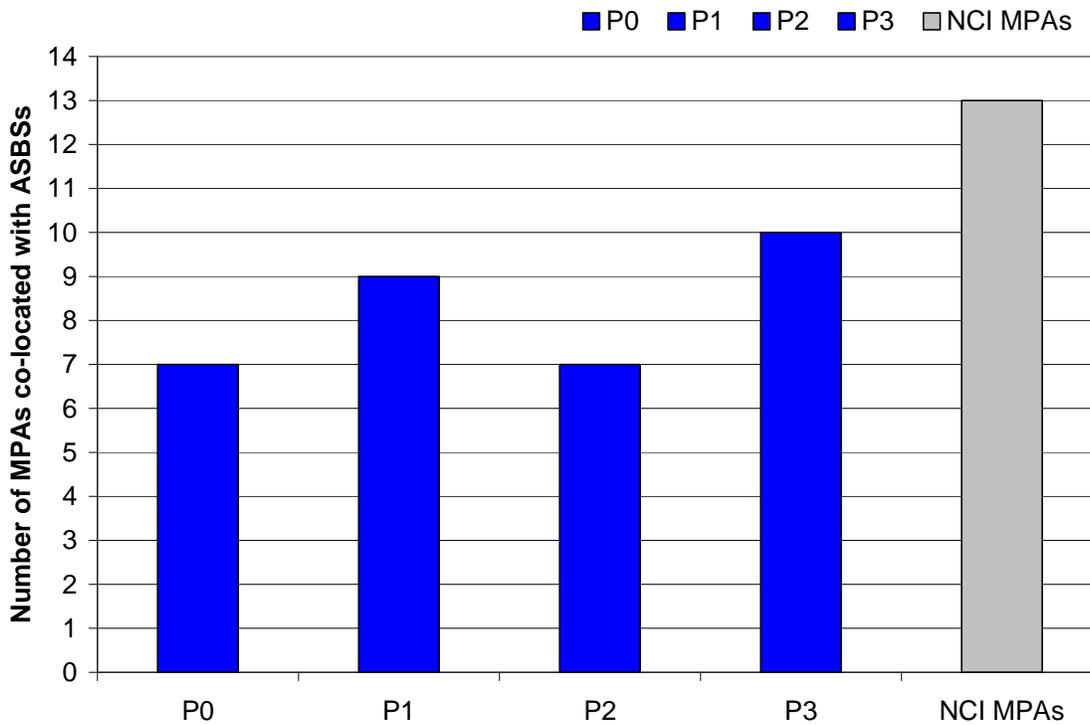
All of the submitted proposals included the special military closures at San Clemente Island. All of the waters around San Clemente Island are an ASBS. It should be noted that there is a small exclusion zone located within the ASBS at Wilson Cove that allows the discharge from a small treatment plant; however, this discharge is considered by the SAT to be a minor wastewater outfall that will not result in significant impacts when operated within the constraints of its National Pollution Discharge Elimination System (NPDES) permit. Likewise, Proposal 3 also included an MPA (San Diego – Scripps Coastal SMCA) co-located with an

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<sup>1</sup> The use of the term "coastal MPA" in this document refers to both mainland and island MPAs not located in bays or estuaries.

ASBS, and all submitted proposals included an MPA at Santa Catalina Island (Blue Cavern) co-located with an ASBS; both of these proposed MPAs contain marine laboratory waste seawater discharges (from the Scripps Institution of Oceanography and the Wrigley Marine Science Center respectively). Again, these discharges are considered by the SAT to be a minor wastewater outfall that will not result in significant impacts when operated within the constraints of its NPDES permit.

**Figure 1. Number of coastal MPAs co-located with ASBS, with Northern Channel Islands (NCI) shown separately**



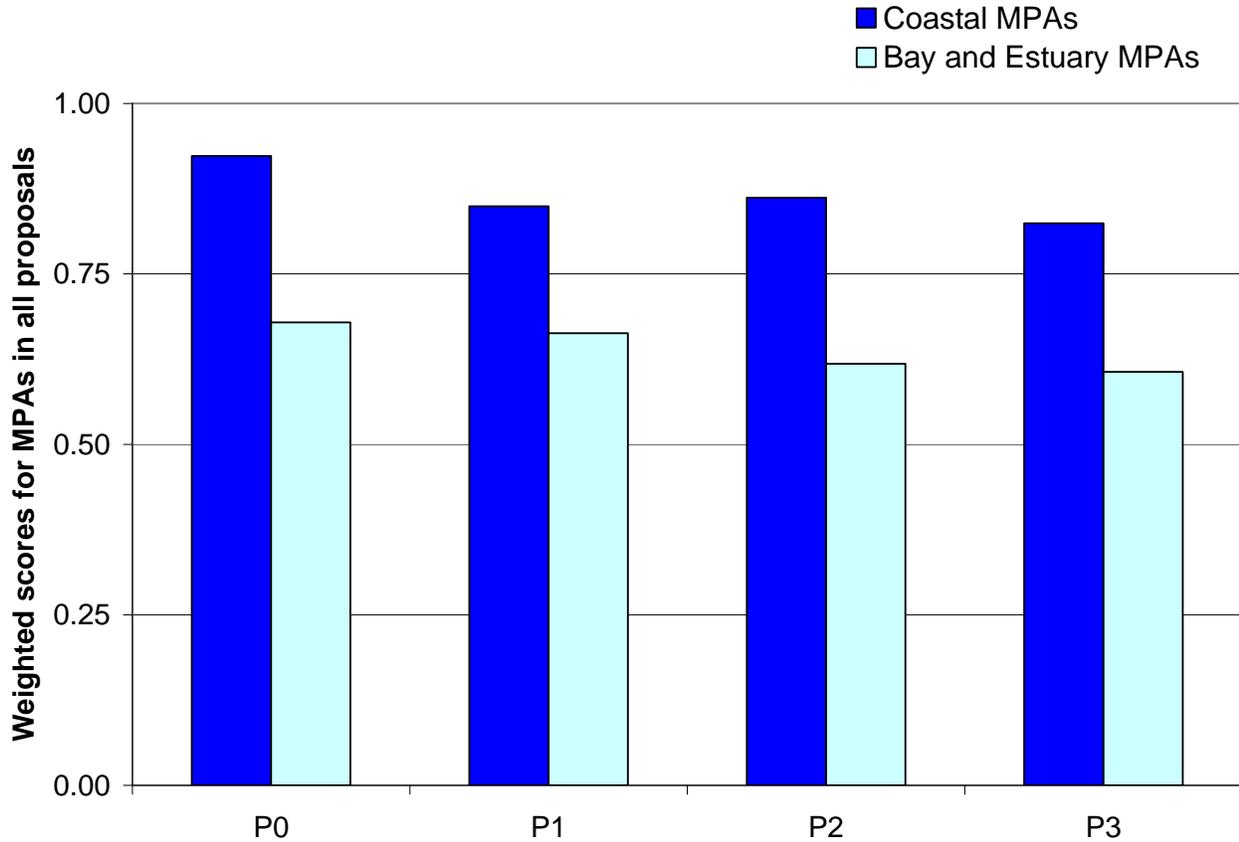
**Table 1. Water-quality evaluation scores for existing Northern Channel Islands MPS, all of which are co-located with ASBS**

Existing NCI MPAs Co-located with ASBS	Average Score
Anacapa Island SMCA	1.00
Anacapa Island SMR	1.00
Carrington Point SMR	1.00
Footprint SMR	1.00
Gull Island SMR	1.00
Harris Point SMR	1.00
Judith Rock SMR	1.00
Painted Cave SMCA	1.00
Richardson Rock SMR	1.00
Santa Barbara Island SMR	1.00
Scorpion SMR	1.00
Skunk Point SMR	1.00
South Point SMR	1.00

***Coastal MPAs Summary***

All proposals scored very well for coastal MPAs, with all proposal scores greater than 0.75 (Figure 2). The difference between the highest and lowest scores was negligible. Of the three proposals submitted for evaluation, Proposal 2 had the most favorable coastal MPAs scores followed by Proposal 1 and then Proposal 3, although the difference was very small.

**Figure 2. Scores for all water-quality evaluation categories in a given proposal**

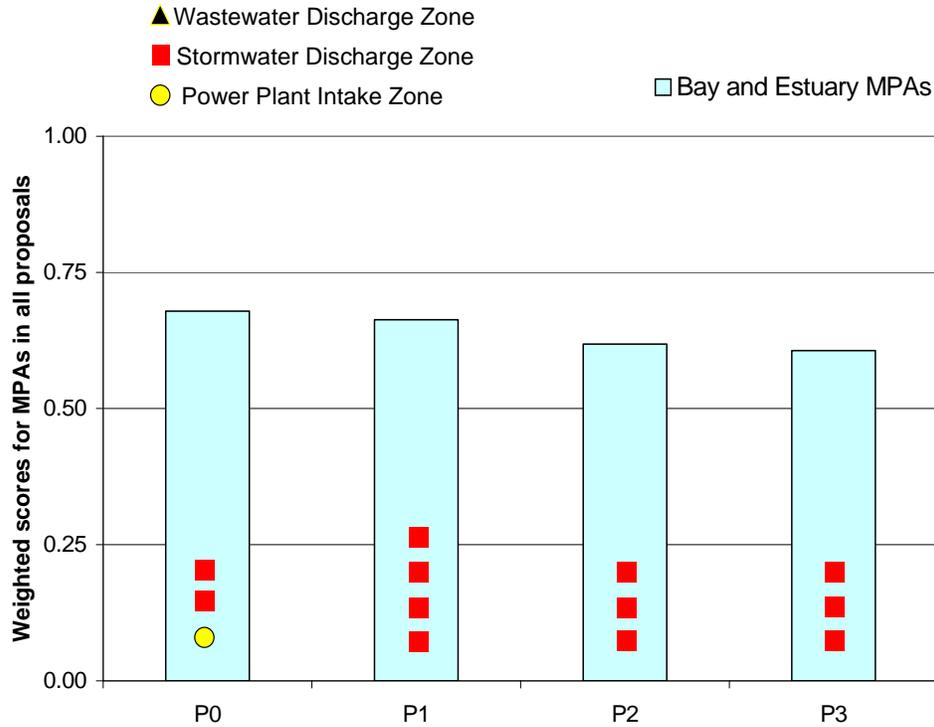


*Note: Scores between 0.75 and 1.0 indicate MPA placement without areas of water-quality concern. Scores less than 0.75 indicate placement of MPAs within areas of water-quality concern.*

### **Bay and Estuary MPAs Summary**

The bay and estuary MPAs scored lower than coastal MPAs for all proposals, with scores ranging from 0.61-0.66 (Figures 2 and 3). This was expected because of the reasons discussed above. All of the proposals included stormwater plumes in certain bay and estuary MPAs. Proposals 2 and 3 included the fewest major stormwater plumes in embayment MPAs, but scored lower overall than Proposal 1 because they included fewer embayment MPAs that are unaffected by stormwater plumes. It is important to state that all of the proposals did very well in excluding power plant intakes in bay and estuary MPAs. Overall, for bay and estuary MPAs, Proposal 1 had the best water-quality score, although the other two proposals also scored well. All three proposals improved on those of the previous round in avoiding water-quality concerns within bays and estuaries.

**Figure 3. Weighted scores and the associated water-quality concerns for all Round 2 proposals**



*Note: Stormwater discharge zones were the dominant concern in each proposal that included bays and estuaries.*

The following individual summaries focus on the specific co-location with areas of water-quality concern and water-quality opportunities (ASBSs). By reviewing the individual MPA proposal charts and tables, it is possible to determine which, if any, MPAs could be adjusted to include areas without water-quality concerns. Again, these considerations should be secondary and supplemental to other SAT guidelines, such as size, spacing, and habitat representation and replication.

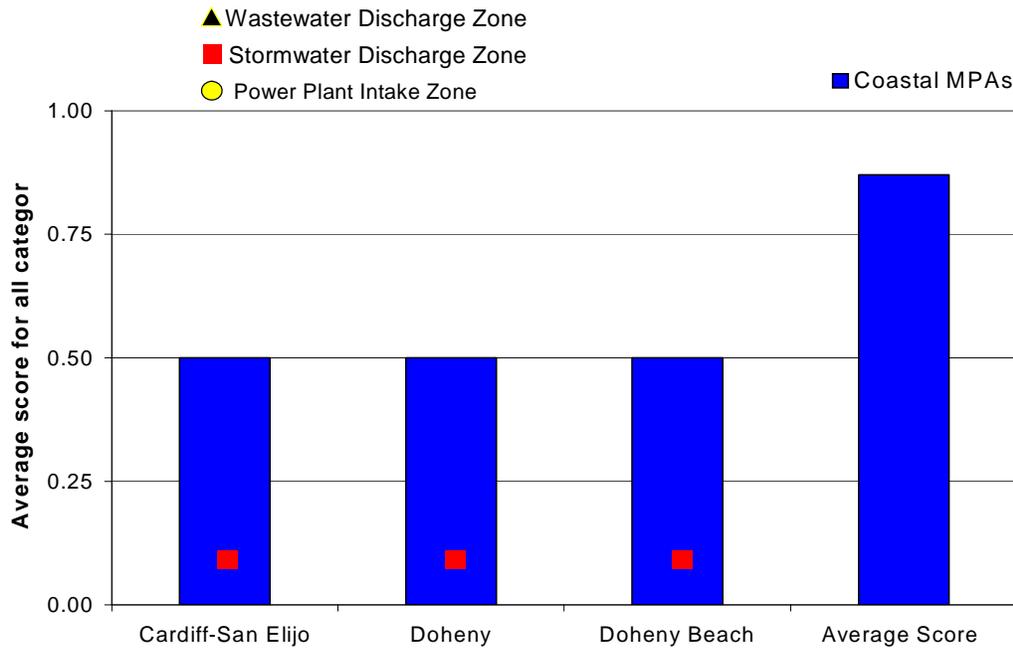
**Proposal 0: Individual Summary**

Proposal 0 comprises the 42 existing MPAs, which include 13 in the NCI and 29 in the remainder of the study region. Excluding the NCI MPAs, there are 22 MPAs located along the coast and seven located in bays and estuaries.

Of the existing MPAs in bays and estuaries, 57% (four of seven) scored well (0.75). There is one existing MPA co-located in a bay with a power plant intake (Encina Power Plant at Agua Hedionda Lagoon) and two located in lagoons connected to major stormwater discharge zones: San Elijo Lagoon at Escondido Creek and San Dieguito Lagoon at San Dieguito Creek.

The average score for existing coastal MPAs is 0.87. Excluding the NCI, 19 out of 22 coastal MPAs (86%) scored 0.75 or higher. Also excluding the NCI, seven of 22 (32%) existing MPAs are co-located within ASBSs (Table 2). Only three out of 22 coastal MPAs scored lower than 0.75 (located within stormwater discharge plumes at San Juan and Escondido Creeks) (Figure 4).

**Figure 4. Proposal 0: scores for coastal MPAs with water-quality concerns**



**Table 2. Water-quality evaluation scores for Proposal 0 that had water-quality concerns and/or were co-located with ASBSs**

Existing Coastal MPAs	Average Score
Cardiff-San Elijo	0.50
Doheny	0.50
Doheny Beach	0.50
Existing Bay and Estuary MPAs	Average Score
Agua Hedionda Lagoon	0.38
San Dieguito Lagoon	0.50
San Elijo Lagoon	0.50
Existing MPAs Co-located with ASBSs*	Average Score
Laguna Beach	0.77
Heisler Park	0.97
La Jolla	0.97
Irvine Coast SMCA	1.00
Robert E Badham	1.00
San Diego-Scripps	1.00
Big Sycamore Canyon	1.00

\* Note: Does not include NCI MPAs. See Appendix B for the breakdown of these scores.

### **Proposal 1: Individual Summary**

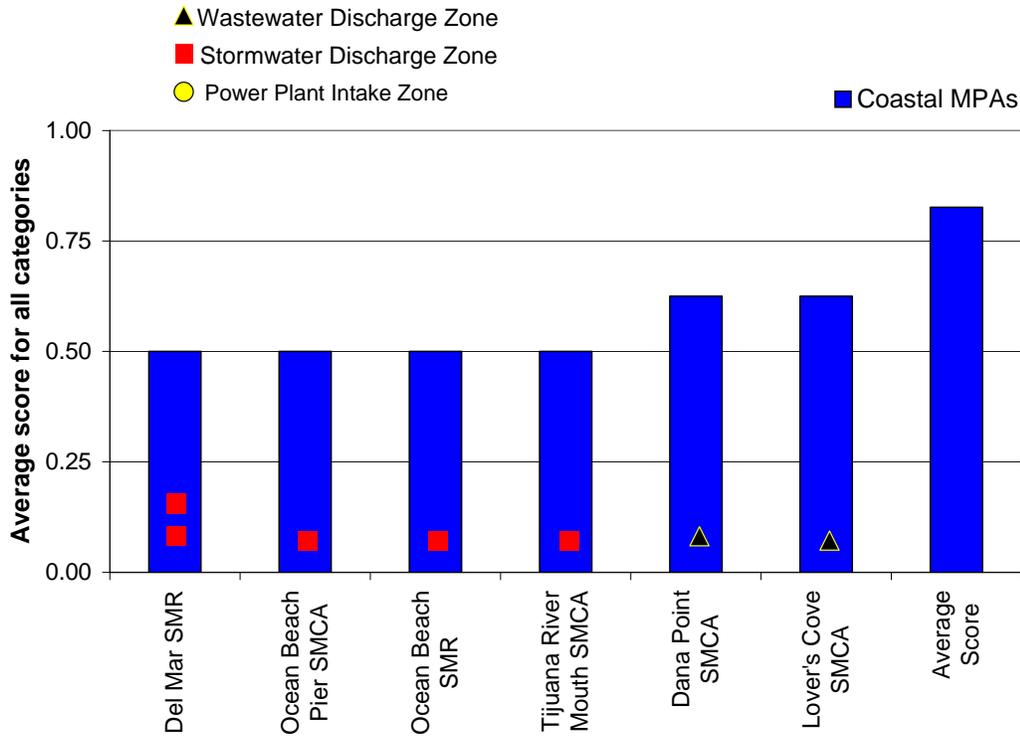
Proposal 1 consists of 52 MPAs, which include 13 in the NCI and 39 in the remainder of the study region.

Exactly 60% of the Proposal 1 MPAs located in bays and estuaries scored well (0.75); four out of ten MPAs located in bays and estuaries scored lower than 0.75. These four MPAs were co-located with major stormwater discharge zones as follows: Los Peñasquitos Marsh SMR (Los Peñasquitos Creek), San Dieguito Lagoon SMR (San Dieguito Creek), San Elijo Lagoon SMR (Escondido Creek), and Formosa Slough SMR (San Diego River). This proposal avoided all the power plant intake zones found within bay and estuaries.

The average score for Proposal 1 coastal MPAs is 0.83 (Figure 5). Excluding the NCI, 23 out of 29 (79%) coastal MPAs scored 0.75 or higher. Excluding the NCI, 9 of 29 (31%) coastal MPAs are co-located within ASBSs (Table 3). There were six coastal MPAs that scored lower than 0.75. Four coastal MPAs (Del Mar SMR, Ocean Beach Pier SMCA, Ocean Beach SMR, and Tijuana River Mouth SMCA) received reduced scores because they were located within major stormwater discharge zones (San Dieguito and Peñasquitos Creeks, San Diego River, and Tijuana River respectively). Del Mar SMR was located within two stormwater discharge zones; the San Dieguito and Peñasquitos Creeks can be found on either side of this MPA. Two coastal MPAs (Lover’s Cove SMCA and Dana Point SMCA) received reduced scores because

each intersected an intermediate wastewater outfall’s quarter-mile buffer zone (Avalon outfall and Aliso Creek outfall, respectively). It is important to note that these two MPAs did not contain the entire outfall but slightly intersected the outer edge of the outfall’s buffer zone.

**Figure 5. Proposal 1: Scores for coastal MPAs with water-quality concerns**



**Table 3. Proposed MPAs by the Proposal 1 group that either had water-quality concerns and/or were co-located with ASBSs**

Coastal MPAs	Average Score
Del Mar SMR	0.50
Ocean Beach Pier SMCA	0.50
Ocean Beach SMR	0.50
Tijuana River Mouth SMCA	0.50
Dana Point SMCA	0.63
Lover's Cove SMCA	0.63
Bay and Estuary MPAs	Average Score
Los Peñasquitos Marsh SMR	0.50
San Dieguito Lagoon SMR	0.50
San Elijo Lagoon SMR	0.50
Famosa Slough SMR	0.50
MPAs Co-located with ASBSs*	Average Score
Laguna SMR	0.80
Begg Rock SMR	0.82
Crystal Cove SMCA	0.94
La Jolla Cove SMR	0.97
Emerald Bay SMCA	1.00
Point Dume SMCA	1.00
Point Dume SMR	1.00
San Clemente Pending Military Closure 1	1.00
San Clemente Pending Military Closure 2	1.00

\* Note: Does not include NCI MPAs. See Appendix C for the breakdown of these scores.

### **Proposal 2: Individual Summary**

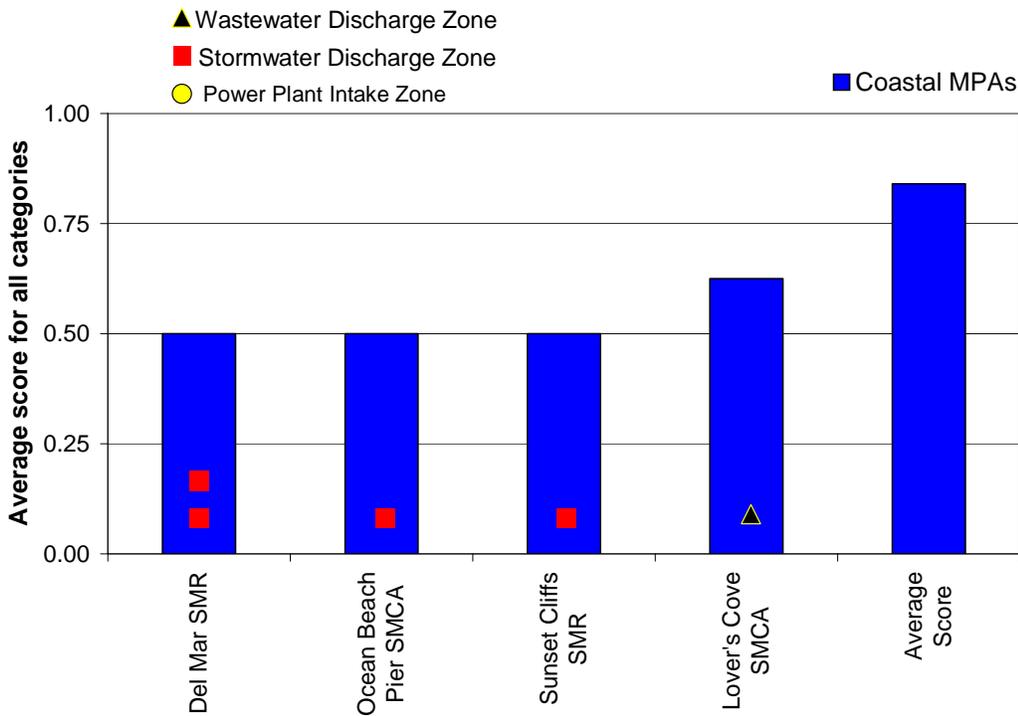
Proposal 2 consists of 40 MPAs, which includes 13 in the NCI and 27 in the remainder of the study region.

Only 50% of the Proposal 2 MPAs located in bays and estuaries scored well (0.75); three out of six MPAs located in bays and estuaries scored lower than 0.75. All of these lower-scoring MPAs were co-located with major stormwater discharge zones as follows: Point Mugu SMRMA with Calleguas Creek, San Dieguito Lagoon SMR with San Dieguito Creek, and Formosa Slough SMR with the San Diego River. This proposal avoided all the power plant intake zones found within bays and estuaries.

The average score for Proposal 2 coastal MPAs is 0.84 (Figure 6). Excluding the NCI, 17 out of 21 (81%) coastal MPAs scored 0.75 or higher. Excluding the NCI, 7 of 21 (33%) coastal MPAs are co-located within ASBSs (Table 3). There were four coastal MPAs that scored lower than 0.75. Three coastal MPAs (Del Mar SMR, Ocean Beach SMCA, and Sunset Cliffs SMR)

received reduced scores because they were located within major stormwater discharge zones (San Dieguito and Peñasquitos Creeks and San Diego River). One coastal MPA (Lover's Cove SMCA) is co-located with a wastewater discharge zone (Avalon outfall). This MPA slightly touches the outfall's quarter-mile buffer zone.

**Figure 6. Proposal 2. Scores for coastal MPAs with water-quality concerns and the proposal's average score**



**Table 4. Proposed MPAs by the Proposal 2 group that either had water-quality concerns and/or were co-located with ASBSs**

Coastal MPAs	Average Score
Del Mar SMR	0.50
Ocean Beach Pier SMCA	0.50
Sunset Cliffs SMR	0.50
Lover's Cove SMCA	0.63
Bay and Estuary MPAs	Average Score
San Dieguito Lagoon SMR	0.50
Point Mugu SMRMA	0.50
Famosa Slough SMR	0.50
MPAs Co-located with ASBSs*	Average Score
Laguna SMR	0.79
Begg Rock SMR	0.82
Laguna North SMCA	0.93
La Jolla SMR	0.97
Point Dume SMCA	1.00
San Clemente Pending Military Closure 1	1.00
San Clemente Pending Military Closure 2	1.00

\* Note: Does not include NCI MPAs. See Appendix D for the breakdown of these scores.

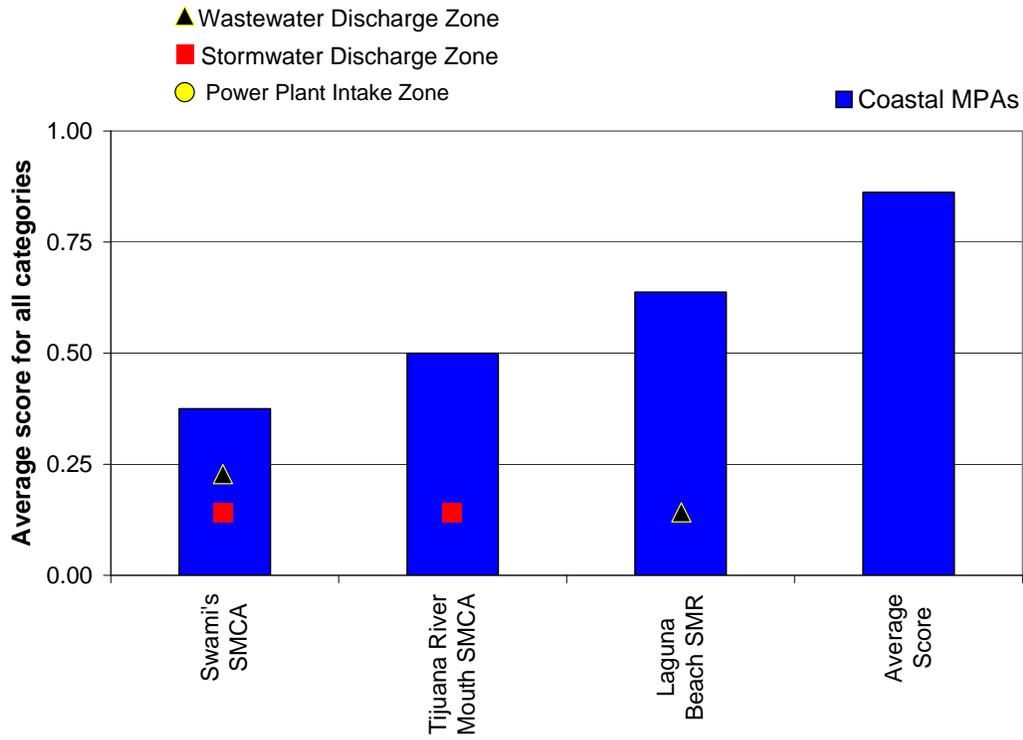
### **Proposal 3: Individual Summary**

Proposal 3 consists of 43 MPAs, which include 13 in the NCI and 30 in the remainder of the study region.

Nearly 57% of the Proposal 3 MPAs located in bays and estuaries scored well (0.75); three out of seven MPAs located in bays and estuaries scored lower than 0.75. All of these MPAs with reduced scores were co-located with major stormwater discharge zones as follows: Mugu Lagoon SMRMA with Calleguas Creek, San Elijo Lagoon SMR with Escondido Creek, and San Dieguito Lagoon SMR with San Dieguito Creek. This proposal avoided all the power plant intake zones found within bays and estuaries.

The average score for Proposal 3 coastal MPAs is 0.86 (Figure 7). Excluding the NCI, 20 out of 23 (87%) coastal MPAs scored 0.75 or higher. Excluding the NCI, 10 of 23 (43%) coastal MPAs are co-located within ASBSs (Table 3). There were three coastal MPAs that scored lower than 0.75. Two coastal MPAs (Swami's SMCA and Tijuana River Mouth SMCA) received reduced scores because they were located within major stormwater discharge zones (Escondido Creek and Tijuana River). Swami's SMCA is also co-located with a wastewater discharge zone (San Elijo outfall), while Laguna Beach SMR has a wastewater discharge zone completely contained within it (Aliso Creek outfall).

Figure 7. Proposal 3. Scores for coastal MPAs with water-quality concerns



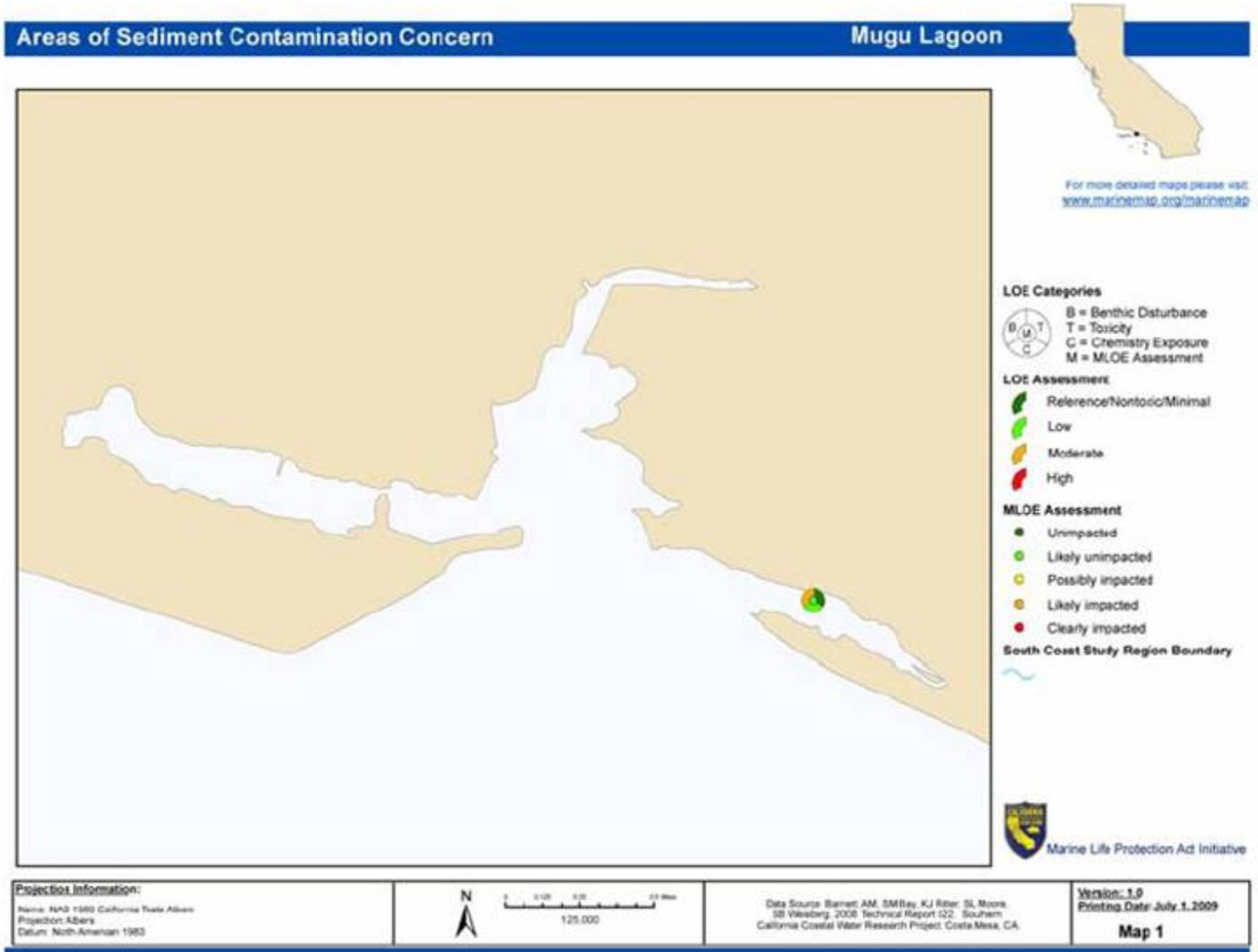
**Table 5. Proposed MPAs by the Proposal 3 group that either had water-quality concerns and/or were co-located with ASBSs**

Coastal MPAs	Average Score
Swami's SMCA	0.38
Tijuana River Mouth SMCA	0.50
Laguna Beach SMR	0.64
Bay and Estuary MPAs	Average Score
Mugu Lagoon SMRMA	0.50
San Elijo Lagoon SMR	0.50
San Dieguito Lagoon SMR	0.50
MPAs Co-located with ASBSs*	Average Score
Laguna Beach SMR	0.64
San Diego-Scripps Coastal SMCA	0.83
Newport Coast SMCA	0.96
Matlahuayl SMR	0.97
Lachusa SMCA	1.00
North Catalina SMR	1.00
Point Dume SMR	1.00
San Clemente Pending Military Closure 1	1.00
San Clemente Pending Military Closure 2	1.00
San Nicolas Alpha Area Military Closure	1.00

\* Note: Does not include NCI MPAs. See Appendix E for the breakdown of these scores.

**Appendix A. Maps (1 through 5) of the available sediment quality sample results in those embayments included in the proposals**

Each station result provides information on the relative status of sediment toxicity, sediment chemistry, and benthic community condition.

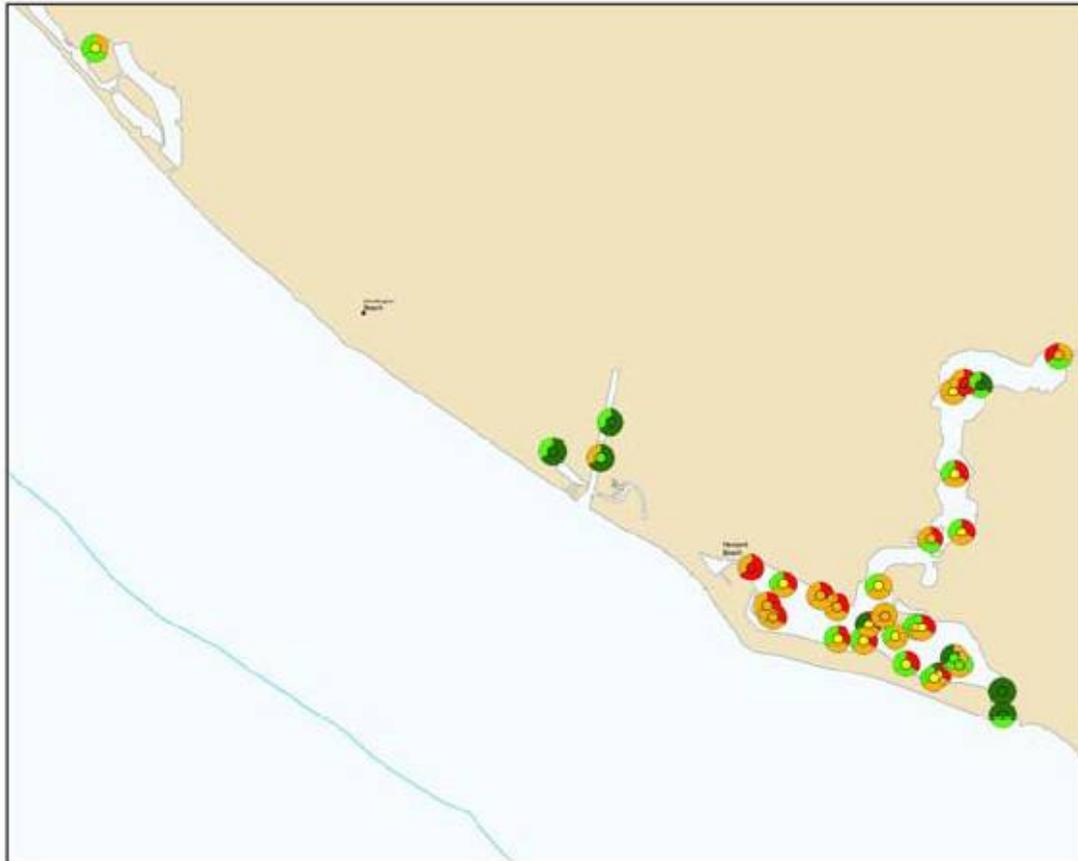


Areas of Sediment Contamination Concern

Bolsa Chica and Newport Bay



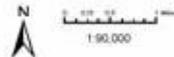
For more detailed maps please visit:  
[www.marinemap.org/marinemap](http://www.marinemap.org/marinemap)



- LOE Categories**
- B = Benthic Disturbance
  - T = Toxicity
  - C = Chemistry Exposure
  - M = MLOE Assessment
- LOE Assessment**
- Reference/Nontoxic/Minimal
  - Low
  - Moderate
  - High
- MLOE Assessment**
- Unimpacted
  - Likely unimpacted
  - Possibly impacted
  - Likely impacted
  - Clearly impacted
- South Coast Study Region Boundary**



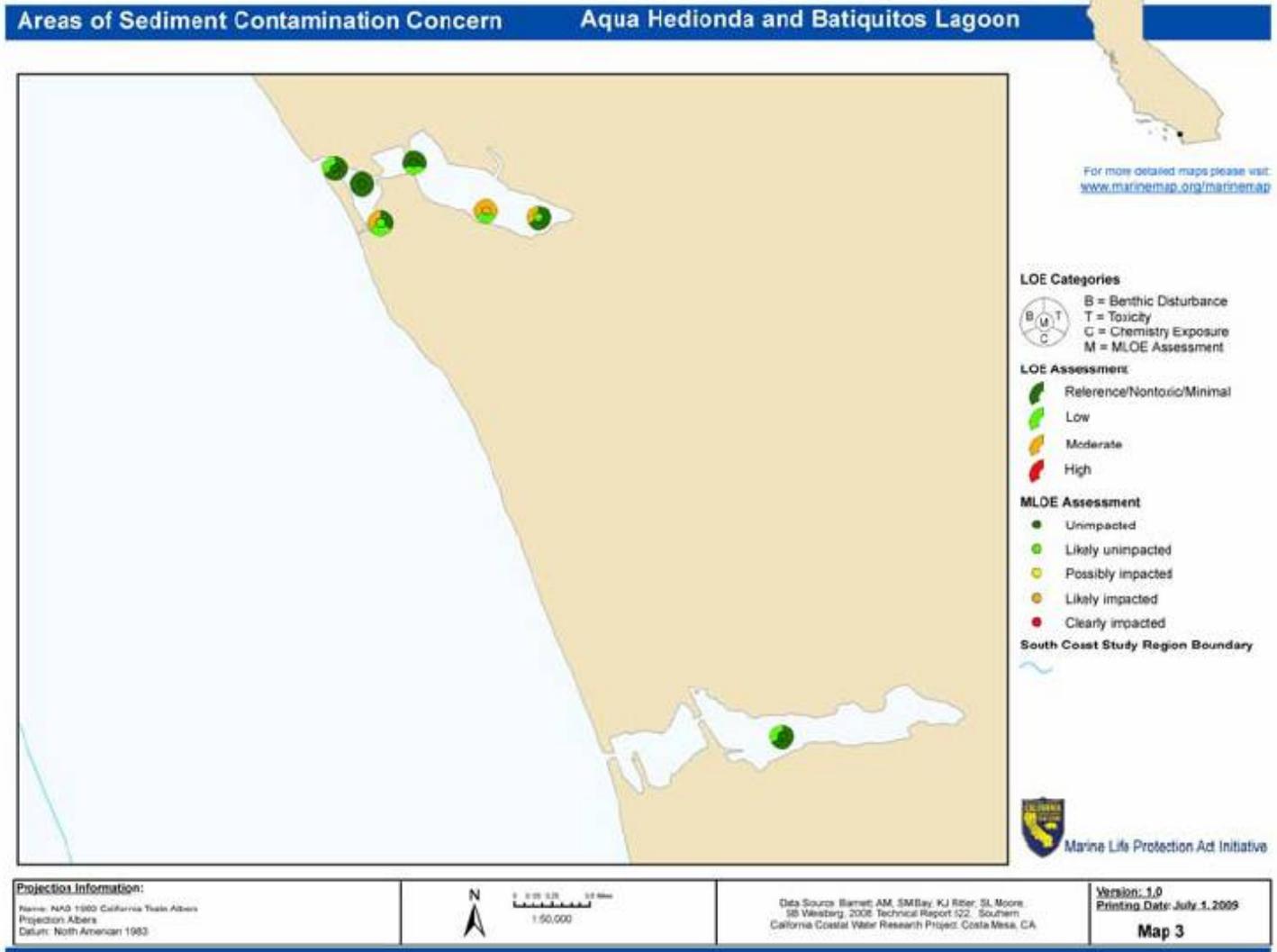
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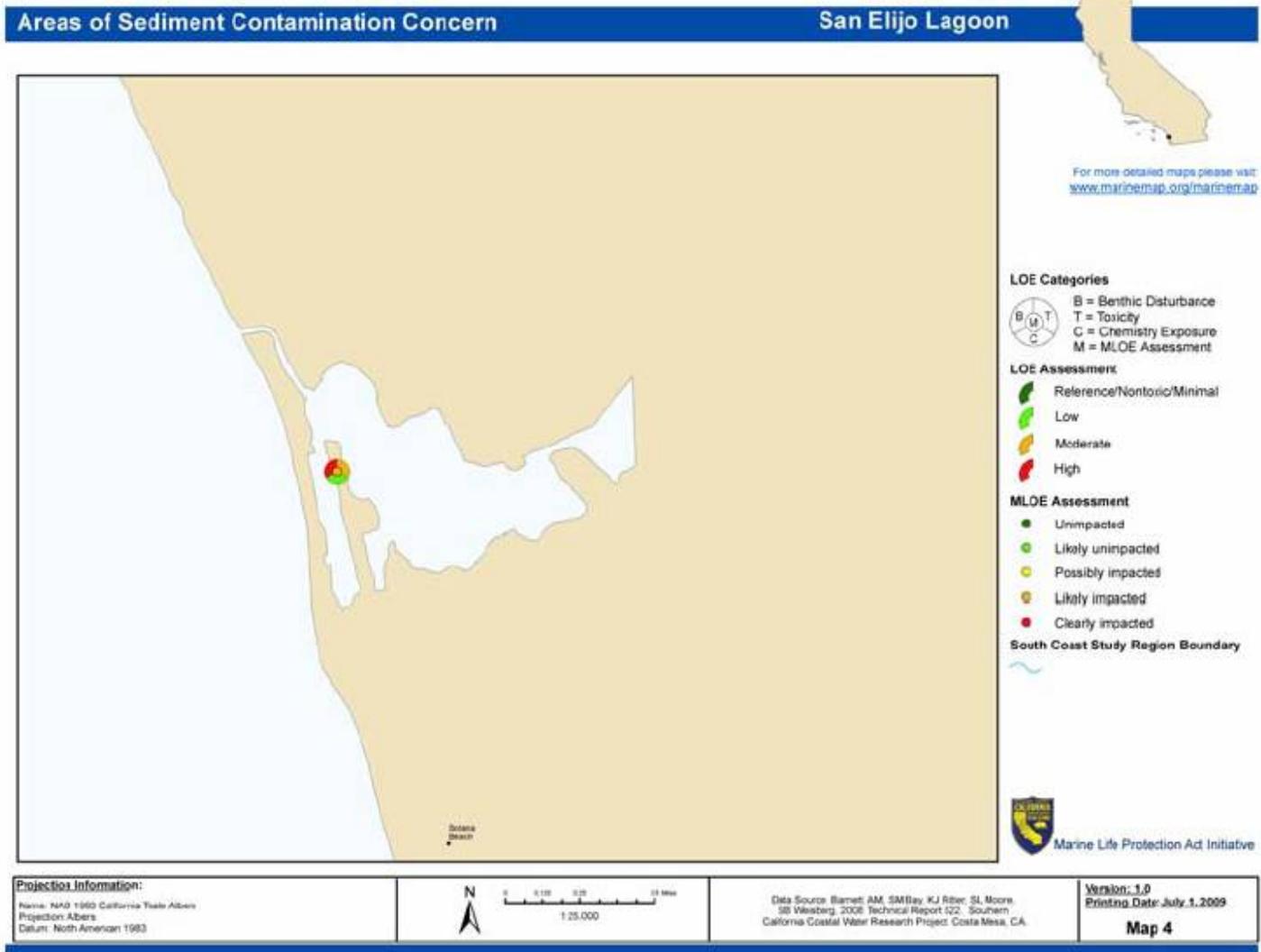


Data Source: Garner, AM, SMiley, KJ, Riber, SL, Moore, SB, Weisberg, 2008. Technical Report 122. Southern California Coastal Water Research Project, Costa Mesa, CA.

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 Printing Date: July 1, 2009

Map 2



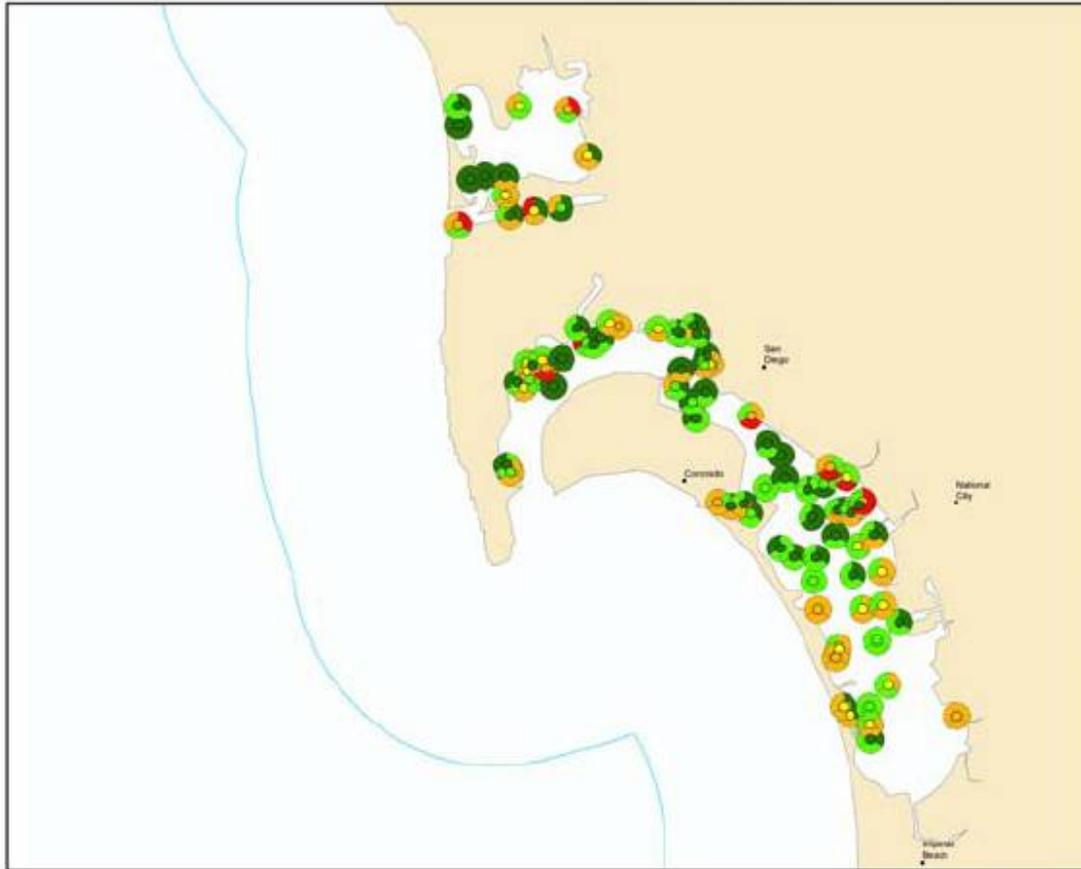


Areas of Sediment Contamination Concern

Mission Bay and San Diego Bay



For more detailed maps please visit  
[www.marinemap.org/marinemap](http://www.marinemap.org/marinemap)



**LOE Categories**  
 B = Benthic Disturbance  
 T = Toxicity  
 C = Chemistry Exposure  
 M = MLOE Assessment

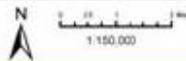
**LOE Assessment**  
 Reference/Nontoxic/Minimal  
 Low  
 Moderate  
 High

**MLOE Assessment**  
 Unimpacted  
 Likely unimpacted  
 Possibly impacted  
 Likely impacted  
 Clearly impacted

South Coast Study Region Boundary



**Projection Information:**  
 Name: NAD 1983 California State Albers  
 Projection: Albers  
 Datum: North American 1983



Data Source: Barnett, AM, SM Bay, KJ Ester, St. Moore,  
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Version: 1.0  
 Printing Date: July 1, 2009

**Map 5**

**Appendix B. Raw scoring table for Proposal 0 based on SAT water-quality evaluation methods**

	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co- Located with an ASBS	Average Category Score	Weighted Score
<u>Coastal MPAs</u>							
Cardiff-San Elijo SMP	2.22	1.00	0.00	1.00	0.00	0.50	0.01
Doheny Beach SMCA	1.33	1.00	0.00	1.00	0.00	0.50	0.01
Doheny SMCA	1.39	1.00	0.00	1.00	0.00	0.50	0.01
Abalone Cove SMP	1.13	1.00	1.00	1.00	0.00	0.75	0.01
Catalina Marine Science Center SMR	1.19	1.00	1.00	1.00	0.00	0.75	0.01
Dana Point SMCA	0.88	1.00	1.00	1.00	0.00	0.75	0.01
Farnsworth Bank SMCA	1.16	1.00	1.00	1.00	0.00	0.75	0.01
Lover's Cove SMCA	0.37	1.00	1.00	1.00	0.00	0.75	0.00
Mia J Tegner SMCA	0.68	1.00	1.00	1.00	0.00	0.75	0.01
Niguel SMCA	2.31	1.00	1.00	1.00	0.00	0.75	0.02
Point Fermin SMP	0.51	1.00	1.00	1.00	0.00	0.75	0.00
Refugio SMCA	2.61	1.00	1.00	1.00	0.00	0.75	0.02
South Laguna Beach SMCA	0.47	1.00	1.00	1.00	0.00	0.75	0.00
Encinitas SMCA	0.46	1.00	1.00	1.00	0.00	0.75	0.00
Laguna Beach SMCA	5.05	1.00	1.00	1.00	0.09	0.77	0.05
Heisler Park SMR	0.40	1.00	1.00	1.00	0.88	0.97	0.00
La Jolla SMCA	1.94	1.00	1.00	1.00	0.88	0.97	0.02
Anacapa Island SMCA	2.45	1.00	1.00	1.00	1.00	1.00	0.03
Anacapa Island SMR	4.19	1.00	1.00	1.00	1.00	1.00	0.05
Big Sycamore Canyon SMR	2.27	1.00	1.00	1.00	1.00	1.00	0.03
Carrington Point SMR	5.94	1.00	1.00	1.00	1.00	1.00	0.07
Crystal Cove SMCA	3.28	1.00	1.00	1.00	1.00	1.00	0.04
Footprint SMR	4.70	1.00	1.00	1.00	1.00	1.00	0.05
Gull Island SMR	3.28	1.00	1.00	1.00	1.00	1.00	0.04
Harris Point SMR	8.17	1.00	1.00	1.00	1.00	1.00	0.9
Irvine Coast SMCA	3.26	1.00	1.00	1.00	1.00	1.00	0.04
Judith Rock SMR	1.84	1.00	1.00	1.00	1.00	1.00	0.02
Painted Cave SMCA	2.82	1.00	1.00	1.00	1.00	1.00	0.03
Richardson Rock SMR	6.50	1.00	1.00	1.00	1.00	1.00	0.08
Robert E Badham SMCA	0.69	1.00	1.00	1.00	1.00	1.00	0.01
San Diego-Scripps SMCA	0.49	1.00	1.00	1.00	1.00	1.00	0.01
Santa Barbara Island SMR	1.08	1.00	1.00	1.00	1.00	1.00	0.01
Scorpion SMR	3.83	1.00	1.00	1.00	1.00	1.00	0.04

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	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co- Located with an ASBS	Average Category Score	Weighted Score
Skunk Point SMR	2.52	1.00	1.00	1.00	1.00	1.00	0.03
South Point SMR	4.73	1.00	1.00	1.00	1.00	1.00	0.05
<b>Average Score</b>		<b>1.00</b>	<b>0.91</b>	<b>1.00</b>	<b>0.57</b>	<b>0.87</b>	<b>0.92</b>
<u>Bays and Estuaries MPAs</u>							
Agua Hedionda Lagoon SMR	0.39	-0.50	1.00	1.00	0.00	0.38	0.01
San Dieguito Lagoon SMP	1.40	1.00	0.00	1.00	0.00	0.50	0.04
San Elijo Lagoon SMP	3.40	1.00	0.00	1.00	0.00	0.50	0.09
Batiquitos Lagoon SMP	2.07	1.00	1.00	1.00	0.00	0.75	0.08
Upper Newport Bay SMP	4.32	1.00	1.00	1.00	0.00	0.75	0.17
Goleta Slough SMP	4.42	1.00	1.00	1.00	0.00	0.75	0.18
Bolsa Chica SMP	2.87	1.00	1.00	1.00	0.00	0.75	0.11
<b>Average Category Score</b>		<b>0.79</b>	<b>0.71</b>	<b>1.00</b>	<b>0.00</b>	<b>0.63</b>	<b>0.68</b>

**Appendix C. Raw scoring table for Proposal 1 based on SAT water-quality evaluation methods**

	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co-Located with an ASBS	Average Category Score	Weighted Score
<u>Coastal MPAs</u>							
Del Mar SMR	3.79	1.00	0.00	1.00	0.00	0.50	0.01
Ocean Beach Pier SMCA	0.20	1.00	0.00	1.00	0.00	0.50	0.00
Ocean Beach SMR	3.00	1.00	0.00	1.00	0.00	0.50	0.01
Tijuana River Mouth SMCA	1.69	1.00	0.00	1.00	0.00	0.50	0.01
Dana Point SMCA	5.63	1.00	1.00	0.50	0.00	0.63	0.03
Lover's Cove SMCA	0.56	1.00	1.00	0.50	0.00	0.63	0.00
Blue Cavern SMR	3.28	1.00	1.00	1.00	0.00	0.75	0.02
Cabrillo SMR	1.39	1.00	1.00	1.00	0.00	0.75	0.01
Casino Point SMCA	0.09	1.00	1.00	1.00	0.00	0.75	0.00
Cat Harbor SMCA	2.66	1.00	1.00	1.00	0.00	0.75	0.02
Farnsworth SMCA	2.56	1.00	1.00	1.00	0.00	0.75	0.01
Footprint SMR	15.33	1.00	1.00	1.00	0.00	0.75	0.09
Helo SMR	4.13	1.00	1.00	1.00	0.00	0.75	0.02
Kashtayit SMP	1.44	1.00	1.00	1.00	0.00	0.75	0.01
La Jolla South SMCA	1.28	1.00	1.00	1.00	0.00	0.75	0.01
La Jolla South SMR	1.35	1.00	1.00	1.00	0.00	0.75	0.01
Long Point SMR	3.75	1.00	1.00	1.00	0.00	0.75	0.02
Naples SMCA	2.07	1.00	1.00	1.00	0.00	0.75	0.01
Palos Verdes SMR	0.97	1.00	1.00	1.00	0.00	0.75	0.01
Point Conception SMR	4.44	1.00	1.00	1.00	0.00	0.75	0.03
Point Fermin SMCA	0.84	1.00	1.00	1.00	0.00	0.75	0.00
Richardson Rock SMR	0.00	1.00	1.00	1.00	0.00	0.75	0.00
Laguna SMR	7.57	1.00	1.00	1.00	0.20	0.80	0.05
Begg Rock SMR	0.00	1.00	1.00	1.00	0.27	0.82	0.00
Crystal Cove SMCA	3.78	1.00	1.00	1.00	0.77	0.94	0.03
La Jolla Cove SMR	1.94	1.00	1.00	1.00	0.88	0.97	0.01
Anacapa Island SMCA	2.51	1.00	1.00	1.00	1.00	1.00	0.02
Anacapa Island SMR	4.19	1.00	1.00	1.00	1.00	1.00	0.03
Carrington Point SMR	5.94	1.00	1.00	1.00	1.00	1.00	0.05
Emerald Bay SMCA	1.92	1.00	1.00	1.00	1.00	1.00	0.01
Gull Island SMR	3.28	1.00	1.00	1.00	1.00	1.00	0.02
Harris Point SMR	8.17	1.00	1.00	1.00	1.00	1.00	0.06
Judith Rock SMR	1.84	1.00	1.00	1.00	1.00	1.00	0.01
Painted Cave SMCA	2.82	1.00	1.00	1.00	1.00	1.00	0.02
Point Dume SMCA	4.52	1.00	1.00	1.00	1.00	1.00	0.03
Point Dume SMR	2.80	1.00	1.00	1.00	1.00	1.00	0.02
San Clemente Pending Military Closure 1	1.69	1.00	1.00	1.00	1.00	1.00	0.01
San Clemente Pending Military Closure 2	6.09	1.00	1.00	1.00	1.00	1.00	0.05

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	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co-Located with an ASBS	Average Category Score	Weighted Score
Santa Barbara Island SMR	1.08	1.00	1.00	1.00	1.00	1.00	0.01
Scorpion SMR	3.83	1.00	1.00	1.00	1.00	1.00	0.03
Skunk Point SMR	2.52	1.00	1.00	1.00	1.00	1.00	0.02
South Point SMR	4.73	1.00	1.00	1.00	1.00	1.00	0.04
<b>Average Score</b>		<b>1.00</b>	<b>0.90</b>	<b>0.98</b>	<b>0.43</b>	<b>0.83</b>	<b>0.85</b>
<u>Bays and Estuaries MPAs</u>							
Los Peñasquitos Marsh SMR	1.87	1.00	0.00	1.00	0.00	0.50	0.03
San Dieguito Lagoon SMR	3.37	1.00	0.00	1.00	0.00	0.50	0.06
San Elijo Lagoon SMR	3.44	1.00	0.00	1.00	0.00	0.50	0.06
Famosa Slough SMR	1.41	1.00	0.00	1.00	0.00	0.50	0.02
Goleta Slough SMR	4.42	1.00	1.00	1.00	0.00	0.75	0.11
Carpinteria Salt Marsh SMR	2.25	1.00	1.00	1.00	0.00	0.75	0.06
Devereux Lagoon SMR	1.23	1.00	1.00	1.00	0.00	0.75	0.03
Batiquitos Lagoon SMR	2.80	1.00	1.00	1.00	0.00	0.75	0.07
Upper Newport Bay SMCA	4.33	1.00	1.00	1.00	0.00	0.75	0.11
Bolsa Chica SMCA	4.59	1.00	1.00	1.00	0.00	0.75	0.11
<b>Average Score</b>		<b>1.00</b>	<b>0.60</b>	<b>1.00</b>	<b>0.00</b>	<b>0.65</b>	<b>0.66</b>

**Appendix D. Raw scoring table for Proposal 2 based on SAT water-quality evaluation methods**

	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial/ Discharge Zone	Co- Located with an ASBS	Average Category Score	Weighted Score
<u>Coastal MPAs</u>							
Del Mar SMR	3.68	1.00	0.00	1.00	0.00	0.50	0.02
Ocean Beach Pier SMCA	0.41	1.00	0.00	1.00	0.00	0.50	0.00
Sunset Cliffs SMR	2.89	1.00	0.00	1.00	0.00	0.50	0.01
Lover's Cove SMCA	0.56	1.00	1.00	0.50	0.00	0.63	0.00
Abalone Cove SMCA	1.65	1.00	1.00	1.00	0.00	0.75	0.01
Bird Rock SMCA	2.22	1.00	1.00	1.00	0.00	0.75	0.01
Blue Cavern SMR	3.28	1.00	1.00	1.00	0.00	0.75	0.02
Cabrillo SMR	1.40	1.00	1.00	1.00	0.00	0.75	0.01
Campus Point SMR	3.28	1.00	1.00	1.00	0.00	0.75	0.02
Casino Point SMR	0.09	1.00	1.00	1.00	0.00	0.75	0.00
Farnsworth SMCA	4.80	1.00	1.00	1.00	0.00	0.75	0.03
Footprint SMR	15.33	1.00	1.00	1.00	0.00	0.75	0.10
Laguna South SMCA	8.17	1.00	1.00	1.00	0.00	0.75	0.05
Point Conception SMR	5.43	1.00	1.00	1.00	0.00	0.75	0.03
Point Vicente SMR	1.56	1.00	1.00	1.00	0.00	0.75	0.01
Richardson Rock SMR	0.00	1.00	1.00	1.00	0.00	0.75	0.00
Laguna SMR	2.51	1.00	1.00	1.00	0.17	0.79	0.02
Begg Rock SMR	0.00	1.00	1.00	1.00	0.27	0.82	0.00
Laguna North SMCA	5.44	1.00	1.00	1.00	0.73	0.93	0.04
La Jolla SMR	1.94	1.00	1.00	1.00	0.88	0.97	0.02
Anacapa Island SMCA	2.51	1.00	1.00	1.00	1.00	1.00	0.02
Anacapa Island SMR	4.19	1.00	1.00	1.00	1.00	1.00	0.04
Carrington Point SMR	5.95	1.00	1.00	1.00	1.00	1.00	0.05
Gull Island SMR	3.29	1.00	1.00	1.00	1.00	1.00	0.03
Harris Point SMR	8.17	1.00	1.00	1.00	1.00	1.00	0.07
Judith Rock SMR	1.84	1.00	1.00	1.00	1.00	1.00	0.02
Painted Cave SMCA	2.82	1.00	1.00	1.00	1.00	1.00	0.02
Pending Military Closures							
SCI 1	1.69	1.00	1.00	1.00	1.00	1.00	0.01
Pending Military Closures							
SCI 2	6.09	1.00	1.00	1.00	1.00	1.00	0.05
Point Dume SMCA	5.64	1.00	1.00	1.00	1.00	1.00	0.05
Santa Barbara Island							
SMR	1.08	1.00	1.00	1.00	1.00	1.00	0.01
Scorpion SMR	3.83	1.00	1.00	1.00	1.00	1.00	0.03
Skunk Point SMR	2.52	1.00	1.00	1.00	1.00	1.00	0.02
South Point SMR	4.73	1.00	1.00	1.00	1.00	1.00	0.04
<b>Average Score</b>		<b>1.00</b>	<b>0.91</b>	<b>0.99</b>	<b>0.46</b>	<b>0.84</b>	<b>0.86</b>
<u>Bays and Estuaries MPAs</u>							
San Dieguito Lagoon	3.74	1.00	0.00	1.00	0.00	0.50	0.06

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	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co- Located with an ASBS	Average Category Score	Weighted Score
SMR							
Point Mugu SMRMA	12.06	1.00	0.00	1.00	0.00	0.50	0.19
Famosa Slough SMR	0.71	1.00	0.00	1.00	0.00	0.50	0.01
Bolsa Chica SMCA	4.56	1.00	1.00	1.00	0.00	0.75	0.11
Upper Newport Bay SMCA	5.86	1.00	1.00	1.00	0.00	0.75	0.14
Goleta Slough SMR	4.42	1.00	1.00	1.00	0.00	0.75	0.11
<b>Average Score</b>		<b>1.00</b>	<b>0.50</b>	<b>1.00</b>	<b>0.00</b>	<b>0.63</b>	<b>0.62</b>

**Appendix E. Raw scoring table for Proposal 3 based on SAT Water-quality evaluation methods**

MPA	Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/Industrial Discharge Zone	Co-Located with an ASBS	Average Category Score	Weighted Score
<u>Coastal MPAs</u>							
Swami's SMCA	2.84	1.00	0.00	0.50	0.00	0.38	0.00
Tijuana River Mouth SMCA	3.47	1.00	0.00	1.00	0.00	0.50	0.01
Laguna Beach SMR	8.87	1.00	1.00	0.50	0.05	0.64	0.03
Blue Cavern SMR	3.32	1.00	1.00	1.00	0.00	0.75	0.01
Cabrillo SMR	2.05	1.00	1.00	1.00	0.00	0.75	0.01
Dana Point SMCA	2.85	1.00	1.00	1.00	0.00	0.75	0.01
Farnsworth SMR	6.67	1.00	1.00	1.00	0.00	0.75	0.03
Footprint SMR	15.33	1.00	1.00	1.00	0.00	0.75	0.08
Long Point SMR	2.56	1.00	1.00	1.00	0.00	0.75	0.01
Mishopsno SMCA	8.23	1.00	1.00	1.00	0.00	0.75	0.04
Naples SMR	2.07	1.00	1.00	1.00	0.00	0.75	0.01
Palos Verdes SMR	5.39	1.00	1.00	1.00	0.00	0.75	0.03
Point Conception SMR	6.40	1.00	1.00	1.00	0.00	0.75	0.03
Richardson Rock SMR	0.00	1.00	1.00	1.00	0.00	0.75	0.00
South La Jolla Reefs SMR	3.35	1.00	1.00	1.00	0.00	0.75	0.02
UCSB SMR	3.32	1.00	1.00	1.00	0.00	0.75	0.02
San Diego-Scripps Coastal SMCA	1.19	1.00	1.00	1.00	0.32	0.83	0.01
Newport Coast SMCA	4.72	1.00	1.00	1.00	0.84	0.96	0.03
Matlahuayl SMR	2.10	1.00	1.00	1.00	0.89	0.97	0.01
Lachusa SMCA	3.71	1.00	1.00	1.00	1.00	1.00	0.02
North Catalina SMR	4.91	1.00	1.00	1.00	1.00	1.00	0.03
Point Dume SMR	4.19	1.00	1.00	1.00	1.00	1.00	0.03
Anacapa Island SMCA	2.51	1.00	1.00	1.00	1.00	1.00	0.02
Anacapa Island SMR	4.19	1.00	1.00	1.00	1.00	1.00	0.03
Carrington Point SMR	5.94	1.00	1.00	1.00	1.00	1.00	0.04
Gull Island SMR	3.28	1.00	1.00	1.00	1.00	1.00	0.02
Harris Point SMR	8.17	1.00	1.00	1.00	1.00	1.00	0.05
Judith Rock SMR	1.84	1.00	1.00	1.00	1.00	1.00	0.01
Painted Cave SMR	2.82	1.00	1.00	1.00	1.00	1.00	0.02
San Clemente Pending Military Closure 1	1.69	1.00	1.00	1.00	1.00	1.00	0.01
San Clemente Pending Military Closure 2	6.09	1.00	1.00	1.00	1.00	1.00	0.04
San Nicolas Alpha Area Military Closure	4.36	1.00	1.00	1.00	1.00	1.00	0.03
Santa Barbara Island SMR	1.08	1.00	1.00	1.00	1.00	1.00	0.01
Scorpion SMR	3.83	1.00	1.00	1.00	1.00	1.00	0.03
Skunk Point SMR	2.52	1.00	1.00	1.00	1.00	1.00	0.02
South Point SMR	4.73	1.00	1.00	1.00	1.00	1.00	0.03
<b>Average Score</b>		<b>1.00</b>	<b>0.94</b>	<b>0.97</b>	<b>0.53</b>	<b>0.86</b>	<b>0.82</b>

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	MPA Shoreline Length (Miles)	Power Plant Intake Zone	Stormwater Discharge Zone	Municipal/ Industrial Discharge Zone	Co-Located with an ASBS	Average Category Score	Weighted Score
<u>Bays and Estuaries MPAs</u>							
Mugu Lagoon SMRMA	12.05	1.00	0.00	1.00	0.00	0.50	0.16
San Elijo Lagoon SMR	4.41	1.00	0.00	1.00	0.00	0.50	0.06
San Dieguito Lagoon SMR	4.54	1.00	0.00	1.00	0.00	0.50	0.06
Upper Newport Bay SMR	3.43	1.00	1.00	1.00	0.00	0.75	0.07
Batiquitos Lagoon SMR	3.60	1.00	1.00	1.00	0.00	0.75	0.07
Bolsa Chica SMR	4.10	1.00	1.00	1.00	0.00	0.75	0.08
Goleta Slough SMR	4.41	1.00	1.00	1.00	0.00	0.75	0.09
<b>Average Score</b>		<b>1.00</b>	<b>0.57</b>	<b>1.00</b>	<b>0.00</b>	<b>0.64</b>	<b>0.61</b>