California MLPA Master Plan Science Advisory Team
Summary of Evaluation of Existing MPAs in the Northern Channel Islands of the MLPA South Coast Study Region: Habitat Representation/Replication and Size/Spacing
Revised November 9, 2008

Overview of MPA Proposal Evaluations

Upon request of the California Fish and Game Commission, the Master Plan Science Advisory Team (SAT) for the MLPA South Coast Study Region conducted an evaluation of the existing marine protected areas (MPAs) in the northern Channel Islands to assess how well these existing MPAs meet the goals of the Marine Life Protection Act (MLPA) and the design guidelines developed by the SAT and incorporated into the *California Marine Life Protection Act Master Plan for Marine Protected Areas* adopted by the California Fish and Game Commission.

The SAT divides goals 1, 2, 4 and 6 into two categories for evaluation purposes:
- Goals 1 and 4 – These goals focus on ecosystems and habitats and are addressed by habitat representation and replication analyses
- Goals 2 and 6 – These goals focus on populations and connectivity and are addressed by size and spacing analyses

Methods for these analyses, including explanations of levels of protection (LOPs), are described in an associated document: *Methods Used to Evaluate Draft MPA Proposals in the North Central Coast Study Region.* Evaluation methods from the MLPA North Central Coast Study Region were used for this evaluation as refinements of evaluation methods for the MLPA South Coast Study Region are in progress and have not yet been adopted. This summary document focuses on the existing MPAs relative to habitat representation, replication, and size and spacing of MPAs. Associated figures are included as an appendix.

MPAs Evaluated

In 2003, the California Fish and Game Commission designated ten state marine reserves (SMR) and two state marine conservation areas (SMCAs) across state waters of the northern Channel Islands (Figure 1). Based on the best information available to the SAT, the evaluation indicates that these MPAs meet the habitat representation, replication, size, and spacing guidelines currently indentified in the master plan for MPAs. As in previous study regions, the SAT has assigned levels of protection (LOP) based on allowed uses or activities within MPAs (see the SAT evaluation methods document for more details). These levels of protection allow qualitative comparison of the two SMCAs in meeting the MLPA goals relative to state marine reserves, where extractive activities are not allowed.

Habitat Representation Analysis (Goals 1 and 4)

The key questions that the habitat representation analysis addresses are:
1. How well are key habitat types represented in MPA proposals?
2. What are the proposed levels of protection for these habitat types?

3. How well are habitats and levels of protection distributed across the study region?

In order to answer these questions, the SAT compared the amount of habitat available within the northern Channel Islands region (Figure 2) that is included within the designated MPAs at various levels of protection (Figure 3a). Further details on these methods are available in the SAT evaluation methods document.

The abundance of each habitat type varies throughout the region and thus affects how much habitat the MPAs are able to include. For instance, rocky habitats deeper than 100 meters are not abundant in the study region. Other habitats, including seagrass beds, are not well mapped and thus geographic patterns of habitat availability are, in part, an artifact of limited data.

All key habitats have at least 15% representation at the very high level of protection (in SMRs). Highlights from habitat-specific analyses include:

- *Shoreline habitats (surfgrass, rocky shore, and sandy beach):* hTese three habitat categories have 17-23% representation in SMRs.
- *Rocky habitats (kelp, rocky reef 0-30 meters, 30-100 meters, 100-200 meters, and 200-3000 meters):* Two of these habitats, kelp and rock deeper than 200 meters have 19% representation in SMRs. The other three rocky bottom habitats have 26-30% representation in SMRs.
- *Soft bottom habitats (sand 0-30 meters, 30-100 meters, 100-200 meters, and 200-3000 meters):* Two of these soft bottom habitats (sand 0-30 and 30-100 meters have 15-18% representation in SMRs. The two deeper soft bottom habitats (100-200 and 200-3000 meters) have greater than 30% of available habitat in SMRs.
- *Estuarine habitats are not present in the northern Channel Islands.*

Overall, the existing MPAs represent the key habitats across the northern Channel Islands, thereby meeting the SAT guidelines for representation.

Habitat Replication (Goals 1 and 4)

Replication of habitats within the biogeographic region (Point Conception to the California/Mexico border) is required by the MLPA. In order to be counted in the replication analysis for a given habitat, an MPA must meet the minimum size guideline and the habitat within the MPA must be of a sufficient size to encompass 90% of the biodiversity associated with that habitat (further details on these methods are available in the SAT evaluation methods document)

All habitats for which replication could be calculated were replicated in two to seven SMRs in the northern Channel Islands (Figure 3b). Because biodiversity data for the deeper soft-bottom habitats (sand 100-200 and 200-3000 meters) was not readily available, replication of these habitats is not evaluated here. Habitats deeper than 100 meters were not present in the MLPA North Central Coast study region, thus no biodiversity-area relationships were available for these habitats. New biodiversity analyses were conducted using the methods from the north central coast to assess replication of deep rocky habitats (rock 100-200 meters and 200-3000

meters) using data generated from submersible surveys conducted by Dr. Milton Love. For all other habitat types, replication was assessed using the biodiversity-area relationships from the MLPA North Central Coast Study Region and described in the SAT evaluation methods document.

- Shallow rocky habitats (rocky shore, surfgrass, kelp, rock 0-30 meters and 100-200 meters) had the greatest replication in SMRs with 4-7 replicate MPAs.
- Deeper rocky habitats (rock 100-200 and 200-3000 meters) were replicated in 2-3 SMRs. This lower level of replication may be due to limited availability of these habitats within state waters in the northern Channel Islands.
- Sandy habitats (sandy beach, sand 0-30 meters and 30-100 meters) were replicated in 2-3 SMRs.

Overall the existing MPAs contain two to seven replicates of all habitats for which the minimum area criterion could be applied. The northern Channel Islands region is a small portion of the larger biogeographic region from Point Conception to the California/Mexico border. Additional MPAs in the study region will add to this level of replication.

Size and Spacing (Goals 2 and 6)

Size and spacing analyses consider "clusters" of MPAs (adjacent MPAs with different allowed uses) at various levels of protection. Analyses include: 1) the proportion of MPA clusters that meet the minimum and preferred size guidelines, and 2) the maximum gaps between habitats replicated within clusters of at least minimum size guidelines (the analysis is conducted separately at different LOPs). Further details on these methods are available in the SAT evaluation methods document.

Most existing MPA clusters in the northern Channel Islands meet the minimum size guidelines (Figure 4a). Roughly 25% of MPAs (3) were in the preferred size range (18-36 square miles) with one MPA exceeding 40 square miles. An additional 50% of MPAs (5) were within the minimum size range (9-18 square miles). Roughly 25% of MPAs (3) were below the minimum size recommended by the SAT. Although not all MPAs meet the minimum size guideline, the SAT acknowledges that smaller MPAs have conservation and other values that contribute to the goals of the MLPA.

In the spacing analysis (Figure 4b), maximum gaps between replicate MPAs meet the spacing guidelines for most habitats for which spacing could be calculated. The exceptions are 30-100 meters soft bottom and 200-3000 meters rock habitat. In the case of 30-100 meters soft bottom, the roughly 100 mile gap between replicates can be attributed to the large area of this habitat needed to encompass 90% of biodiversity and constitute a replicate. In the case of deep 200-3000 meters rock, the low availability of this habitat within state waters contributed to the small number of replicates and consequently the larger gaps between replicates of this habitat. In both cases, additional MPAs in the MLPA South Coast Study Region will likely reduce these gaps.

Spacing was not calculated for habitats without replication analyses (deeper soft habitats 100-200 and 200-3000 meters). For the sake of simplicity and in keeping with methods used in the north central coast, spacing was analyzed with the assumption of linear connectivity between the nearest large MPA to the north (Vandenberg Air Force Base SMR in the MLPA Central Coast Study Region) and the southernmost of the northern Channel Island MPAs (Santa Barbara Island SMR). Oceanographic currents were not considered in this spacing analysis.

Appendix: Associated Figures

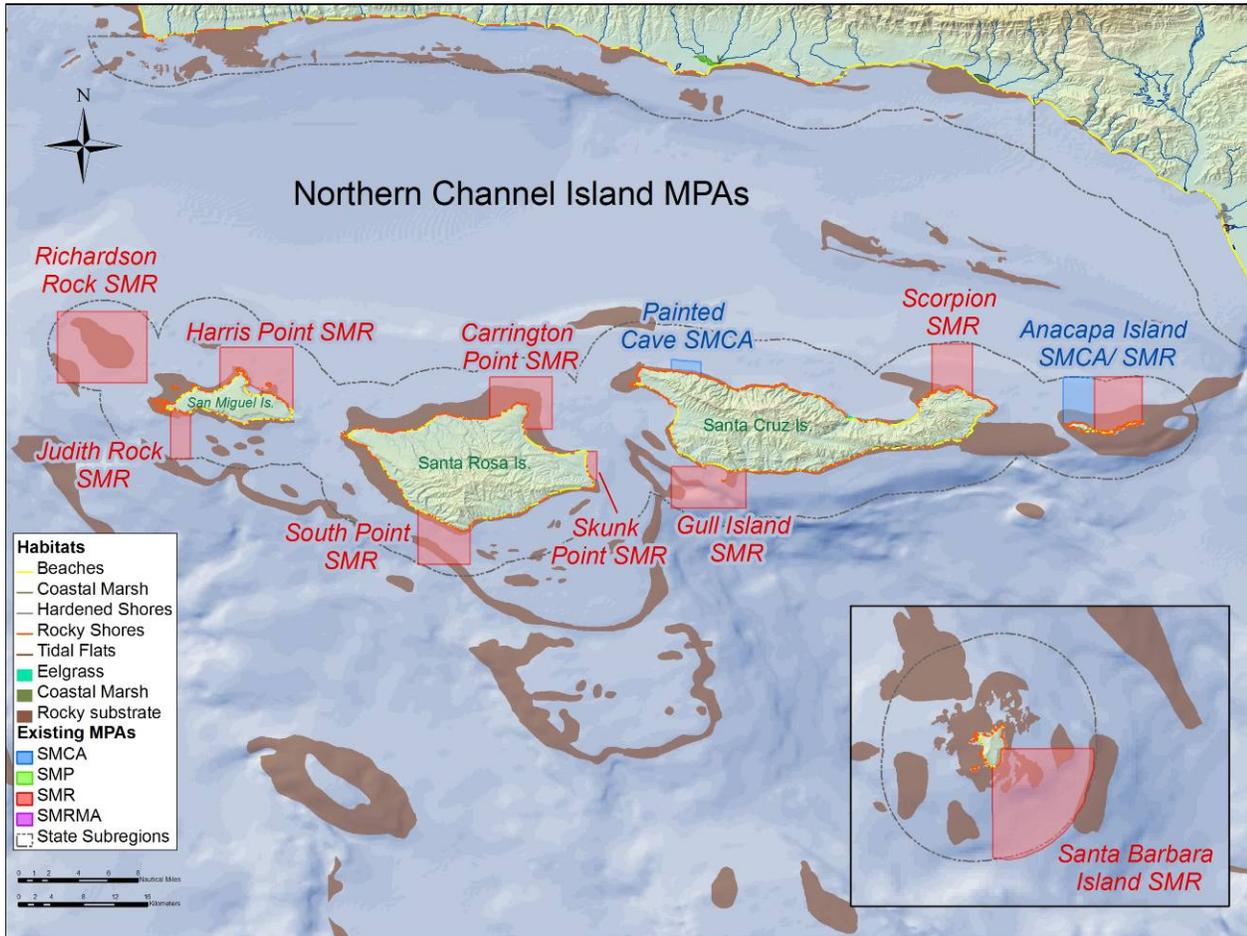**Figure 1: Map of the existing MPAs in the Northern Channel Islands.**

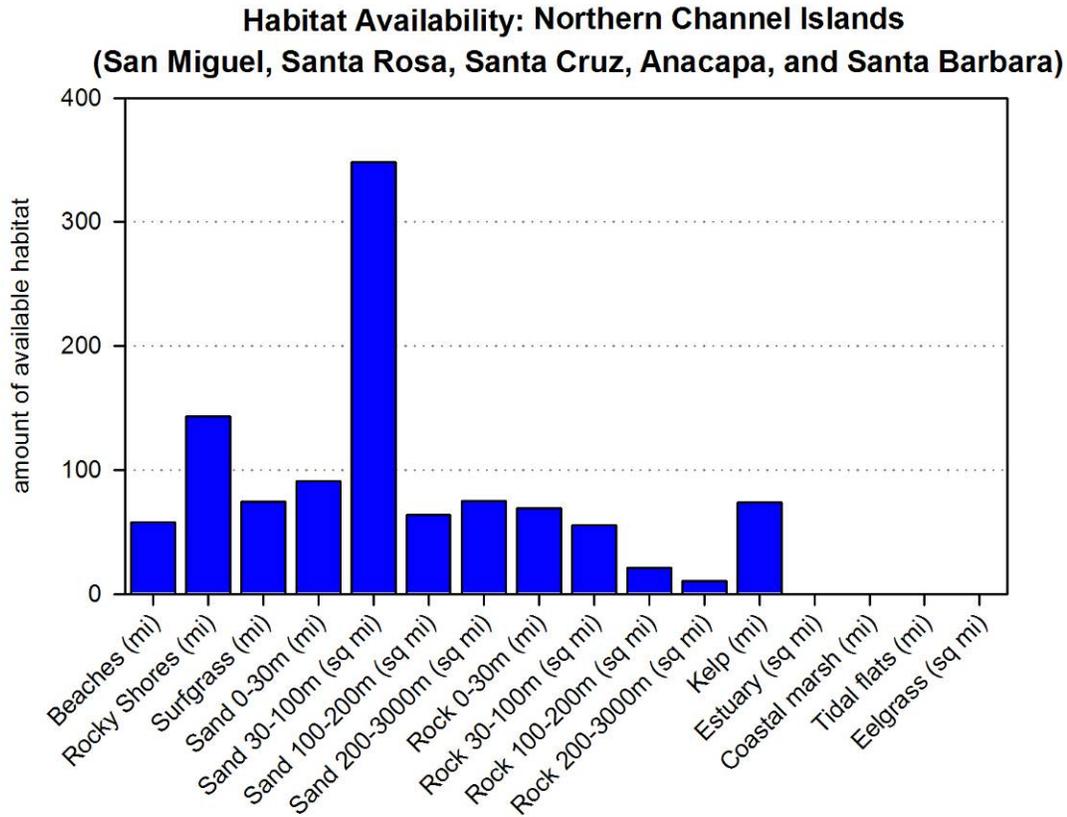**Figure 2. Percent of Study Region Area within Proposals by MPA Designation**
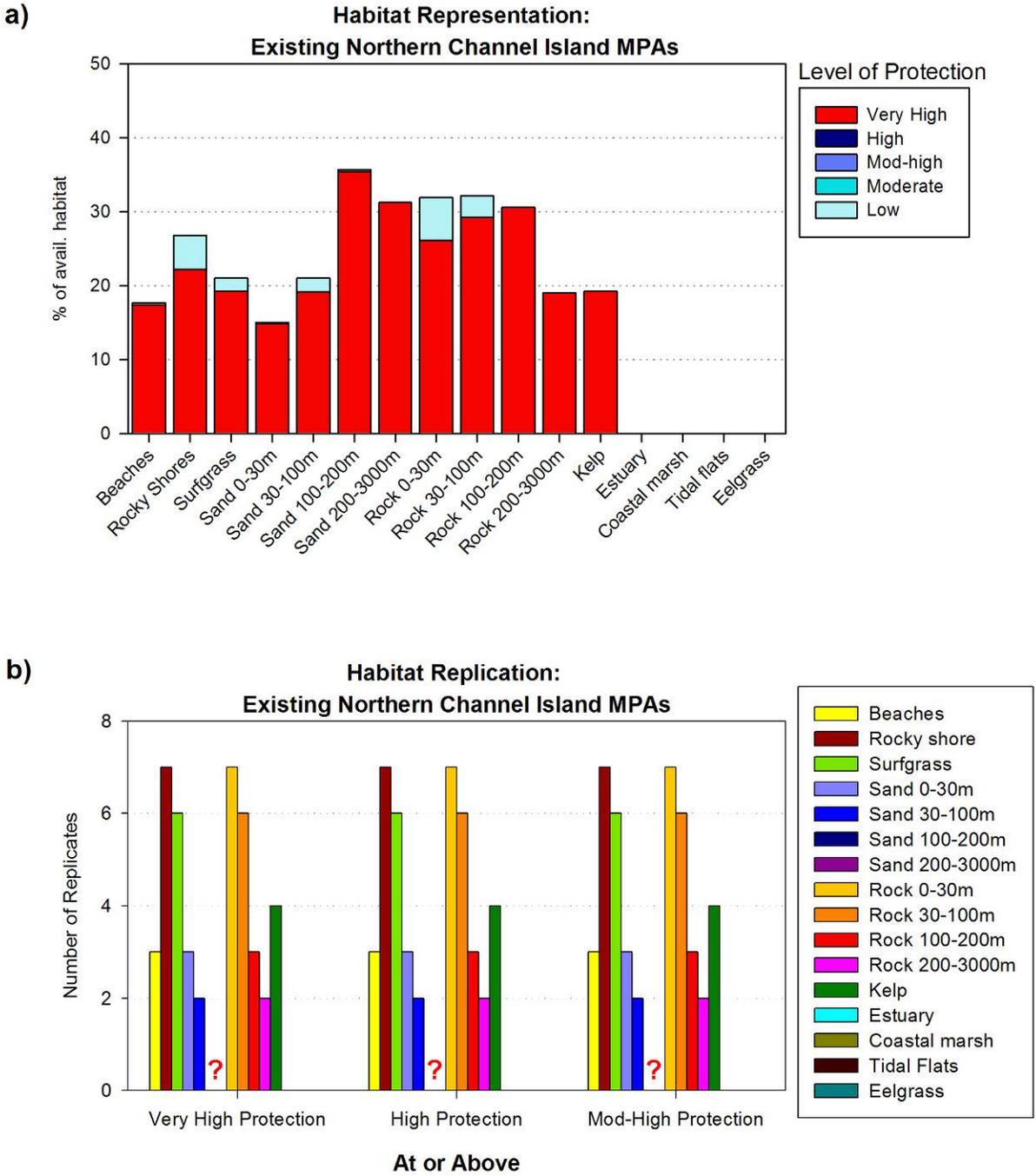
Figure 3: Habitat Representation and Replication

a)

b)

Figure 4: Size and Spacing

a)

Size: Existing Northern Channel Island MPAs

At or above Protection	Below Min Size	Min Size Range	Pref Size Range
Very High	3	5	3
High	3	5	3
Mod-high	3	5	3

b)

Spacing: Existing Northern Channel Island MPAs