California Marine Life Protection Act Initiative
SAT Evaluation of Round 3 SCRSG MPA Proposals for the South Coast Study Region: Habitat Representation, Habitat Replication, MPA Size and MPA Spacing Analyses
Revised October 16, 2009

The MLPA Master Plan Science Advisory Team (SAT) evaluates marine protected area (MPA) proposals in relation to the goals of the MLPA. SAT evaluations of habitat representation and habitat replication primarily address goals 1 and 4 of the Marine Life Protection Act (MLPA), which focus on ecosystems and habitats. SAT evaluations of MPA size and spacing between MPAs primarily address goals 2 and 6 of the MLPA, which focus on marine life populations and connectivity. This document and its associated figures and tables compare the three stakeholder group-generated MPA proposals developed during round 3 of the MLPA South Coast Study Region (SCSR) process and the 'no change' alternative (Proposal 0) for each of the four evaluations: Habitat representation, habitat replication, MPA size and MPA spacing.

Methods for these analyses, including explanations of levels of protection (LOPs), are described in an associated document: *Draft Methods Used to Evaluate Marine Protected Area Proposals in the MLPA South Coast Study Region* (Evaluation Methods Document).

In the SCSR, areas managed by the United States Department of Defense create unique considerations for evaluating MPA proposals as these areas have limited habitat information. Additionally, the SAT does not assign an LOP to military activities; rather, the potential impacts of military activities are discussed in the document: *Draft Potential Impacts of Military Activities in Military Use Areas in the MLPA South Coast Study Region*. Three closures were identified by the military at San Clemente and San Nicolas Islands, each of which was adopted by at least one proposal. Where habitat maps were available, these areas are incorporated into estimates of habitat representation, replication, size and spacing, at all levels of protection so their potential contribution to the networks can be considered.

Habitat Representation (Goals 1 and 4)

The key questions that the habitat representation analysis addresses are:

- How well are key habitat types represented in MPA proposals?
- What are the proposed levels of protection for these habitat types?
- How well are habitats and levels of protection distributed across the study region?

In order to answer these questions, the SAT compared the percentage of available habitat included within each of the proposals across various levels of protection (Figures 2.1 to 2.5). The SAT also considered the distribution of habitat across each of the five bioregions identified in the south coast study region. Further details on these methods are available in the Evaluation Methods Document.

Habitat abundance varies by habitat type and many habitats are unevenly distributed across the study region (Figure 1.1). Habitat abundance and distribution affects the ease with which proposals can capture each habitat within an MPA proposal. For instance, soft-bottom habitats

are generally more abundant across the study region than rocky reef habitats. Additionally, soft-bottom habitats are more prevalent along the mainland, while rocky reef habitats are most abundant at the offshore islands. Deep rocky reef habitat (>100 meters depth) is extremely rare across the study region and occurs in only a few isolated locations, thus capturing this habitat in an MPA proposal may prove challenging. Estuarine habitats occur exclusively in the two mainland bioregions and are concentrated in the southern portion of the mainland.

The results of the habitat representation analysis are displayed in figures 2.1 to 2.5 and table 2.6 below. For the key habitats present in the study region, these figures display the percentage of that habitat included in MPAs in each of the round 3 proposals. Results are grouped by SAT-assigned LOP. Rare and unique habitats in the study region are not well mapped and estimates of their area are not accurate or precise. Therefore, a table of the number of MPAs in each of the round 3 proposals that include each habitat (table 2.6) is used to summarize and compare these results. The rare and unique habitats evaluation is conducted only for MPAs that achieve an LOP at or above moderate-high.

Overall, the three proposals show some consistent patterns across multiple protection levels.

- Across most habitats and protection levels, Proposal 3 includes the greatest proportion of available habitat, followed by Proposal 1, while Proposal 2 includes the lowest proportion.
- State MPAs within the Channel Islands National Marine Sanctuary (CINMS) were included in all proposals and contribute significantly to habitat representation at very high protection for most open coast habitats.
- Military closures proposed at San Clemente and San Nicolas Islands are not assigned a level of protection, but are included in habitat representation totals across all levels of protection. Military closures contributed to representation of open coast rock and soft-bottom habitats across all proposals.
- Levels of habitat representation generally increased across all proposals from round 2 to round 3 proposals.
- Most habitats have at least 10% representation at or above the moderate-high LOP in all three proposals (Figures 2.1-2.5). Exceptions are limited to estuaries, eelgrass and tidal flats.

Highlights from habitat-specific analyses include:

Shoreline habitats *(beaches, rocky shores and surfgrass):*

- Beaches are less represented across all proposals than many other habitats. The three proposals include 8-13% of beach habitat at very high protection and 10-17% at or above moderate-high protection, 3% of which occurs within the CINMS and 2% of which occurs in military closures (figure 2.2a).
- The three proposals include 16-23% of rocky shores at very high protection and17-24% at or above moderate-high protection, 11% of which occurs within the CINMS and 1-2% of which occurs in military closures. Patterns for surfgrass protection are similar, with 17-

25% at very high protection and 18-29% included above mod-high protection, 8% of which occurs within the CINMS and 1-3% of which occurs in military closures (figure 2.1a-b).

Nearshore rocky habitats *(0-30m rocky reef, "persistent" kelp, and maximum kelp):*

- Nearshore rocky habitats are evaluated using three separate, but complimentary, measures. The "persistent" kelp measure, which is defined as areas with kelp present during at least 3 of 7 years of available data, measures the likely presence of kelp forest habitat. Two other measures, 0-30m rocky reef and the maximum extent of kelp (across all 7 years of available data), both indicate the relative protection of nearshore rocky reef or potential kelp habitat, but do not by themselves indicate a high likelihood of kelp presence. Within each of the three proposals, these three habitat measures have similar levels of representation, due to the high degree of overlap between the measures.
- The three proposals include 13-21% of nearshore rocky habitats (encompasses all three measurements) at very high protection and 14-24% at or above moderate-high protection, 6% of which occurs within the CINMS and 3-6% of which occurs in military closures (figures 2.1c-e).
- Proposal 3 includes a higher proportion of these nearshore rocky habitats than Proposal 1, which in turn includes a higher proportion than Proposal 2.

Deep rocky reef habitats *(30-100m, 100-200m, and 200-3000m rock reef):*

- Overall, proposals protected a relatively high percentage of 30-100m rocky reef habitat with 21-31% included at very high protection and 22-31% included at or above moderate-high protection, 8% of which occurs within the CINMS and 2-16% of which is included in military closures (figure 2.1f). The military closure at San Nicolas included in Proposal 3 includes a large proportion of the available 30-100m rocky reef.
- 100-200m rocky reef habitat is rare throughout the study region and mainly concentrated in the west and mid Channel Island bioregions. Proposals include 22-27% at very high protection and the same percentage at or above moderate-high protection, 11% of which is protected in MPAs in the CINMS and 5% of which is included in military closures (figure 2.1g). One pending military closure 1 (SWAT I) which was incorporated into all three proposals includes a large area that is likely rocky reef in the 100-200m depth zone, thus all proposals were given credit for 0.22 sq miles of this habitat in the pending closure.
- 200-3000m rocky reef habitat is both rare and patchily distributed throughout the study region, occurring mainly in the north mainland and east Channel Islands bioregions. Representation of deepest rocky reef habitat varies widely between proposals (figure 2.1h), from 11% at very high protection in Proposal 2 to 46% in Proposals 1 and 3 and 26-47% at or above moderate-high protection. Military closure areas contributed 9% of available 200-3000m rocky reef across all three proposals.

Soft-bottom habitats *(0-30m, 30-100m, 100-200m, and 200-3000m soft bottom):*

- Soft-bottom habitats are abundant and relatively evenly distributed across the study region, with the exception of the deepest soft-bottom habitat which occurs mainly in the eastern Channel Islands bioregion. Due to the high availability of soft-bottom habitats, even relatively modest percentages translate into large areas of habitat protected.
- 0-30m soft-bottom habitat is relatively less represented across all proposals than many other habitats. Proposals include 9-14% of 0-30m soft bottom at very high protection and 11-17% at or above moderate-high protection, 6% of which is contributed by the CINMS MPAs and 0-1% of which is contributed by military closures (figure 2.2b).
- Proposals include 15-17% of 30-100m soft-bottom habitat at very high protection and 17-19% at or above moderate-high protection, 7% of which is contributed by the CINMS MPAs and 0-2% of which is contributed by military closures (figure 2.2c).
- Proposals include 19-25% if 100-200m soft-bottom habitat at very high protection and 21-27% at or above moderate-high protection, 8% of which is contributed by the CINMS MPAs and 1% of which is contributed by military closures (figure 2.2d).
- Proposals include 9-13% of the deepest (200-3000m) soft-bottom habitat at very high protection and 15-18% at or above moderate-high protection, 1% of which is contributed by the CINMS MPAs (figure 2.2e).

Estuarine habitats *(estuary, coastal marsh, eelgrass, and tidal flats):*

- Estuarine habitats occur almost exclusively on the mainland and are concentrated in the south mainland, thus, neither MPAs within the CINMS nor military closures contribute to representation of estuarine habitats.
- Proposal 1 includes substantial estuarine areas at moderate-high protection, but the other proposals include most estuarine areas at very high protection.
- The three proposals include 6-12% of estuaries at very high protection and the same range of percentages at or above moderate-high protection (figure 2.3a). Proposals 1 and 3 protect the largest proportion of estuaries.
- Protection of coastal marsh varies markedly among proposals (figure 2.3b) with 21-48% included at very high protection and 24-48% at or above moderate-high protection.
- Eelgrass is both rare and patchily distributed across the study region. The majority of eelgrass occurs in the south mainland bioregion with much of that in San Diego Bay. This patchy distribution led to a low level of eelgrass protection across all proposals. The three proposals include 0-4% of eelgrass at or above moderate-high protection levels (figure 2.3c). Proposal 2 does not include any mapped eelgrass in proposed MPAs.
- Tidal flats are not comprehensively mapped throughout all estuaries in the study region. The three proposals protect 4-16% of mapped tidal flats at very high protection and 7-16% at or above moderate-high protection (figure 2.3d).

Rare and unique habitats *(open coast eelgrass, elk kelp, oil seeps, sulfide vents, and canyons):*

- In general, rare and unique habitats are not mapped with sufficient resolution to assess the relative proportion of available habitat included in proposals. Table 2.6 summarizes the number of MPAs at or above moderate-high protection that are known to contain rare and unique habitats. This summary is compiled by proposal. All rare and unique habitats, with the exception of sulfide vents, were captured in the three proposals. Those habitats included in the CINMS MPAs are called out on a separate line and also included in the totals for each proposal.

Table 2.6: Rare and unique habitats at or above moderate-high protection

Proposal	Open coast eelgrass	Elk kelp	Oil seeps	Sulfide vents[a]	Canyons
CINMS	4	0	1	0	1
Proposal 0	2	1	0	0	1
Proposal 1	9(1)	2(1)	3	0	5
Proposal 2	9(1)	1(1)	3	0	5
Proposal 3	10(1)	3(1)	5	0	6

Number of MPAs at or above moderate-high protection that include rare and unique habitats in each proposal. Totals for each proposal include those habitats captured in CINMS MPAs. (including proposed military closures)

() indicates military closures.

a. Only one sulfide vent location is currently mapped in the study region at Palos Verdes.

Habitat Replication (Goals 1 and 4)

The science guidelines for design of MPAs, described in Chapter 3 of the *California Marine Life Protection Act aster Plan for Marine Protected Areas*, recommend replication of habitats within three to five SMRs in each biogeographical region (Point Conception to the Mexico border). Additionally, for within-habitat ecosystem representation and MPA evaluation opportunities, the SCSR SAT has recommended that habitats should be replicated in at least one MPA in each of the five bioregions of the SCSR, to the extent possible. In order to be counted in the replication analysis, the MPA must meet the minimum size guideline (9 square miles), and a given habitat within the MPA must be present in a sufficient amount to encompass 90% of associated biodiversity (see habitat replication thresholds in the Evaluation Methods Document for further details.)

The results of the habitat replication analysis are displayed in figures 3.1 to 3.4 below. In figure 3.1, the number of MPAs that contain a significant amount of each habitat is shown for each MPA proposal at very high, high, and moderate-high levels of protection. Figure 3.2 contains similar information to 3.1, but is conducted only for depth ranges. The evaluation of habitat replication by depth allows the SAT to assess replication across bioregions with limited data available for deeper habitats. Figure 3.3 is similar to those described above, but simply for estuaries. Figure 3.4 shows, for each proposal, the number of bioregions where a habitat replicate is included within at least one proposed MPA. The replication analysis is conducted

for MPAs at the three highest levels of protection. Grey boxes on Figure 3.4 denote habitats for which a proposal does not have at least one replicate in each possible bioregion. The number of bioregions where it is possible to include a replicate for a given habitat is noted in parentheses after the habitat name.

Across the entire SCSR, the three proposals meet the replication guidelines for all open coast habitats within no-take SMRs. However, at the level of individual bioregions, several proposals do not replicate all habitats at a very high level of protection, and in some cases at the moderate high level of protection, within each of the possible bioregions (figure 3.4).

- State MPAs within the CINMS contribute significantly to replication for all open coast habitats. The number of habitat replicates contained within the CINMS ranges from 1, for the deepest rock and soft-bottom habitats, to 6 or 7 for some shoreline and nearshore habitats.
- Proposed military closures contribute 1-3 replicates for most open coast habitats.
- Deep rock (100-3000m) is rare and unevenly distributed throughout the study region and thus difficult to replicate in multiple MPAs. All proposals add 2-3 replicates of deep rock habitat to the 1 replicate contained in the CINMS MPAs. Deep rock (100-3000m) was not replicated across all available bioregions at or above moderate-high protection in Proposal 3.
- Eelgrass is rare and unevenly distributed across the study region making it difficult to replicate in multiple MPAs. Proposals 1 and 3 include one replicate of eelgrass at very high protection while Proposal 2 includes no replicates of eelgrass at or above moderate-high protection.
- Proposals 1 and 2 did not replicate 30-100 and 200-3000 meter soft-bottom habitats across all bioregions at very high protection, but achieved replication across all bioregions at high protection.

MPA Size

Size guidelines were developed to provide for the persistence of important bottom-dwelling fish and invertebrate groups within MPAs (see size in the Evaluation Methods Document for further details). To accommodate adult movements and life history needs for a range of species, science guidelines in the *California Marine Life Protection Act Master Plan for Marine Protected Areas* state that MPAs should have a minimum alongshore span of 3-6 statute miles (preferably 6-12.5 mi) and should extend offshore to deep waters (note that state waters generally extend offshore to 3 statute miles). The SAT combined these two guidelines to recommend that an individual MPA or MPA cluster should have a minimum area of 9-18 square statute miles (preferably 18-36 sq mi).

The size analysis considers the number of MPA “clusters” (or adjacent MPAs at or above a given level of protection) that meet the minimum and preferred SAT size guidelines at very

high, high, and moderate-high protection levels. Estuarine MPAs are not included in the size analysis.

Figure 4.1 displays results of the MPA size analysis. Each proposal is displayed on a separate line of the figure and each circle indicates the size of an MPA "cluster", with larger MPA clusters further to the right and smaller MPA clusters further to the left. An MPA cluster may consist of a single MPA, or several MPAs that are adjacent to one another. The pink shaded area to the far left of the figure indicates MPA clusters that fall below the minimum MPA size recommended by the SAT (9 sq mi). The yellow shaded area in the middle of the figure indicates MPA clusters that are bigger than the minimum size guideline, but smaller than the preferred size recommended by the SAT (18 sq mi). The blue shaded area to the right of the figure indicates MPA clusters that fall within the preferred size range recommended by the SAT (18 – 36 sq mi). These results also are tabulated on the right hand size of the figure. Since MPAs within the CINMS are included in all proposals, the sizes for these MPAs are provided separately from the proposals for ease of display and not included in the totals for each proposal.

The proposals vary in terms of the number and size range of MPA clusters at different levels of protection. Proposals 1 and 2 have the most SMRs in the preferred size range. Proposal 2 has the most MPA clusters in the preferred size range at high and moderate high LOPs. Proposal 3 has the most MPA clusters in the minimum size range at all LOPs, and the largest MPA in proposal 3 is smaller than the largest MPA in proposals 1 and 2.

- All proposals have three no-take clusters within the preferred size range (including military closures).
- In contrast to round 2, all proposals in round 3 show most MPAs at or above the minimum size (figure 4.1a).
- At a high level of protection additional MPA clusters move into the preferred size range for all proposals from round 2 to round 3 (figure 4.1b).
- Some additional MPA clusters below the minimum size range are added at moderate-high protection from round 2 to round 3 (figure 4.1c).

MPA Spacing

Spacing guidelines were developed to provide for the dispersal of larvae for a range of important bottom-dwelling fish and invertebrate groups between MPAs and to promote connectivity in the network. Further details on these methods are available in the Evaluation Methods Document. To facilitate dispersal and connectivity spacing guidelines along the mainland recommend that MPAs be placed within 31-62 statute miles of each other. Since marine populations are generally habitat specific, the spacing evaluation is conducted for each habitat; to be included in the spacing analysis habitat must be present in sufficient quantity to count as a replicate (see above). MPAs or MPA clusters must also meet the minimum size guidelines (9 sq mi) to count as a replicate in the spacing analysis. Due to the complex

geography and ocean circulation around the Channel Islands, the MPA spacing is not evaluated at the offshore islands but other science guidance is used for MPA design.

Spacing analyses include 1) the maximum distance (gap) between MPA clusters that meet the minimum and preferred SAT size guidelines for each habitat and 2) the number of spacing gaps that exceed SAT spacing guidelines (> 62 sq mi) between adjacent MPA clusters (9 sq mi) for a given habitat. Both analyses are conducted for MPAs at very high, high, and moderate-high protection levels.

1) Maximum Distance (Gap)

Figure 5.1 displays the results of the MPA spacing analysis on the MPA clusters that meet at least the minimum size guidelines. The height of each bar indicates the maximum distance between two MPAs that include a specific habitat in a given proposal. In order to count as a protected habitat, sufficient area to encompass 90% of biodiversity for a given habitat must exist in an MPA cluster of at least minimum MPA size. These maximum distances, or gaps, for each habitat may be compared to the spacing guidelines, a maximum of 31 to 62 miles between MPAs, which is indicated by the horizontal dashed red lines.

A key caveat to drawing conclusions from spacing evaluations is that it is not possible to meet the spacing guidelines for some habitats that are not well represented in the study region or are patchily distributed, such as rock 30-100m and 100-200m along the mainland, soft 200-3000 m, and to a lesser extent, “kelp persistence” due to a gap in persistent kelp distribution between Palos Verdes and the San Elijo area. In consideration of the gap between patches of “persistent kelp” along the mainland, the SAT conducted a “combined kelp” spacing analysis which considered protection of 2.04 miles of maximum kelp within the gap to contribute to spacing of kelp habitat.

Although it is not possible to meet all spacing guidelines across the entire study region for each of these habitats, it may be possible to meet the spacing guidelines in at least a portion of the study region. The spacing guidelines were developed to facilitate connectivity for larval stages which differs species by species. While the guidelines were developed by assessing larval duration for a large number of organisms, the inherent variability dictates that for biodiversity the spacing guidelines should be met or nearly met for the broadest set of habitats possible.

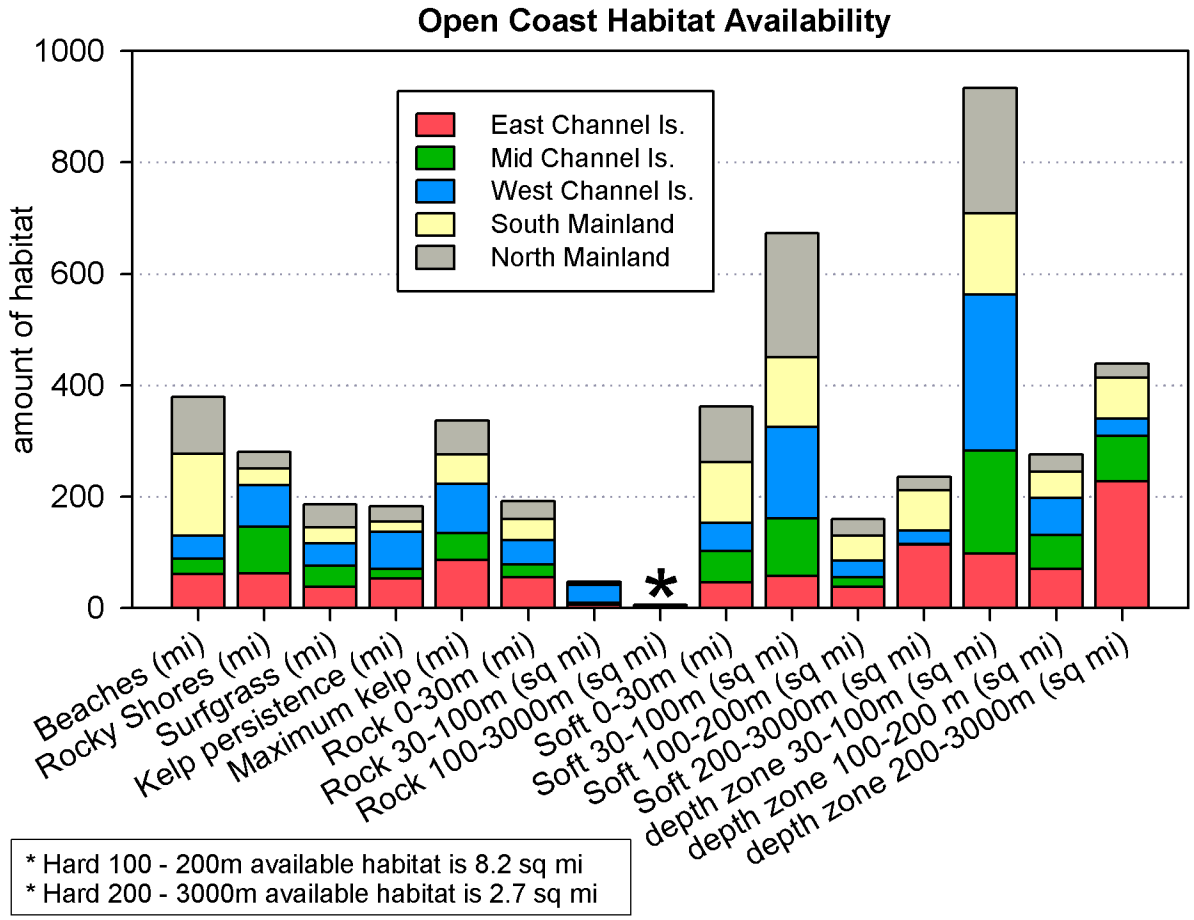
- Proposals 1 and 3 met or approached the spacing guidelines for all possible habitats at or above high protection.
- Proposal 2 met or approached the spacing guidelines for many of the possible habitats at or above high protection, but exceeded the spacing guidelines for persistent kelp, 0-30m rock and 30-100m soft bottom although spacing guidelines were possible to meet for these habitats.
- At the high protection level, Proposal 3 achieved spacing for many habitats that was close to the preferred spacing guideline of 32 miles.

2) Number of Spacing Gaps

Table 5.2a-c provides the number of spacing gaps that exceed SAT spacing guidelines between adjacent MPA clusters for a given habitat. The location and distance of each gap also is identified for each habitat. The intent of this analysis is to provide the South Coast Regional Stakeholder Group (SCRSG) and the Blue Ribbon Task Force (BRTF) with detailed information about specific spacing gaps by habitat for each proposal, in order to identify specific MPA proposal designs that result in the spacing results.

Figure 1.1: South Coast Study Region Habitat Availability

a)



b)

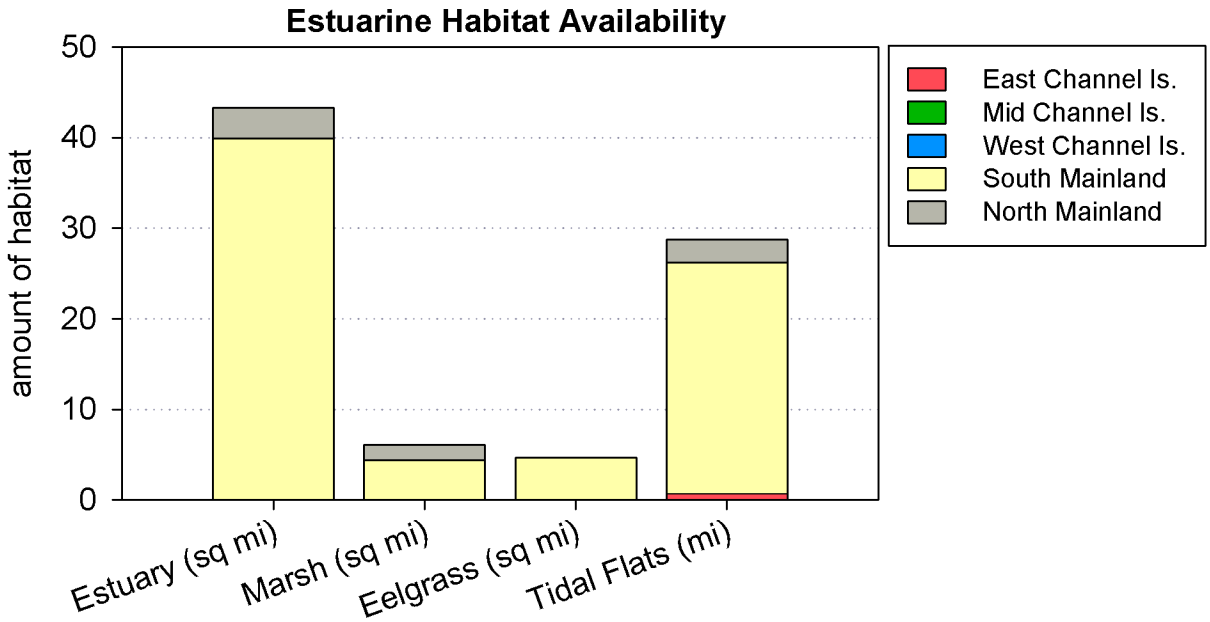


Figure 1.2: Summary of MPA Designations and Levels of Protection

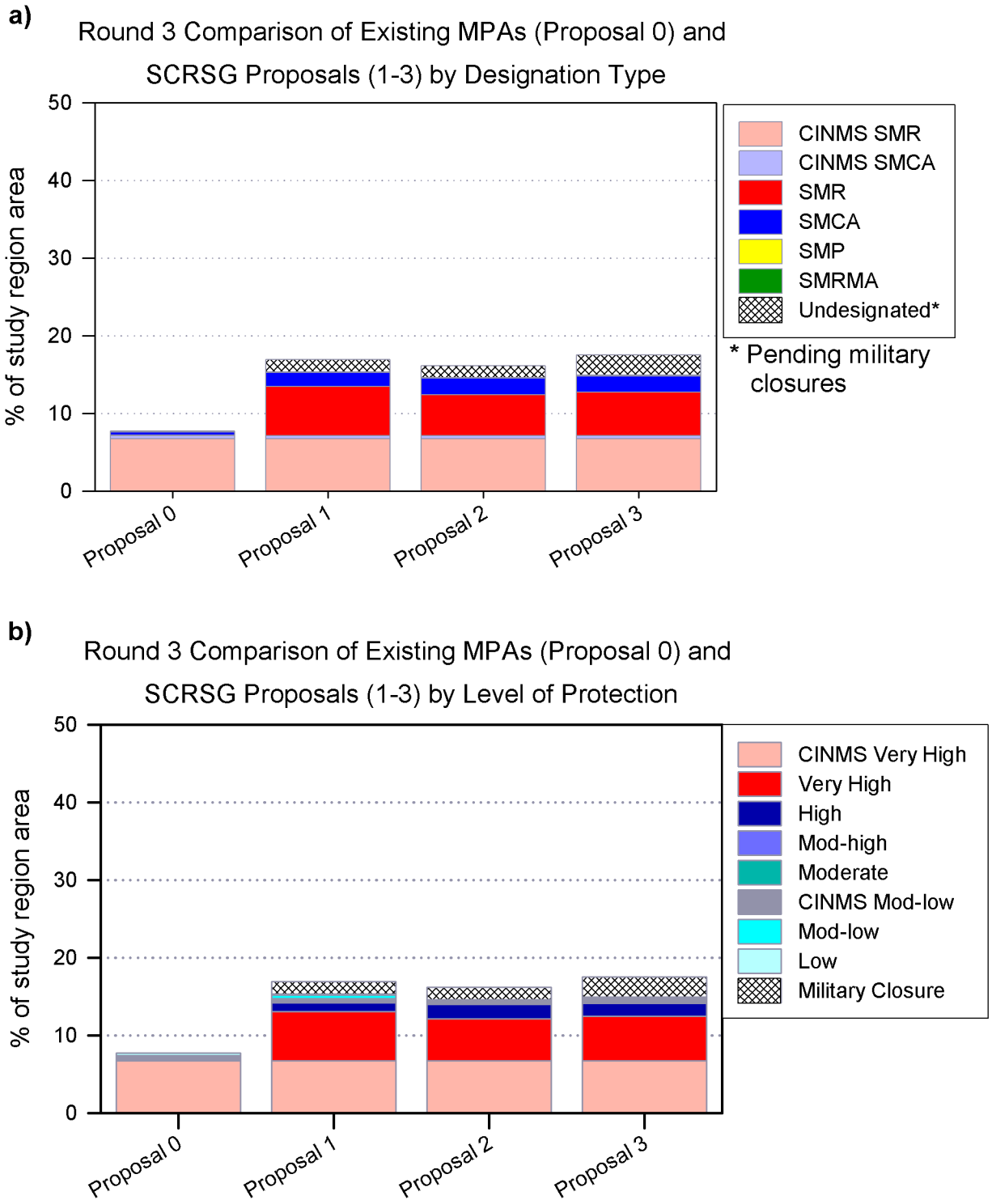


Figure 2.1: Habitat Representation - Rocky Habitats

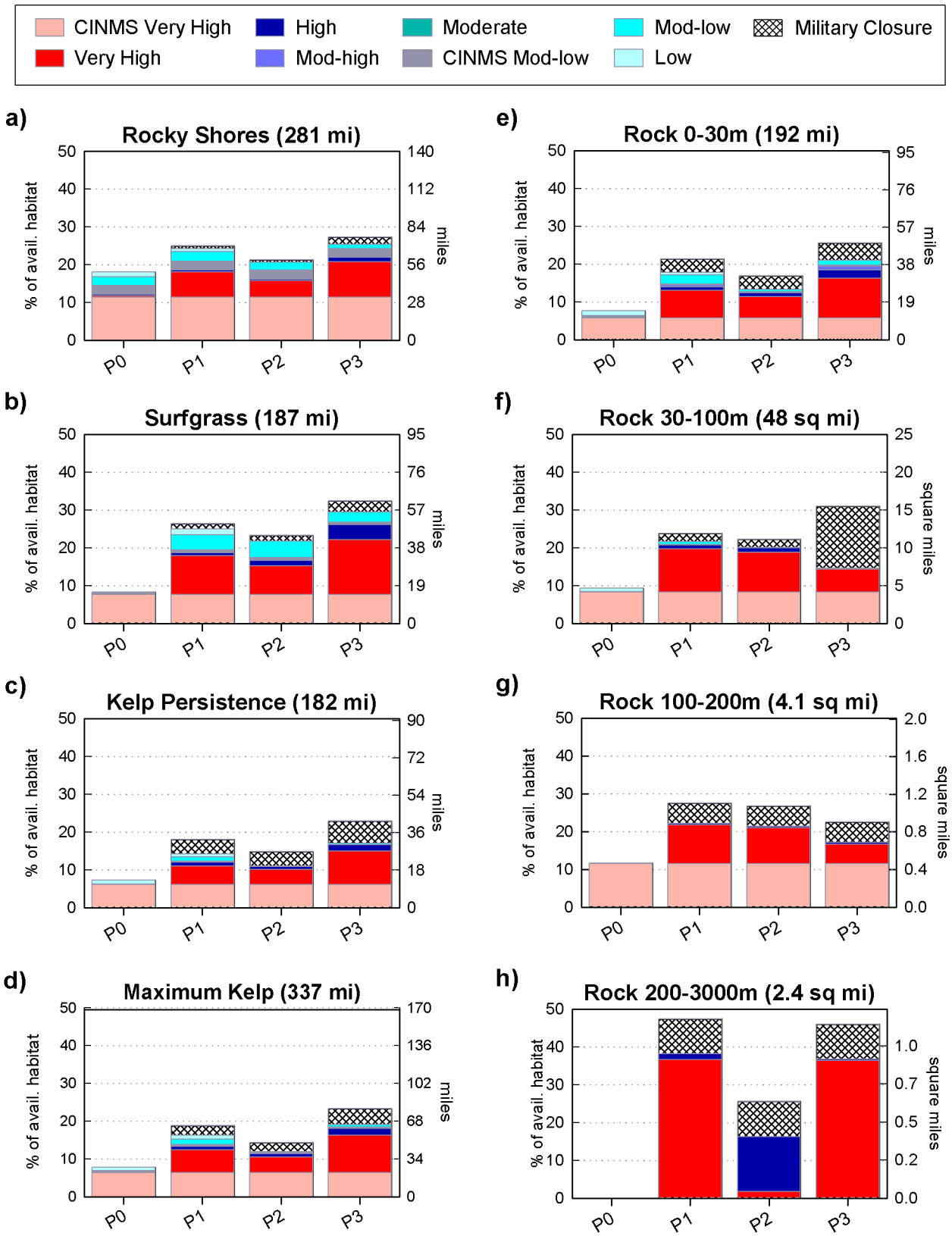


Figure 2.2: Habitat Representation - Soft Bottom Habitats

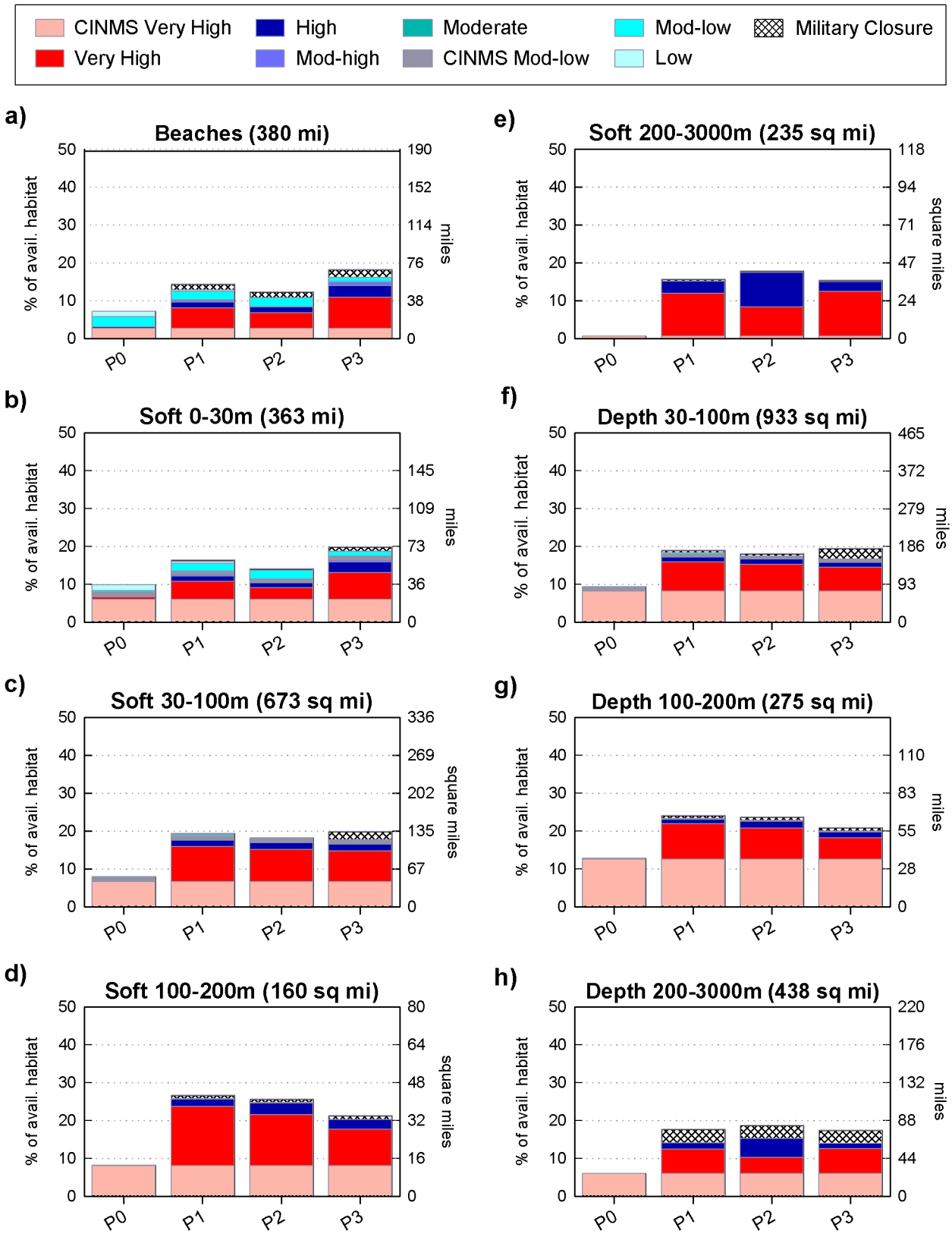


Figure 2.3: Habitat Representation - Estuarine Habitats

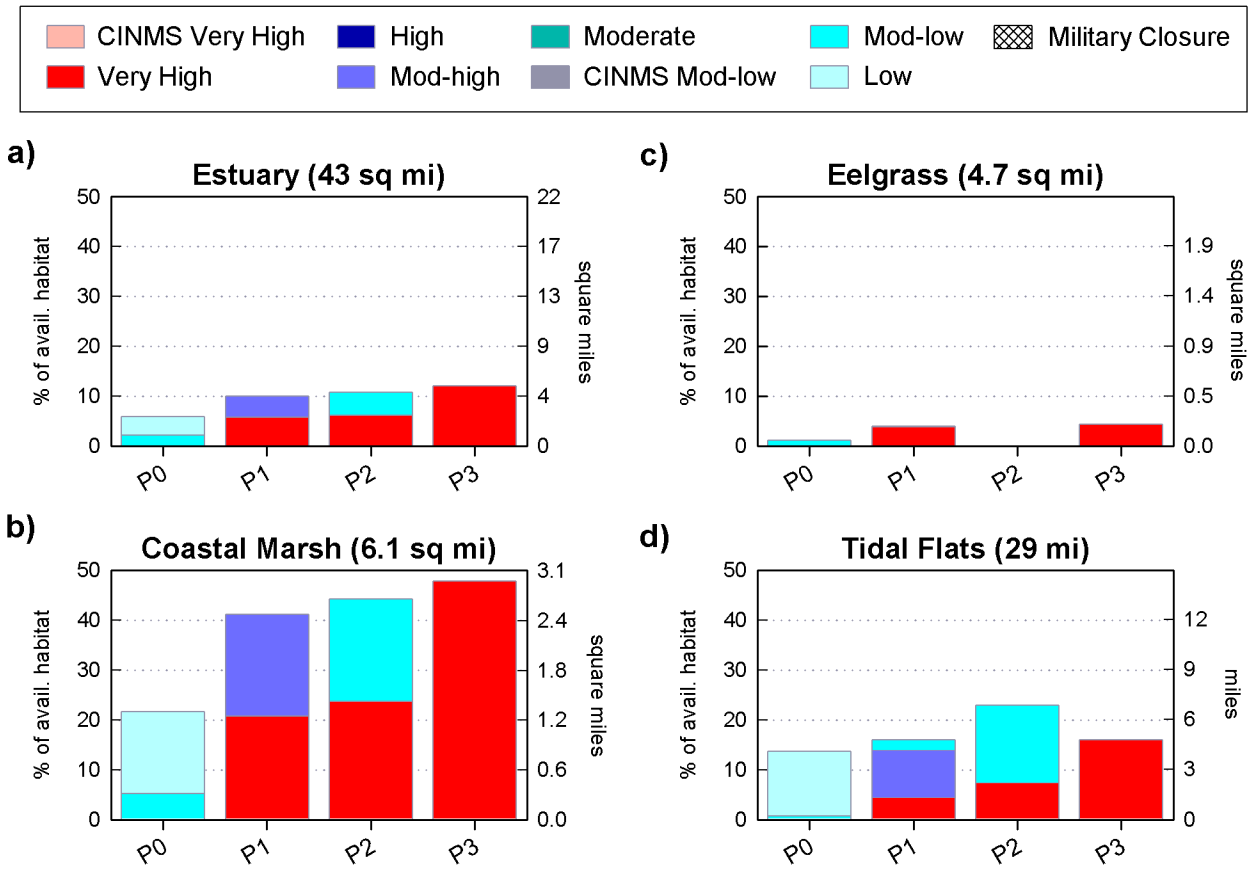


Figure 2.4: Habitat Representation Overview - Open Coast Habitats

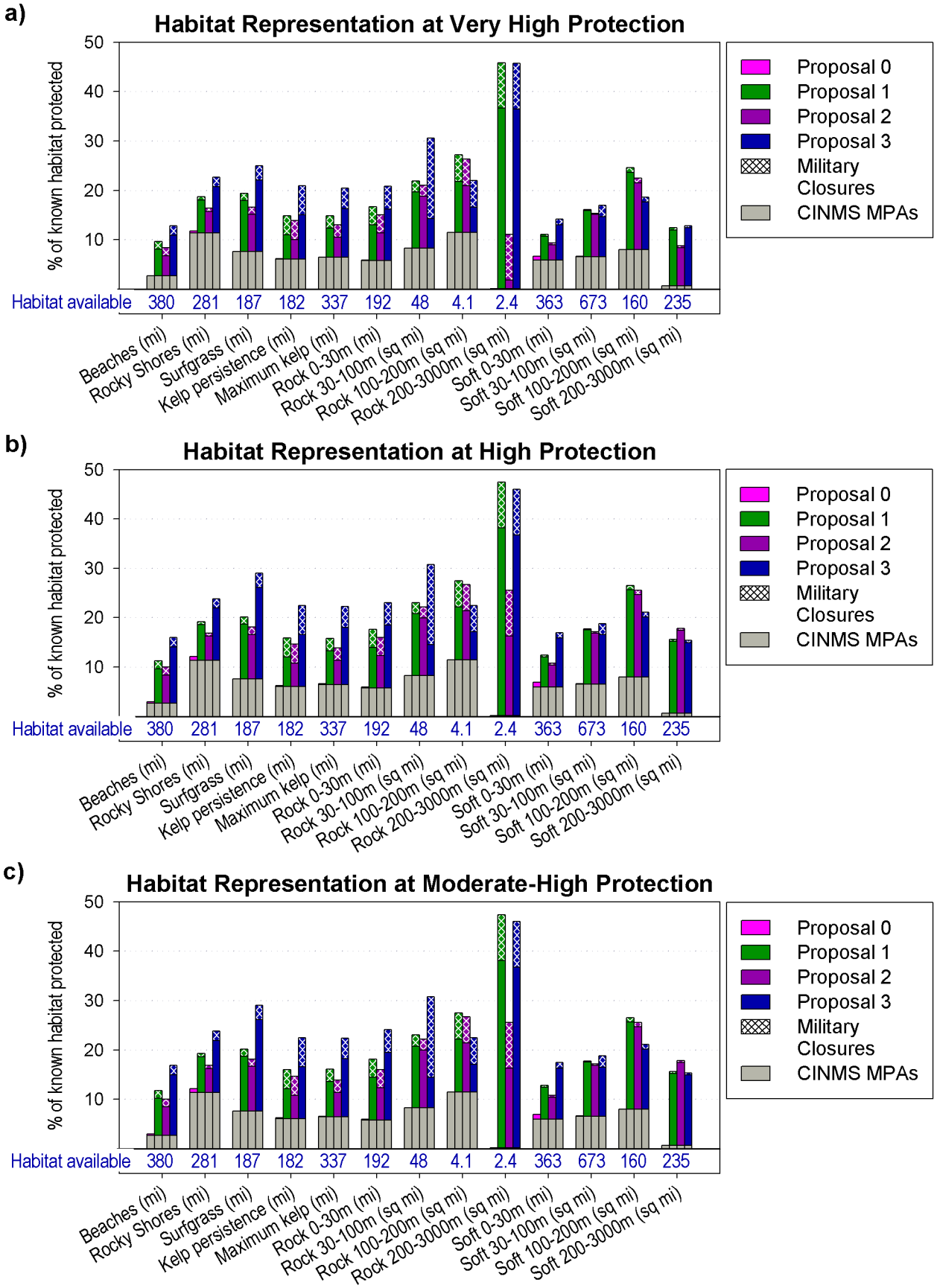
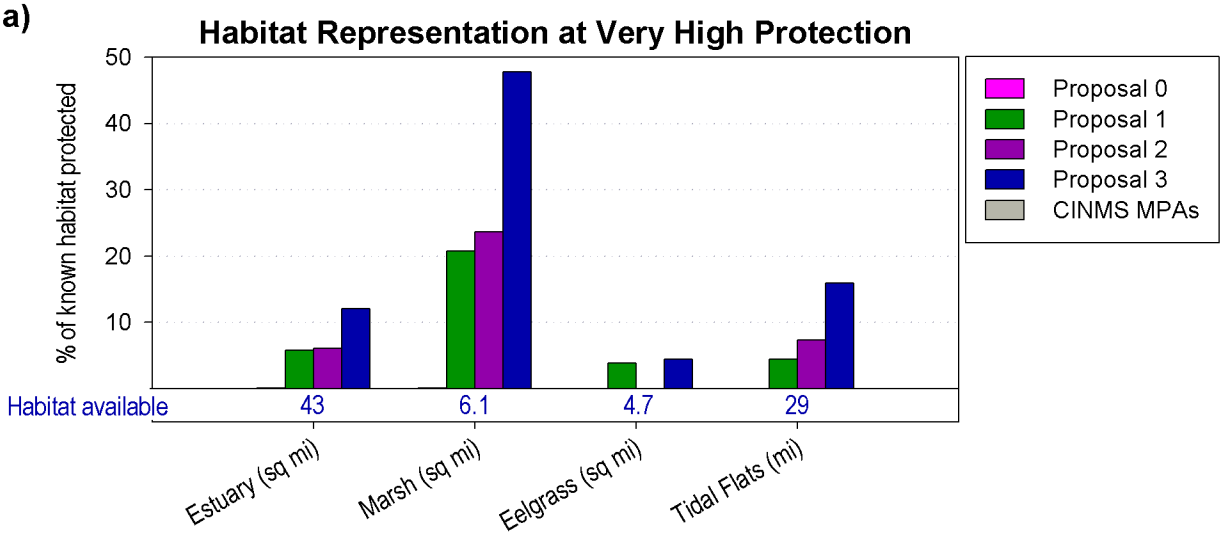
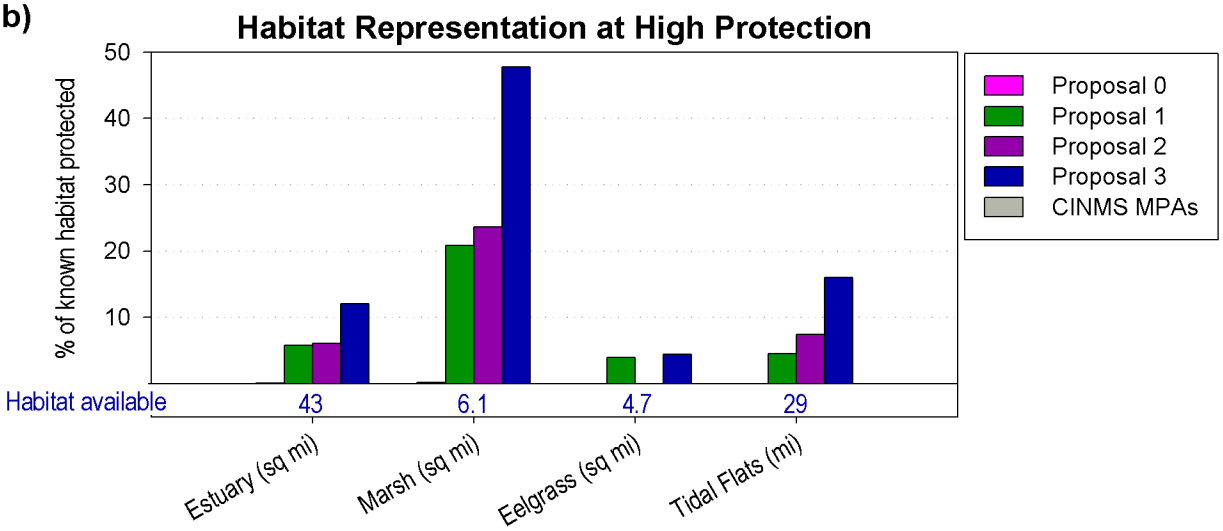


Figure 2.5: Habitat Representation Overview - Estuarine Habitats

a)



b)



c)

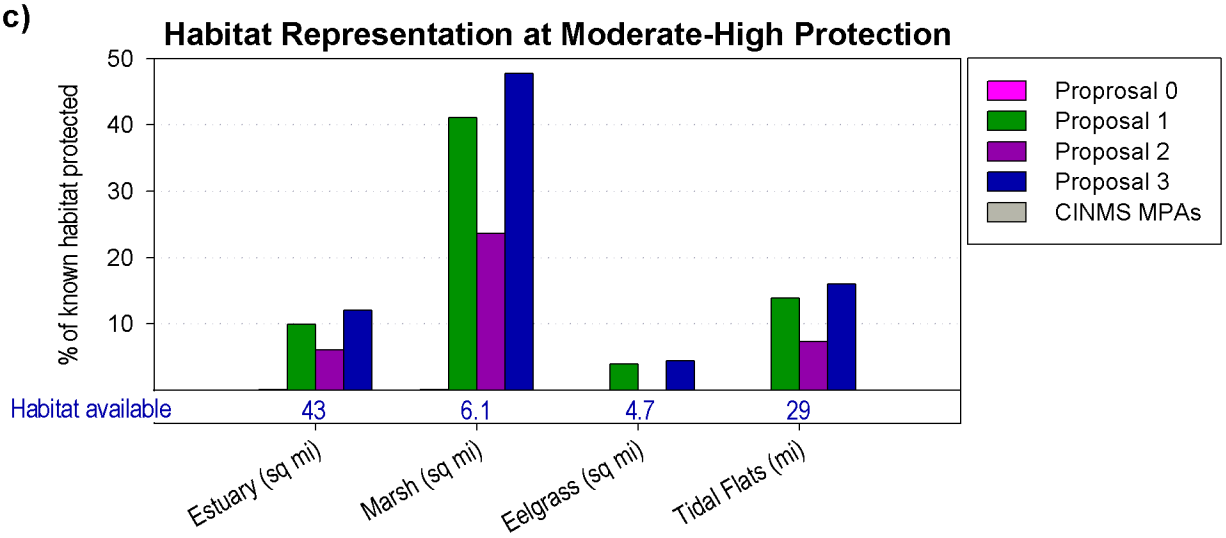


Figure 3.1: Habitat Replication by Study Region - Open Coast Habitats

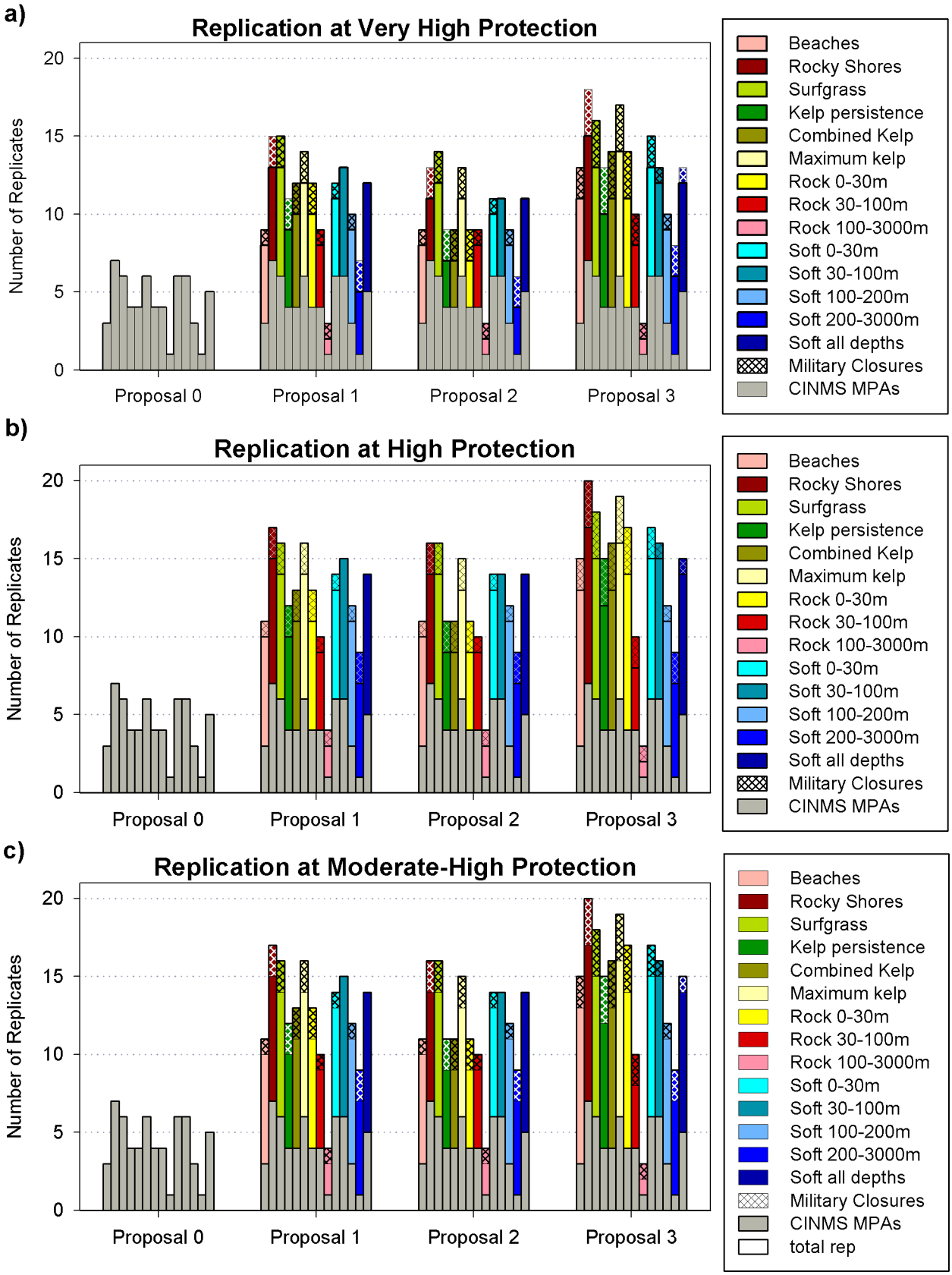


Figure 3.2: Habitat Replication by Study Region - Depth Zones

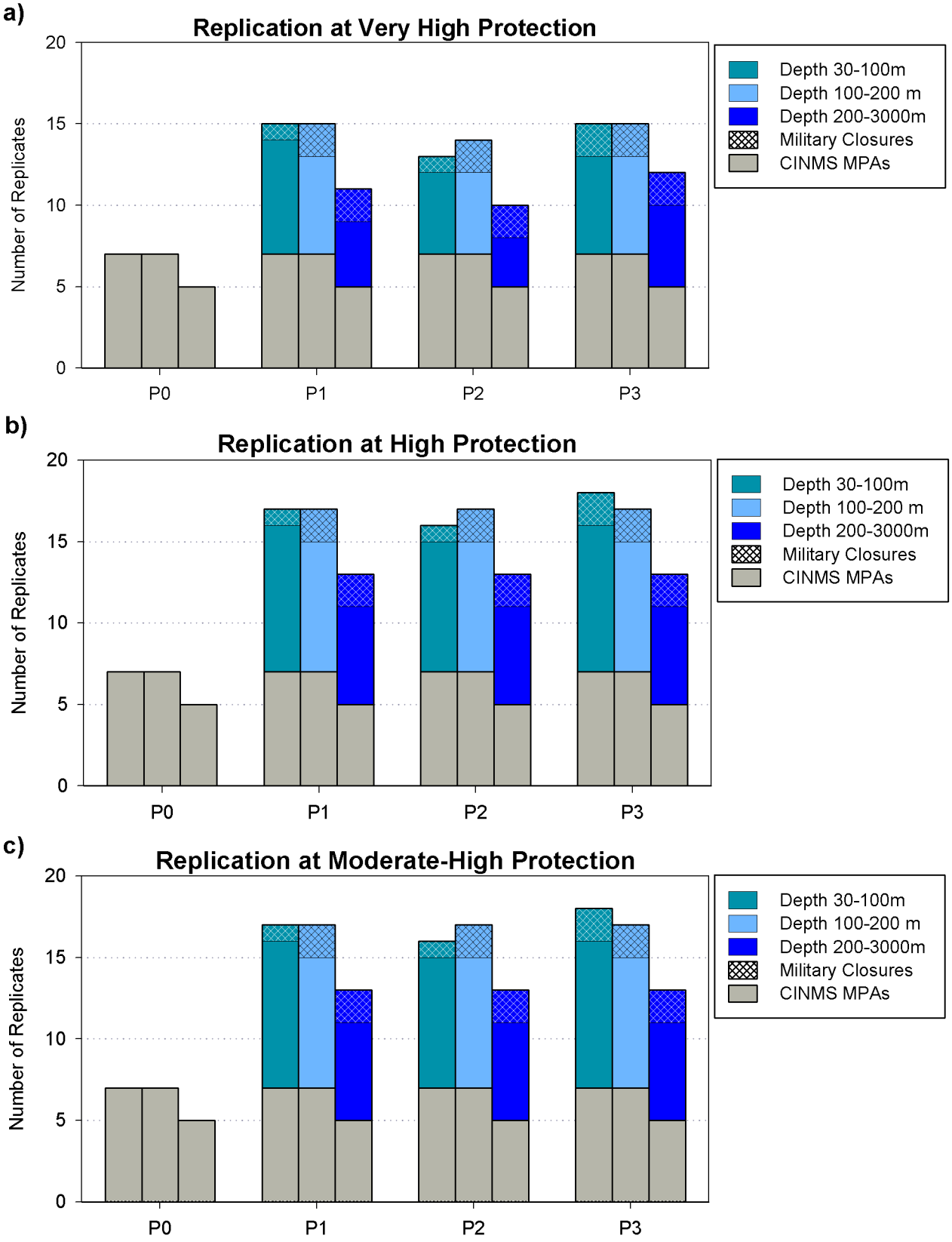


Figure 3.3: Habitat Replication by Study Region - Estuarine Habitats

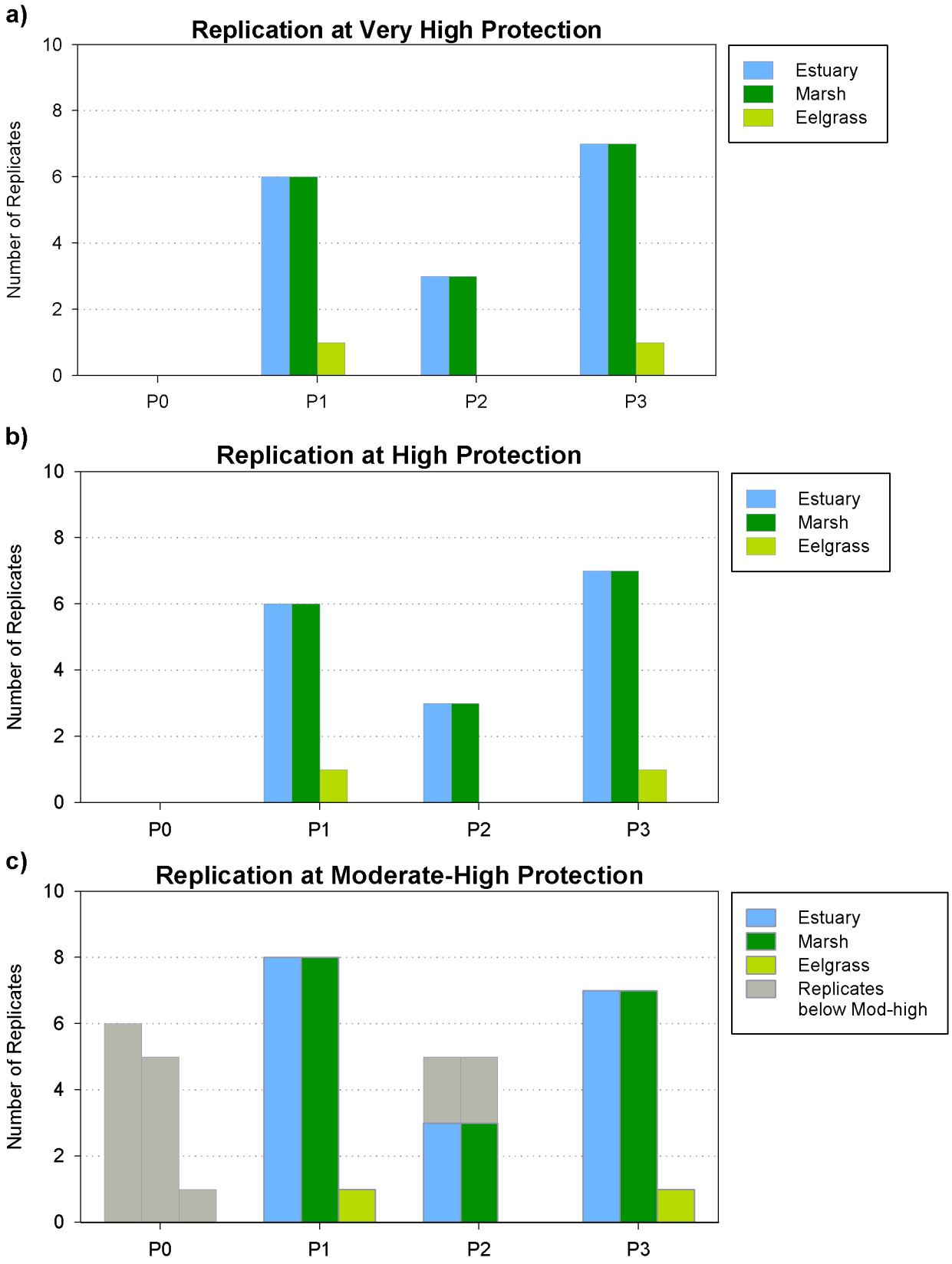


Figure 3.4: Habitat Replication by Bioregion

a	Rocky Shores (5)			Surfgrass (5)			Kelp persist. (5)			Maximum kelp (5)			Rock 0-30m (5)			Rock 30-100m (5)			Rock 100-3000m (4)		
	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH
Proposal 0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Proposal 1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4	4
Proposal 2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4	4
Proposal 3	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3

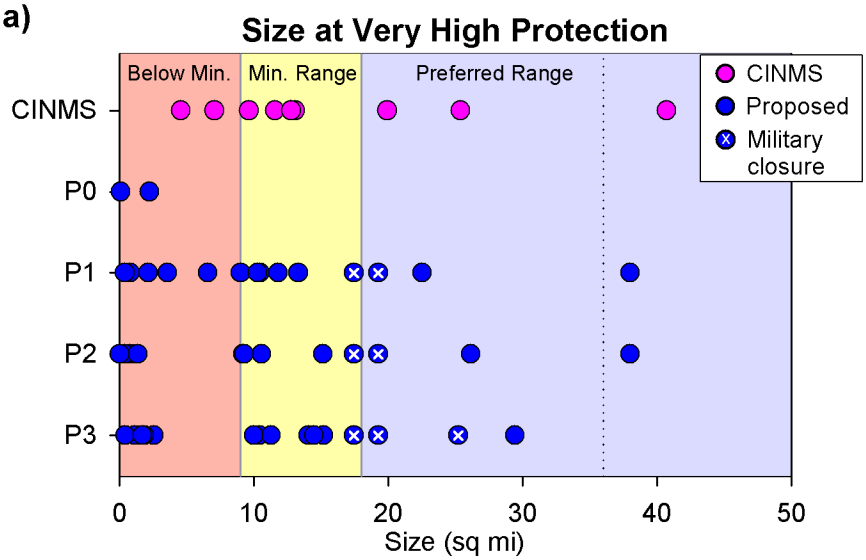
b	Beaches (5)			Soft 0-30m (5)			Soft 30-100m (5)			Soft 100-200m (5)			Soft 200-3000m (4)			Soft all depths (5)		
	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH
Proposal 0	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2
Proposal 1	5	5	5	5	5	5	4	5	5	5	5	5	3	4	4	5	5	5
Proposal 2	5	5	5	5	5	5	4	5	5	5	5	5	3	4	4	4	5	5
Proposal 3	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	5	5	5

c	Depth 30-100m (5)			Depth 100-200 m (5)			Depth 200-3000m (5)		
	VH	H	MH	VH	H	MH	VH	H	MH
Proposal 0	2	2	2	2	2	2	2	2	2
Proposal 1	5	5	5	5	5	5	4	5	5
Proposal 2	5	5	5	5	5	5	4	5	5
Proposal 3	5	5	5	5	5	5	5	5	5

d	Estuary (2)			Marsh (2)			Eelgrass (1)			Tidal Flats (0)		
	VH	H	MH	VH	H	MH	VH	H	MH	VH	H	MH
Proposal 0	0	0	0	0	0	0	0	0	0	0	0	0
Proposal 1	2	2	2	2	2	2	1	1	1	0	0	0
Proposal 2	2	2	2	2	2	2	0	0	0	0	0	0
Proposal 3	2	2	2	2	2	2	1	1	1	0	0	0

Figure 4.1: Size

a)

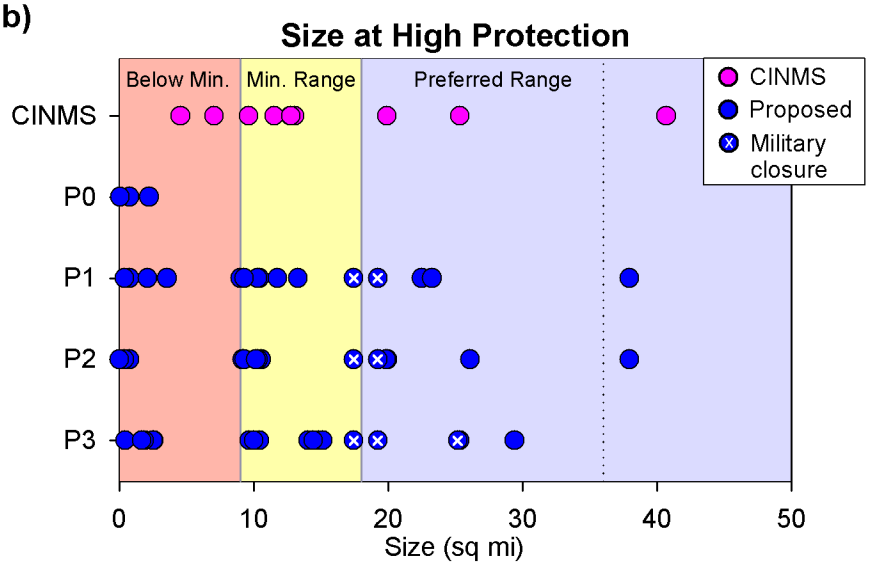


Number of MPA Clusters* at Very High Protection

Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
CINMS MPAs	3	5	3	11
Proposal 0	3	0	0	3
Proposal 1	5	6(1)	2(1)	13(2)
Proposal 2	4	5(1)	2(1)	11(2)
Proposal 3	5	7(1)	1(2)	13(3)

* Clusters tabulated above do not include CINMS MPAs in proposals, () indicates military closures

b)

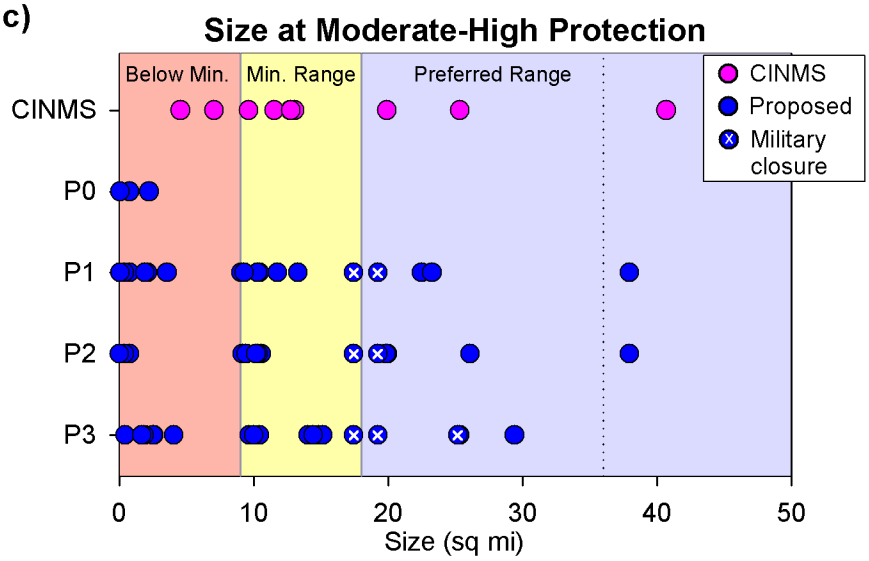


Number of MPA Clusters* at High Protection

Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
CINMS MPAs	3	5	3	11
Proposal 0	4	0	0	4
Proposal 1	4	7(1)	3(1)	14(2)
Proposal 2	3	6(1)	4(1)	13(2)
Proposal 3	5	8(1)	2(2)	15(3)

* Clusters tabulated above do not include CINMS MPAs in proposals, () indicates military closures

c)



Number of MPA Clusters* at Moderate-High Protection

Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
CINMS MPAs	3	5	3	11
Proposal 0	4	0	0	4
Proposal 1	6	7(1)	3(1)	16(2)
Proposal 2	3	6(1)	4(1)	13(2)
Proposal 3	6	8(1)	2(2)	16(3)

* Clusters tabulated above do not include CINMS MPAs in proposals, () indicates military closures

Figure 5.1: Spacing

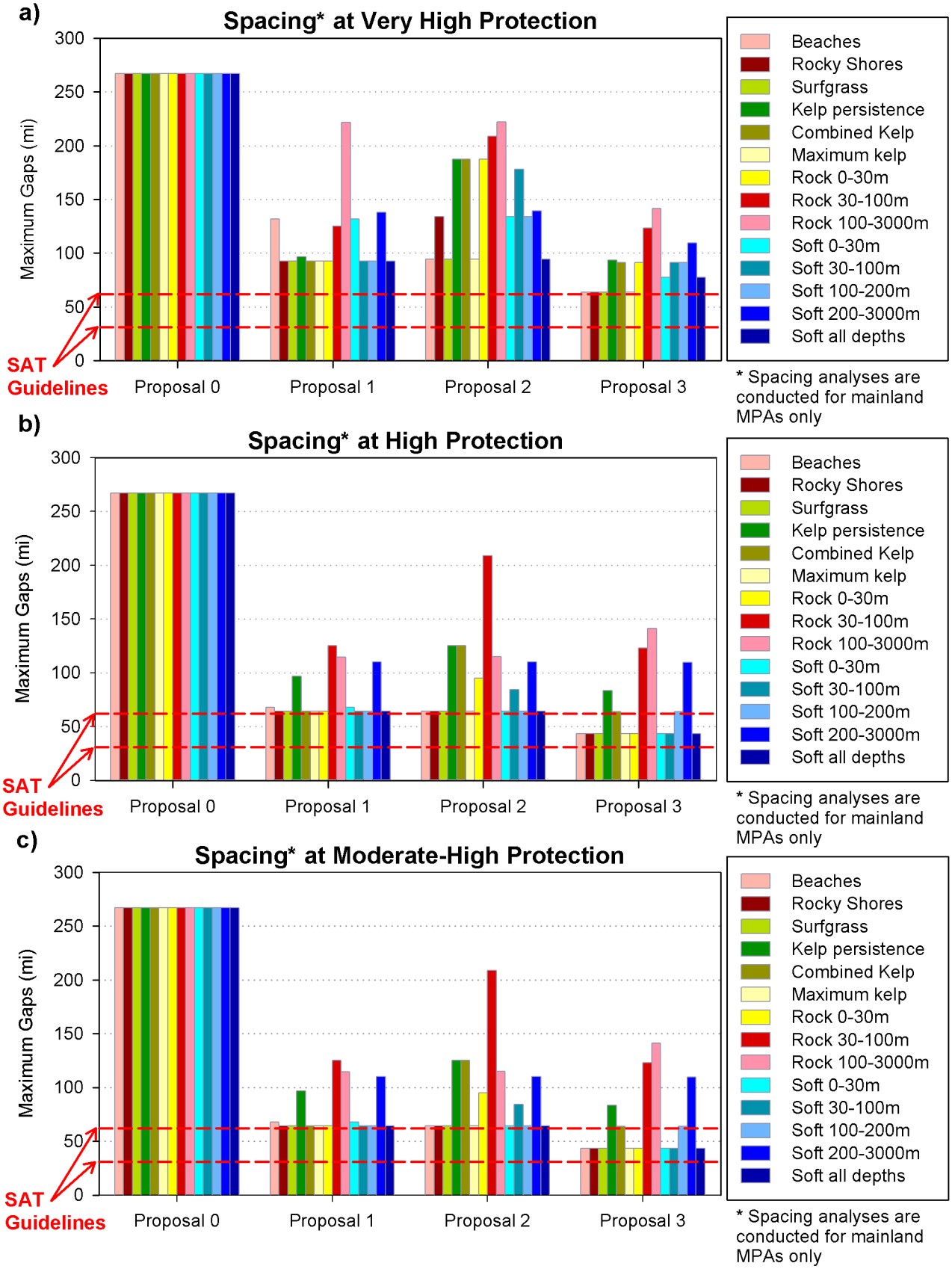


Table 5.2a: Gaps that exceed the SAT spacing guidelines and their locations - Proposal 1

Proposal 1		Very High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	1	132	Helo SMR to Laguna Cluster				
Rocky Shores	2	92	Helo SMR to Palos Verdes SMR	63	Laguna Cluster to Ocean Beach Cluster		
Surfgrass	1	92	Helo SMR to Palos Verdes SMR				
Kelp persistence	2	97	Palos Verdes SMR to Ocean Beach Cluster	92	Helo SMR to Palos Verdes SMR		
Combined kelp	2	92	Helo SMR to Palos Verdes SMR	63	Laguna Cluster to Ocean Beach Cluster		
Maximum kelp	2	92	Helo SMR to Palos Verdes SMR	63	Laguna Cluster to Ocean Beach Cluster		
hard 0 - 30m proxy	1	92	Helo SMR to Palos Verdes SMR				
hard 30 - 100m	2	125	Point Conception SMR to Palos Verdes SMR	97	Palos Verdes SMR to Ocean Beach Cluster		
hard 100 - 3000m	1	222	Vandenberg SMR CCSR to Del Mar SMR				
soft 0 - 30m proxy	1	132	Helo SMR to Laguna Cluster				
soft 30 - 100m	1	92	Helo SMR to Palos Verdes SMR				
soft 100 - 200m	1	92	Helo SMR to Palos Verdes SMR				
soft 200 - 3000m	1	138	Vandenberg SMR CCSR to Palos Verdes SMR				
soft 0 - 3000m	1	92	Helo SMR to Palos Verdes SMR				
Estuary	1	166	Carpinteria Salt Marsh SMR to Batiquitos Lagoon SMR				
Coastal Marsh (area)	1	166	Carpinteria Salt Marsh SMR to Batiquitos Lagoon SMR				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						

Proposal 1		High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	2	68	Point Dume Cluster to Laguna Cluster	64	Helo SMR to Point Dume Cluster		
Rocky Shores	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
Surfgrass	1	64	Helo SMR to Point Dume Cluster				
Kelp persistence	2	97	Palos Verdes SMR to Ocean Beach Cluster	64	Helo SMR to Point Dume Cluster		
Combined kelp	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
Maximum kelp	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
hard 0 - 30m proxy	1	64	Helo SMR to Point Dume Cluster				
hard 30 - 100m	2	125	Point Conception SMR to Palos Verdes SMR	97	Palos Verdes SMR to Ocean Beach Cluster		
hard 100 - 3000m	2	114	Point Dume Cluster to Del Mar SMR	110	Vandenberg SMR CCSR to Point Dume Cluster		
soft 0 - 30m proxy	2	68	Point Dume Cluster to Laguna Cluster	64	Helo SMR to Point Dume Cluster		
soft 30 - 100m	1	64	Helo SMR to Point Dume Cluster				
soft 100 - 200m	1	64	Helo SMR to Point Dume Cluster				
soft 200 - 3000m	1	110	Vandenberg SMR CCSR to Point Dume Cluster				
soft 0 - 3000m	1	64	Helo SMR to Point Dume Cluster				
Estuary	1	166	Carpinteria Salt Marsh SMR to Batiquitos Lagoon SMR				
Coastal Marsh (area)	1	166	Carpinteria Salt Marsh SMR to Batiquitos Lagoon SMR				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						

Proposal 1		Moderate-High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	2	68	Point Dume Cluster to Laguna Cluster	64	Helo SMR to Point Dume Cluster		
Rocky Shores	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
Surfgrass	1	64	Helo SMR to Point Dume Cluster				
Kelp persistence	2	97	Palos Verdes SMR to Ocean Beach Cluster	64	Helo SMR to Point Dume Cluster		
Combined kelp	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
Maximum kelp	2	64	Helo SMR to Point Dume Cluster	63	Laguna Cluster to Ocean Beach Cluster		
hard 0 - 30m proxy	1	64	Helo SMR to Point Dume Cluster				
hard 30 - 100m	2	125	Point Conception SMR to Palos Verdes SMR	97	Palos Verdes SMR to Ocean Beach Cluster		
hard 100 - 3000m	2	114	Point Dume Cluster to Del Mar SMR	110	Vandenberg SMR CCSR to Point Dume Cluster		
soft 0 - 30m proxy	2	68	Point Dume Cluster to Laguna Cluster	64	Helo SMR to Point Dume Cluster		
soft 30 - 100m	1	64	Helo SMR to Point Dume Cluster				
soft 100 - 200m	1	64	Helo SMR to Point Dume Cluster				
soft 200 - 3000m	1	110	Vandenberg SMR CCSR to Point Dume Cluster				
soft 0 - 3000m	1	64	Helo SMR to Point Dume Cluster				
Estuary	1	107	Carpinteria Salt Marsh SMR to Bolsa Chica SMCA				
Coastal Marsh (area)	1	107	Carpinteria Salt Marsh SMR to Bolsa Chica SMCA				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						

Table 5.2b: Gaps that exceed the SAT spacing guidelines and their locations - Proposal 2

Proposal 2		Very High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	1	95	Campus Point SMR to Point Vicente Cluster				
Rocky Shores	1	134	Campus Point SMR to Laguna Cluster				
Surfgrass	1	95	Campus Point SMR to Point Vicente Cluster				
Kelp persistence	1	188	Campus Point SMR to Sunset Cliffs Cluster				
Combined kelp	1	188	Campus Point SMR to Sunset Cliffs Cluster				
Maximum kelp	1	95	Campus Point SMR to Point Vicente Cluster				
hard 0 - 30m proxy	1	188	Campus Point SMR to Sunset Cliffs Cluster				
hard 30 - 100m	1	209	Point Conception SMR to Del Mar SMR				
hard 100 - 3000m	1	222	Vandenberg SMR CCSR to Del Mar SMR				
soft 0 - 30m proxy	1	134	Campus Point SMR to Laguna Cluster				
soft 30 - 100m	1	178	Campus Point SMR to Del Mar SMR				
soft 100 - 200m	1	134	Campus Point SMR to Laguna Cluster				
soft 200 - 3000m	1	140	Vandenberg SMR CCSR to Point Vicente Cluster				
soft 0 - 3000m	1	95	Campus Point SMR to Point Vicente Cluster				
Estuary	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Coastal Marsh (area)	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Eelgrass	1	272	Santa Ynez River CCSR to South Boundary of SCSR				
Tidal Flats	NA						

Proposal 2		High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	1	64	Campus Point SMR to Point Dume SMCA				
Rocky Shores	1	64	Campus Point SMR to Point Dume SMCA				
Surfgrass	1	64	Campus Point SMR to Point Dume SMCA				
Kelp persistence	2	125	Point Dume SMCA to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
Combined kelp	2	125	Point Dume SMCA to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
Maximum kelp	1	64	Campus Point SMR to Point Dume SMCA				
hard 0 - 30m proxy	2	95	Point Vicente Cluster to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
hard 30 - 100m	1	209	Point Conception SMR to Del Mar SMR				
hard 100 - 3000m	2	115	Point Dume SMCA to Del Mar SMR	110	Vandenberg SMR CCSR to Point Dume SMCA		
soft 0 - 30m proxy	1	64	Campus Point SMR to Point Dume SMCA				
soft 30 - 100m	2	84	Point Vicente Cluster to Del Mar SMR	64	Campus Point SMR to Point Dume SMCA		
soft 100 - 200m	1	64	Campus Point SMR to Point Dume SMCA				
soft 200 - 3000m	1	110	Vandenberg SMR CCSR to Point Dume SMCA				
soft 0 - 3000m	1	64	Campus Point SMR to Point Dume SMCA				
Estuary	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Coastal Marsh (area)	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Eelgrass	1	272	Santa Ynez River CCSR to South Boundary of SCSR				
Tidal Flats	NA						

Proposal 2		Moderate-High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	1	64	Campus Point SMR to Point Dume SMCA				
Rocky Shores	1	64	Campus Point SMR to Point Dume SMCA				
Surfgrass	1	64	Campus Point SMR to Point Dume SMCA				
Kelp persistence	2	125	Point Dume SMCA to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
Combined kelp	2	125	Point Dume SMCA to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
Maximum kelp	1	64	Campus Point SMR to Point Dume SMCA				
hard 0 - 30m proxy	2	95	Point Vicente Cluster to Sunset Cliffs Cluster	64	Campus Point SMR to Point Dume SMCA		
hard 30 - 100m	1	209	Point Conception SMR to Del Mar SMR				
hard 100 - 3000m	2	115	Point Dume SMCA to Del Mar SMR	110	Vandenberg SMR CCSR to Point Dume SMCA		
soft 0 - 30m proxy	1	64	Campus Point SMR to Point Dume SMCA				
soft 30 - 100m	2	84	Point Vicente Cluster to Del Mar SMR	64	Campus Point SMR to Point Dume SMCA		
soft 100 - 200m	1	64	Campus Point SMR to Point Dume SMCA				
soft 200 - 3000m	1	110	Vandenberg SMR CCSR to Point Dume SMCA				
soft 0 - 3000m	1	64	Campus Point SMR to Point Dume SMCA				
Estuary	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Coastal Marsh (area)	1	138	Point Mugu SMRMA to San Dieguito Lagoon SMR				
Eelgrass	1	272	Santa Ynez River CCSR to South Boundary of SCSR				
Tidal Flats	NA						

Table 5.2c: Gaps that exceed the SAT spacing guidelines and their locations - Proposal 3

Proposal 3		Very High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	1	64	UCSB SMR to Point Dume Cluster				
Rocky Shores	1	64	UCSB SMR to Point Dume Cluster				
Surfgrass	1	64	UCSB SMR to Point Dume Cluster				
Kelp persistence	2	94	Palos Verdes SMR to South La Jolla Reefs SMR	91	UCSB SMR to Palos Verdes SMR		
Combined kelp	1	91	UCSB SMR to Palos Verdes SMR				
Maximum kelp	1	64	UCSB SMR to Point Dume Cluster				
hard 0 - 30m proxy	1	91	UCSB SMR to Palos Verdes SMR				
hard 30 - 100m	2	123	Point Conception SMR to Palos Verdes SMR	94	Palos Verdes SMR to South La Jolla Reefs SMR		
hard 100 - 3000m	2	141	Point Dume Cluster to South Boundary of SCSR	109	Vandenberg SMR CCSR to Point Dume Cluster		
soft 0 - 30m proxy	2	77	Laguna Cluster to South Boundary of SCSR	64	UCSB SMR to Point Dume Cluster		
soft 30 - 100m	1	91	UCSB SMR to Palos Verdes SMR				
soft 100 - 200m	2	91	UCSB SMR to Palos Verdes SMR	77	Laguna Cluster to South Boundary of SCSR		
soft 200 - 3000m	2	109	Vandenberg SMR CCSR to Point Dume Cluster	77	Laguna Cluster to South Boundary of SCSR		
soft 0 - 3000m	2	77	Laguna Cluster to South Boundary of SCSR	64	UCSB SMR to Point Dume Cluster		
Estuary	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Coastal Marsh (area)	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						

Proposal 3		High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	0						
Rocky Shores	0						
Surfgrass	0						
Kelp persistence	2	83	Palos Verdes SMR to Swami's SMCA	64	UCSB SMR to Point Dume Cluster		
Combined kelp	1	64	UCSB SMR to Point Dume Cluster				
Maximum kelp	0						
hard 0 - 30m proxy	0						
hard 30 - 100m	2	123	Point Conception SMR to Palos Verdes SMR	94	Palos Verdes SMR to South La Jolla Reefs SMR		
hard 100 - 3000m	2	141	Point Dume Cluster to South Boundary of SCSR	109	Vandenberg SMR CCSR to Point Dume Cluster		
soft 0 - 30m proxy	0						
soft 30 - 100m	0						
soft 100 - 200m	1	64	UCSB SMR to Point Dume Cluster				
soft 200 - 3000m	1	109	Vandenberg SMR CCSR to Point Dume Cluster				
soft 0 - 3000m	0						
Estuary	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Coastal Marsh (area)	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						

Proposal 3		Moderate-High Protection					
Habitat	# gaps over guideline	gap #1	gap #1 location	gap #2	gap #2 location	gap #3	gap #3 location
Beaches	0						
Rocky Shores	0						
Surfgrass	0						
Kelp persistence	2	83	Palos Verdes SMR to Swami's SMCA	64	UCSB SMR to Point Dume Cluster		
Combined kelp	1	64	UCSB SMR to Point Dume Cluster				
Maximum kelp	0						
hard 0 - 30m proxy	0						
hard 30 - 100m	2	123	Point Conception SMR to Palos Verdes SMR	94	Palos Verdes SMR to South La Jolla Reefs SMR		
hard 100 - 3000m	2	141	Point Dume Cluster to South Boundary of SCSR	109	Vandenberg SMR CCSR to Point Dume Cluster		
soft 0 - 30m proxy	0						
soft 30 - 100m	0						
soft 100 - 200m	1	64	UCSB SMR to Point Dume Cluster				
soft 200 - 3000m	1	109	Vandenberg SMR CCSR to Point Dume Cluster				
soft 0 - 3000m	0						
Estuary	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Coastal Marsh (area)	1	72	Mugu Lagoon SMRMA to Bolsa Chica SMR				
Eelgrass	1	244	Santa Ynez River CCSR to Batiquitos Lagoon SMR				
Tidal Flats	NA						