

**California Marine Life Protection Act Initiative**  
**North Central Coast Regional Stakeholder Group MPA Proposals**  
**Summary of SAT Evaluation of MPA Proposals (Round 3):**  
**Habitat Representation/Replication and Size/Spacing**  
*April 17, 2008*

**Overview of MPA Proposal Evaluations**

Marine protected area (MPA) proposals generated by the MLPA North Central Coast Regional Stakeholder Group (NCCRSG) are evaluated against the goals of the Marine Life Protection Act (MLPA) by the Master Plan Science Advisory Team (SAT). 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* ("SAT Methods Document"). This document summarizes results from evaluations of "round 3" MPA proposals. Associated figures are included as an appendix.

**NCCRSG MPA Proposals**

In the third round of MPA proposal development, the NCCRSG generated three MPA proposals: Proposal 1-3, Proposal 2-XA, and Proposal 4. Compared to Proposal 0 (existing state MPAs), all three of the NCCRSG proposals increase the area included within MPAs, including large increases in area within SMRs:

<b>Proposal Name</b>	<b>% Study Region in MPAs</b>	<b>% in SMRs</b>
Proposal 0	3.5%	<0.1%
Proposal 1-3	21.6%	11.4%
Proposal 2-XA	18.0%	8.9%
Proposal 4:	26.9%	13.8%

The SAT has assigned LOP based on allowed uses within MPAs (see SAT Methods Document for more details). At or above the "very high" and "high" LOP (as well as at the moderate and low LOP), Proposal 4 covers the most area, Proposal 2-XA covers the least area, and Proposal 1-3 covers an intermediate amount of area. At or above the "moderate-high" level of protection, Proposal 4 covers the most area, Proposal 1-3 covers the least area, and Proposal 2-XA covers an intermediate amount of area. All proposals cover at least 16.5% of the study region at or above the "moderate-high" level of protection (Figure 2).

## **Habitat Representation Analyses (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 study region that is included within each of the proposals within various levels of protection (Figures 3a-3h and Figures 4a-4d). Further details on these methods are available in the SAT Methods Document.

Habitat availability varies throughout the study region and thus affects how much habitat the proposals are able to include. For instance, there is more rocky shoreline and shallow rocky reef habitat in the northern part of the study region than the southern part of the study region. Some habitats, including rocky and sandy deep habitats deeper than 200 meters, are not present in the study region. Other habitats, including kelp, are not well mapped and thus geographic patterns of habitat availability are, in part, an artifact of limited data.

Overall, there has been strong convergence among the three NCCRSR proposals at the "very high" level of protection, likely due to similar MPA designs in many locations. All three NCCRSR proposals include a similar percentage of habitat in the study region within SMRs especially in shoreline habitats. In shallow and deep rock and soft bottom analyses, habitat coverage is similar within SMRs, though Proposal 4 tends to include the most habitat and Proposal 2-XA tends to include the least. This pattern is apparent across most habitats when all LOPs (including moderate-low and low) are considered. All habitats, with the exception of shallow sand, have at least 10% representation at or above the moderate-high LOP in all three proposals.

Highlights from habitat-specific analyses include:

- *Shoreline habitats:* All three proposals include roughly 20% of surfgrass and rocky shore habitat at the very high LOP (Figures 3a and 3b, respectively)
- *Rocky habitats:* All three proposals include shallow and deep rocky habitats including kelp mostly within SMRs, as opposed to other kinds of MPAs (Figures 3e, 3f, and 3g). Proposal 4 protects the greatest portion of kelp and shallow, and deep rocky habitats within SMRs. Proposal 2-XA (and to some extent Proposal 1-3) includes a portion of deep rocky habitat within moderate-high LOP MPAs in order to allow take of salmon and crab.
- *Soft bottom habitats:* A smaller percentage of available soft bottom habitats are represented in proposals as compared to rock habitats, however, note that deep soft bottom is more expansive than deep rock, so that a smaller proportion may still be a relatively large amount (Figures 3d and 3h). At a very high LOP, a similar percentage of shallow and deep soft bottom habitats are represented in the three NCCRSR proposals. All three proposals have areas of deep sand included in high and moderate-high level of protection MPAs due to allowances for salmon and crab take.

- *Estuarine habitats:* All three proposals are similar in the location and size of estuarine MPAs (though only Proposal 4 has an MPA in Tomales Bay), and include a similar proportion of available estuarine habitats within very high protection level MPAs (Figure 4). Consideration of existing aquaculture leases led to a smaller amount of estuarine habitat within very high protection MPAs as compared to previous evaluation rounds. All three proposals include a large estuarine area in an SMCA that allow aquaculture (low LOP) until the expiration of the existing lease. Proposals 1-3 and 2XA also allow recreational clamming (moderate LOP) within this SMCA.

### **Habitat Replication (Goals 1 and 4)**

Replication of habitats within the biogeographic region (Point Conception to the Oregon border) within 3-5 SMRs is required by the MLPA. For this analysis, the SAT included both north central coast MPAs within the NCCRSG proposals and recently implemented MPAs in the central coast (Figures 5a-5c and Figures 6a-6b). Additionally, the SAT evaluated habitat replication in the NCCSR for within-habitat ecosystem representation and monitoring and evaluation opportunities. In order to be counted in the replication analysis for a given habitat, MPAs must be of minimum SAT size and the habitat must be present. Further details on these methods are available in the SAT Methods Document.

Compared to evaluations of previous rounds of proposals, there are no longer marked differences between the MPA proposals in terms of replication. Even at a very high LOP, there is similarity in numbers of replicates across proposals in various habitats. When combined with results from the Central Coast, deep sand has the lowest rate of replication at the very high LOP, and has the most replicates in Proposal 1-3 and the fewest replicates in Proposal 2-XA (Figure 5b) (note that kelp is also not well replicated, but that this result is likely an artifact of poor data quality for this habitat). At or above the moderate-high LOP, surfgrass has the lowest number of replicates in all three proposals. Estuaries are similarly replicated across NCCRSG proposals and are replicated entirely at the very high level of protection (note: the low protection estuarine area that allows aquaculture is not considered for replication).

### **Size and Spacing (Goals 2 and 6)**

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

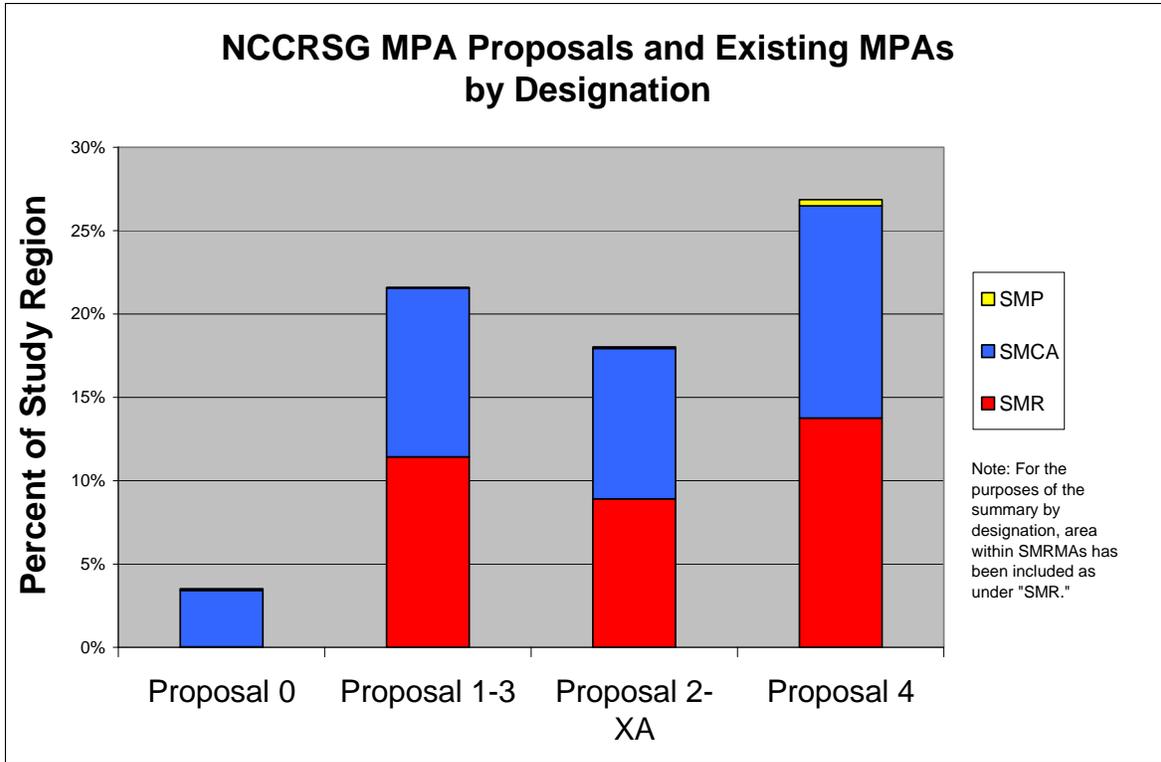
In terms of size analysis (Figures 7a-7c), there is a great deal of convergence between the NCCRSG proposals. Across all proposals, most clusters meet the minimum size guidelines. At the very high level of protection, NCCRSG proposals differ less than in previous rounds, although on average Proposal 4 has larger MPAs. At high and moderate-high LOPs, overall MPA cluster sizes increase. At or above a high LOP, all MPAs in all three proposals meet at least the minimum size guidelines. At or above a moderate-high LOP, the majority of MPAs within all three NCCRSG proposals are within the preferred size range. On average, across all

levels of protection, Proposal 4 tends to have larger MPAs and the most within the preferred size range.

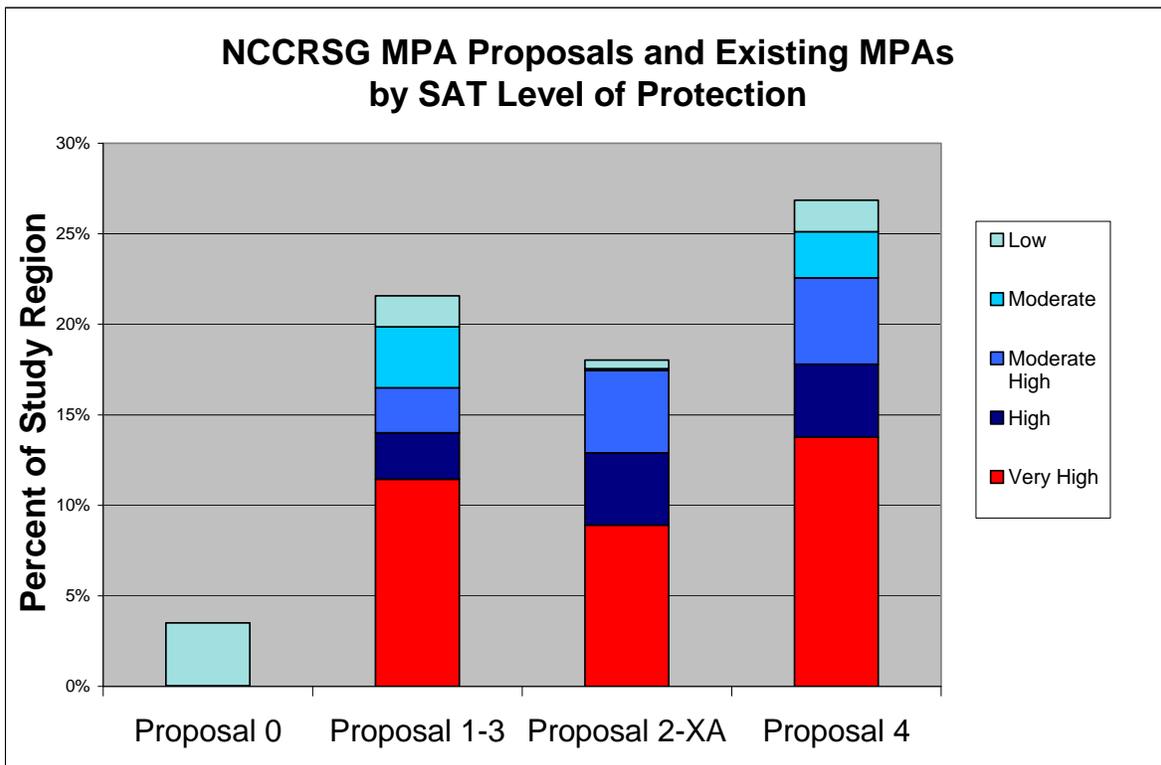
In the spacing analysis (Figures 8a-8c), all three NCCRSG proposals greatly improve over existing MPAs (Proposal 0), which exceeds maximum spacing guidelines for all habitats at very high, high, and moderate-high levels of protection. At the very high and high LOPs, all three NCCRSG proposals have two habitats with gaps that exceed the maximum spacing guidelines (shallow and deep sand in Proposals 1-3 and 4 and sandy beach and deep sand in Proposal 2-XA). At the moderate-high LOP, Proposal 2-XA meets the spacing guidelines for all habitats, while Proposals 1-3 and 4 have a gap that exceeds the SAT guidelines for shallow sand. This gap is located between Point Reyes and the northern edge of the study region.

**Appendix: Associated Figures**

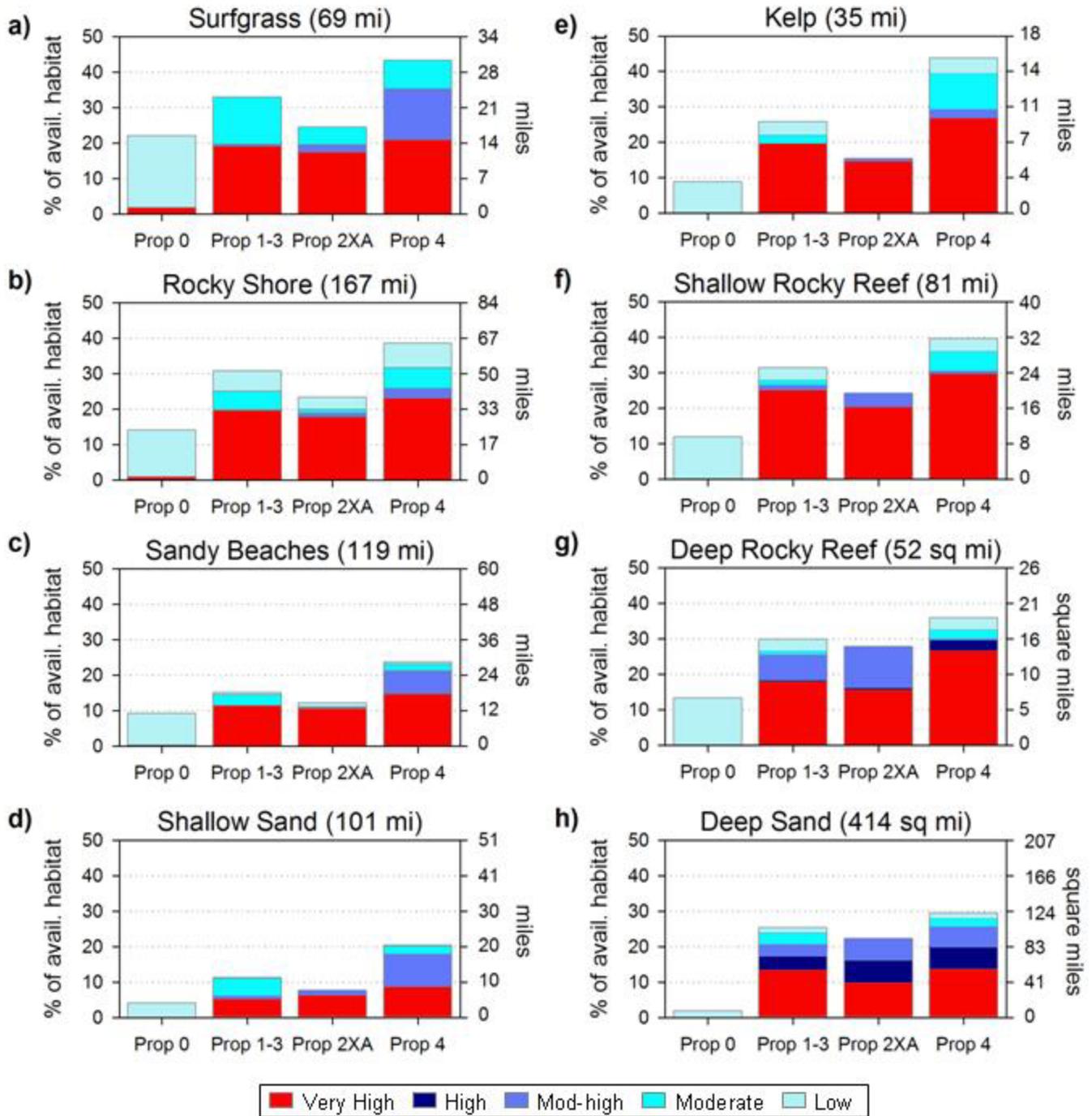
**Figure 1: Percent of Study Region Area within Proposals by MPA Designation**



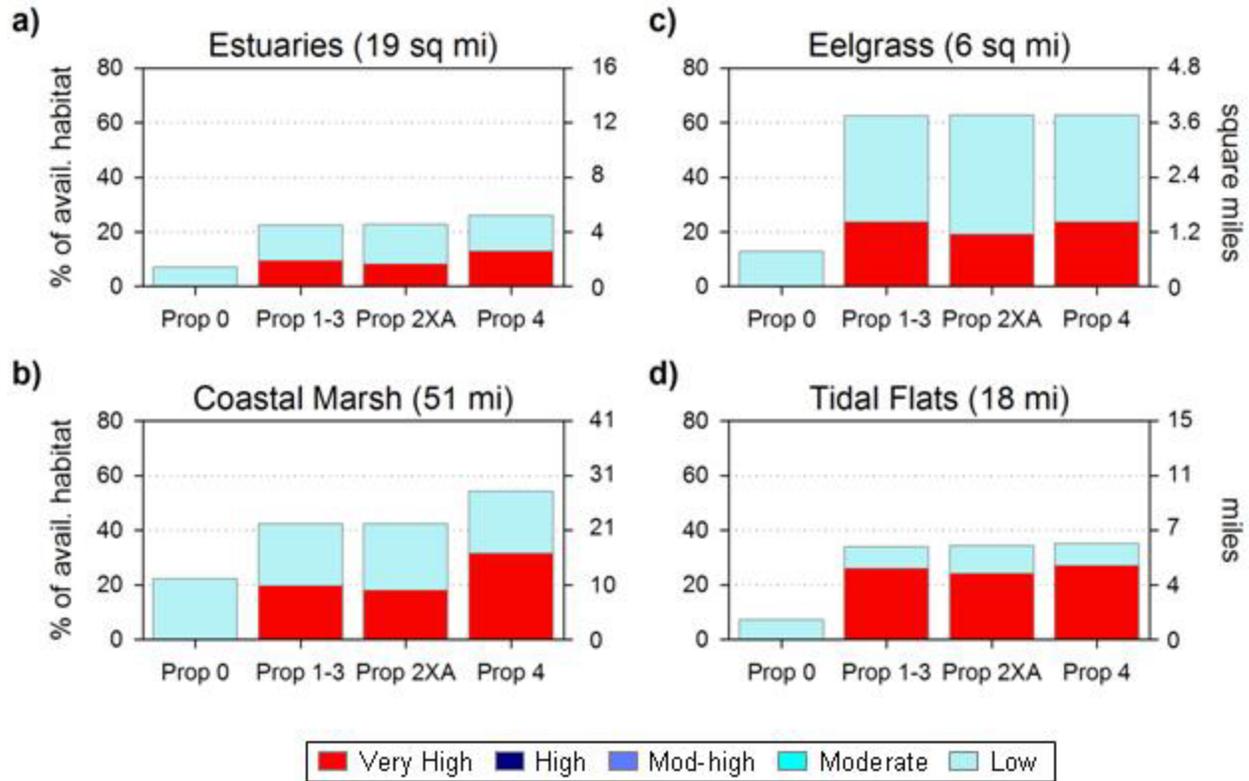
**Figure 2: Percent of Study Region Area within Proposals by Level of Protection**



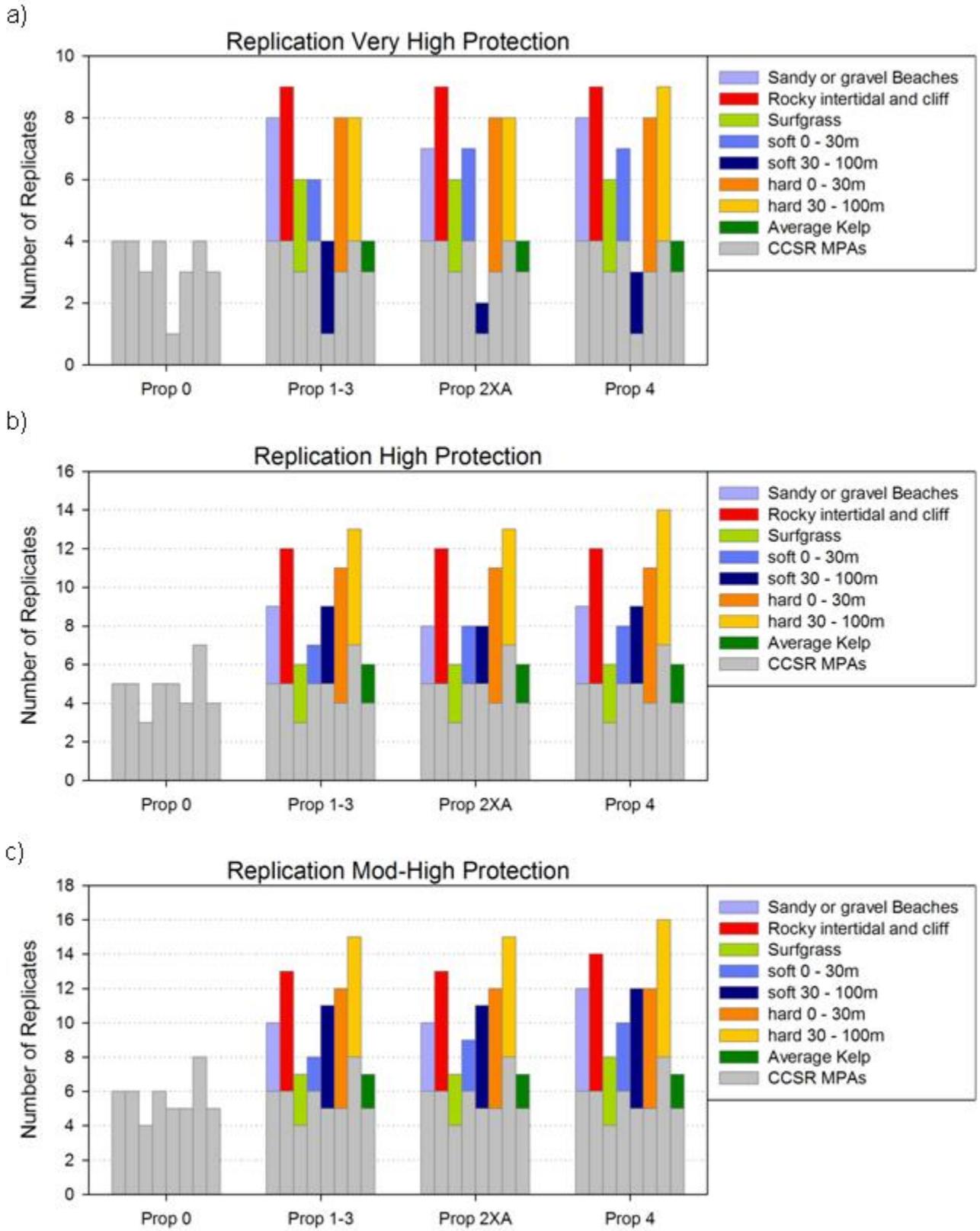
**Figure 3: Habitat Representation for Open Coast Habitats**



**Figure 4: Habitat Representation for Estuarine Habitats**

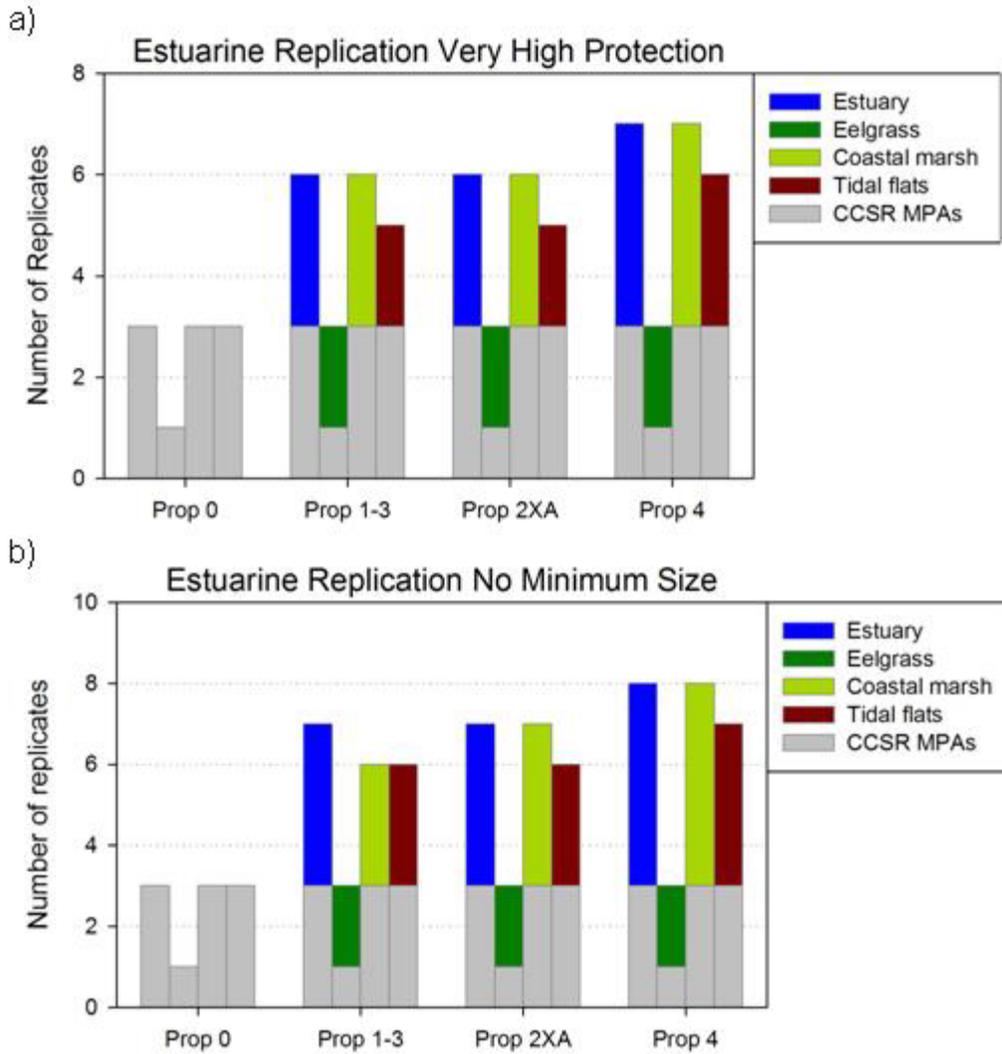


**Figure 5: Habitat Replication for Open Coast Habitats**

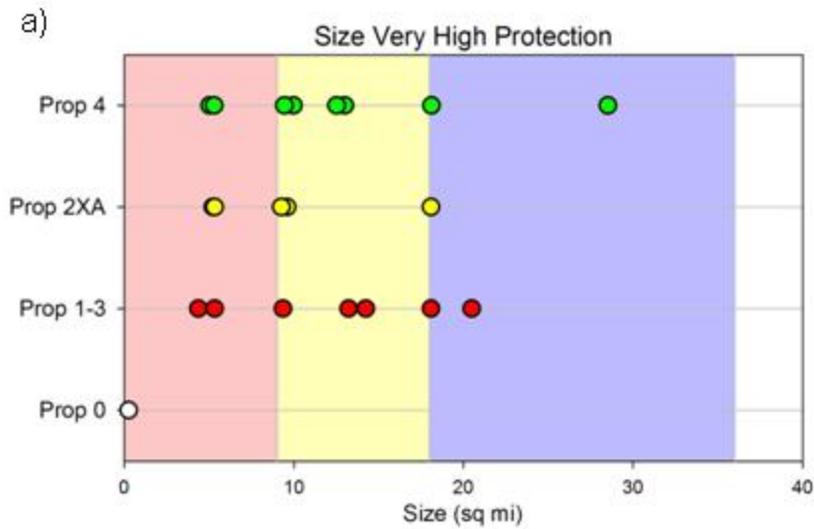




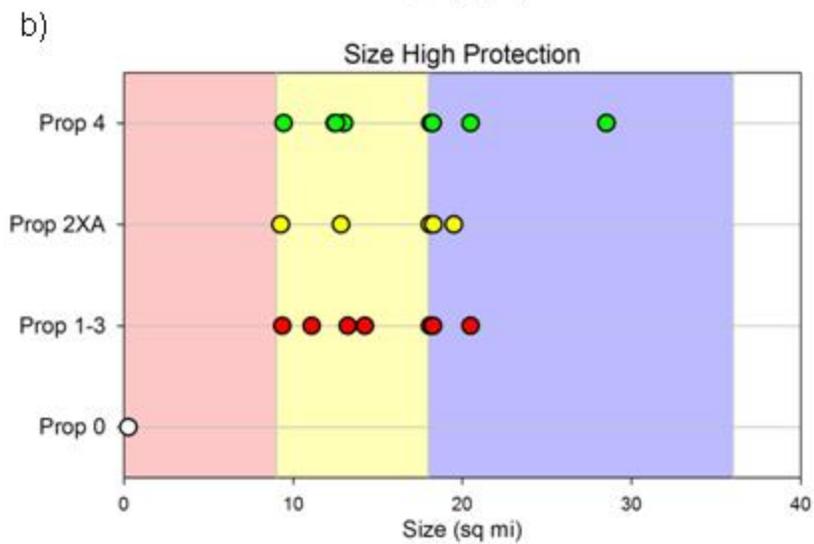
**Figure 6: Habitat Replication for Estuarine Habitats**



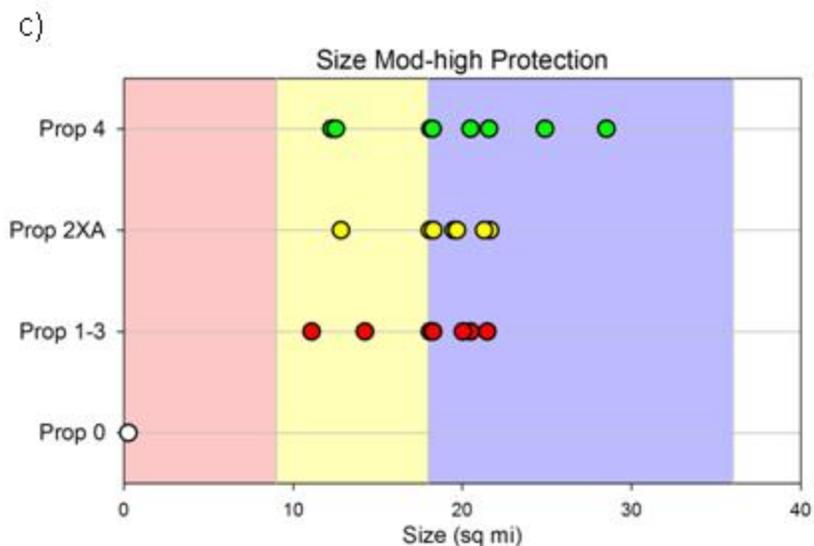
**Figure 7: Size Analysis Figures**



Proposal	Below Min Size	Min Size Range	Pref Size Range
Prop 4	2	4	2
Prop 2XA	2	4	1
Prop 1-3	2	3	2
Prop 0	1	0	0



Proposal	Below Min Size	Min Size Range	Pref Size Range
Prop 4	0	4	4
Prop 2XA	0	4	3
Prop 1-3	0	4	3
Prop 0	1	0	0



Proposal	Below Min Size	Min Size Range	Pref Size Range
Prop 4	0	3	6
Prop 2XA	0	1	6
Prop 1-3	0	2	5
Prop 0	1	0	0

**Figure 8: Spacing Analysis Figures**

