

California MLPA Master Plan Advisory Team
Preliminary Description of Habitat Protection by Evaluation Subregions
within Draft Options for MPA Arrays and Draft External MPA Proposals
Revised November 28, 2007

The relative amount of protection afforded to 12 different habitat types by each of the 11 packages within the entire study region and within each of the three subregions was evaluated using the SAT levels of protection assigned to each MPA (i.e., Very High, High, Mod-High, Moderate, Low-mod, and Low), the amount of habitats available in each subregion, and the amount of habitats protected within the proposed MPAs. We assumed no kelp harvesting occurs in the proposed MPAs unless specifically designated. The estimated area (or linear extent) of habitat in each proposed MPA was divided by the estimated area (or linear extent) of each habitat available in each subregion. These proportions were summed across MPAs of similar protection level within a subregion to estimate percentage of habitat protected at each level within each sub-region for each package. The following comments are based on our interpretations of this information.

Package: 0

North Subregion: Point Arena to Point Reyes

Comments: Most of the 12 habitats present in the north subregion are represented only in low protection MPAs. Of only four habitats represented in very high protection MPAs, only surfgrass (6%) has more than 1% of the available habitat in very high protection. To achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats represented in this region, none received protection greater than low. To achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed.

Farallones Subregion: Farallon Islands

Comments: None of the seven habitats represented in the Farallones received protection greater than low. To achieve MLPA Goals 1 and 4, more MPAs of higher protection level would be needed.

Package: EA

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats represented in this subregion, 8 have between 15% and 40% of the available habitat protected in very high protection MPAs. The exceptions are eelgrass (10%), estuaries (14%), deep soft bottom (4%), and deep hard bottom (10%). Inclusion of high and mod-high protection MPAs in the analysis increases representation of deep soft bottom habitat to 12% of available. A considerable amount of estuarine environments received a moderate level of protection because the fate of mariculture activities in Tomales bay was not specified.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats represented in this subregion, 7 have between 15% and 39% of their available extent protected in very high protection MPAs. The exceptions are: eelgrass (<1%), shallow soft (6%) and deep soft bottom (2%), and deep hard habitats (8%). Inclusion of high and mod-high protection MPAs in the analysis increases representation of soft bottom shallow and deep to 8% and 13%, respectively. A considerable amount of estuarine environments received a moderate level of protection because the fate of oyster farming activities in Drakes Estero was not specified.

Farallones Subregion: Farallon Islands

Comments: All 7 habitats in the Farallons have at least 33% of their available extent in very high protection MPAs.

Package: EB

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 5 have between 15 and 40% of their available extent protected in very high protection MPAs. These include coastal marsh, tidal flats, surfgrass, and shallow and deep hard bottom. The habitats with the smallest proportion of available extent under very high protection are deep soft bottom (5%) and kelp (5%). Inclusion of high mod-high protection in this analysis increases shallow soft and deep hard representation to 10% and 29% respectively.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 7 have between 15 and 36% of their available extent protected in very high protection MPAs. These include rocky intertidal, coastal marsh, tidal flats, surfgrass, estuaries, and shallow and deep hard bottom. Only eelgrass is not represented in any high protection MPA, the remaining habitats have 6%-13% of their available extent in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increased representation of deep soft habitat from 13% to 21%. A considerable amount of estuarine environments received a moderate level of protection because the fate of oyster farming activities in Drakes Estero was not specified.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the Farallon subregion, 5 have 23-43% of their available extent protected in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increased deep soft bottom representation from 5% to 21%. Surfgrass is not represented in any MPA.

Package: JA

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 6 have between 15 and 41% of their available extent protected in very high protection MPAs. The remaining habitats are represented in very high protection MPAs as follows: sandy beach (14%), deep soft bottom (14%), estuaries (7%),

shallow soft bottom (9%), and tidal flats and eelgrass (<2%). Inclusion of high and mod-high protection MPAs in the analysis increases deep soft bottom representation to 26% and deep hard to 35%.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 7 have between 18% and 100% of their available extent protected in very high protection MPAs. Shallow soft bottom, deep hard bottom, and sandy beach are represented 8-11%. Deep soft bottom has 3% of its available extent in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases sandy beach representation to 18%, tidal flats to 59%, shallow soft bottom to 11%, deep soft bottom to 38%, and deep hard to 14%.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the farallon subregion, 6 have 40-100% of their available extent protected in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases deep hard representation to 49% and raises deep soft bottom from 4% to 32%.

Package: JB

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 5 have between 15 and 41% of their available extent protected in very high protection MPAs. These include rocky intertidal, coastal marsh, surfgrass, shallow hard bottom, and kelp habitat. The remaining habitats have 0-13% of their available extent in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of surfgrass to 19%, shallow hard to 23%, deep soft from 3% to 13%, and deep hard from 11% to 31%.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 7 have from 15-100% of their available extent protected in very high protection MPAs. The remaining habitats include sandy beach (7%) shallow soft bottom (5%), deep soft bottom (2%), and deep hard bottom (8%). Inclusion of high and mod-high protection MPAs in the analysis has no effect on representation of any habitat. 36% of the available deep soft bottom habitat received a moderate level of protection because of allowed halibut harvest.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the Farallones subregion, 5 have 83-100% of their available extent protected in very high protection MPAs. The exceptions are deep hard bottom (13%) and deep soft bottom (3%). Inclusion of high and mod-high protection MPAs in the analysis increases deep soft bottom representation to 14%.

Package: TA

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 4 have between 15 and 30% of their available extent included in very high protection MPAs. These include surfgrass, shallow and deep hard bottom, and coastal marsh. Eelgrass is not represented in any MPA in the study region. All other habitats have 2-10% of their available extent in very high protection. Inclusion of high and mod-high protection MPAs in the analysis increases coastal marsh representation to 41% and raises sandy beach from 7% to 17%, rocky intertidal from 10% to 14%, estuaries from 4% to 7%, and shallow and deep soft bottom to 15% and 17% respectively.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 6 have from 25-100% of their available extent protected in very high protection MPAs. The remaining habitats include sandy beach (8%), shallow soft bottom (6%), deep soft bottom (2%), shallow hard bottom (13%), and deep hard bottom (5%). Inclusion of high and mod-high protection MPAs in the analysis has no effect on this representation. Substantial amounts of these habitats are included in MPAs that received a moderate level of protection because of allowed halibut harvest.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the Farallones subregion, 6 have 27-100% of their available extent protected in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of deep soft bottom from 2% to 54%.

Package: TB

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 6 have between 15 and 31% of their available extent protected in very high protection MPAs. Representation of sandy beach, tidal flats, estuaries, and shallow and deep soft bottom ranges from 5% to 9%. Eelgrass is not represented in any MPA in the subregion. Inclusion of high and mod-high protection MPAs in the analysis increases representation of coastal marsh to 41% and raises sandy beach representation from 9-19%, shallow soft bottom from 6% to 16% and deep soft bottom from 5% to 14%.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 6 have from 32-100% of their available extent protected in very high protection MPAs. The remaining habitats include sandy beach (12%), shallow soft bottom (6%), deep soft bottom (3%), shallow hard bottom (13%), and deep hard bottom (7%). Inclusion of high and mod-high protection MPAs in the analysis increase representation shallow hard bottom to 17% but does not raise representation of deep hard bottom or shallow and deep soft bottom above 15%.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the farallon subregion, 6 have 29-100% of their available extent protected in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis raises deep soft bottom representation from 4% to 17%.

Package: A

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, only 8 are represented in very high protection MPAs and all have less than 15% of their available extent included in these MPAs. Those with more than 5% of available habitat protected in very high protection MPAs include rocky intertidal (11%) surfgrass (13%) shallow hard bottom (12%) and kelp (11%). Inclusion of high and mod-high protection MPAs in the analysis does not increase representation of any habitat.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 5 have from 21-39% of their available extent protected in very high protection MPAs. Only shallow and estuarine habitats have more than 15% of their available extent in high protection. Inclusion of high and mod-high protection MPAs in the analysis does not increase representation of any habitat. Less than 2% of shallow and deep soft, and deep hard habitats are protected above the low level of protection.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the Farallones subregion, 5 have 46-90% of their available extent protected in very high protection MPAs. Less than 3% of deep soft and deep hard bottom are protected above low level of protection.

Package: B

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 5 have from 15-20% of their available extent protected in very high protection MPAs. These include, rocky intertidal, surfgrass, and shallow hard bottom. Tidal flats and eelgrass are not represented in any MPA. Only 2-3% of estuaries and deep soft bottom are protected above low level of protection. All other habitats have 10-13% of their available extent included in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not increase habitat representation.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 7 have from 15-100% of their available extent protected in very high protection MPAs. 2-7% of sandy beach, shallow and deep soft bottom, and deep hard bottom are represented at very high protection. Inclusion of high and mod-high protection MPAs in the analysis does not increase representation.

Farallones Subregion: Farallon Islands

Comments: Of the 7 habitats in the farallon subregion, 5 have 27-60% of their available extent protected in very high protection MPAs. The exceptions are deep soft (2%) and deep hard

(7%) in very high protection. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Package: C

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 7 have from 19-40% of their available extent protected in very high protection MPAs. Coastal marsh and shallow soft bottom are represented by 5% and 11% respectively. Tidal flats, eelgrass and estuaries have 1% or less under very high protection. Inclusion of high and mod-high protection MPAs in the analysis increased deep soft bottom representation to 33% and deep hard bottom to 47%.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, all but shallow soft bottom (13%) are represented by 15-100% in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases deep soft bottom representation from 18% to 36%.

Farallones Subregion: Farallon Islands

Comments: All 7 habitats in the subregion have 51-100% of their available extent in very high protection MPAs.

Package: D

Subregion

North Subregion: Point Arena to Point Reyes

Comments: Of the 12 habitats in the subregion, 6 have from 15-31% of their available extent protected in very high protection MPAs. Coastal marsh, tidal flats, eelgrass, and estuaries are not represented in MPAs above a low level of protection. Shallow and deep soft bottom have 3% and 6% respectively under very high protection. Inclusion of high and mod-high protection MPAs in the analysis increases representation of deep soft bottom from 3% to 14%.

South Subregion: Point Reyes to Pigeon Point

Comments: Of the 11 habitats in this subregion, 7 have 15-100% of their available extent in very high protection MPAs. Of the remaining, sandy beach, and shallow and deep hard bottom have 9-10% under very high protection, shallow and deep soft bottom have 5% and 3% respectively. Inclusion of high and mod-high protection MPAs in the analysis increases representation of shallow and deep soft bottom to 6% and 12%, respectively.

Farallones Subregion: Farallon Islands

Comments: The Farallones subregion was not considered in this proposal.

Comparison Among Proposed Packages by Habitat Types and Subregions

Levels of protection of select habitats were compared among the five packages. We selected eight key habitats (shallow [0-100 m depth] and deep [>100 m depth] rock and sand, estuary, intertidal rock, sand beach, and kelp) and compared levels of protection across the five packages (1) for the entire study region (Figure 4), and (2) for each of the seven subregions. The following is our interpretation of the comparison of the five proposed packages in terms of these eight habitats across subregions.

Sand Beach

There is a substantial amount (>50 linear miles) of sandy beach habitat in the north and south subregions. The Farallones subregion has less than 0.1 linear miles of sandy beach.

North Subregion: Point Arena to Point Reyes

Comments: Proposals C, D, and EA, protect 16-23% of available sandy beach in very high protection MPAs. Proposals B, EB, JA, and JB, include 12-14%, and proposals TA and TB include 7-9%. Proposals 0 and A protect less than 2% of available beach habitat. Inclusion of high and mod-high protection MPAs in the analysis increase representation in proposals TA and TB by an additional 10%.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposals EA, and C include 15% and 17% respectively of sand beach habitat in very high protection MPAs. JA, TB, and A contain 11-12% and EB, JB, B, and D protect 6-9%. Proposal 0 does not include any sand beach in very high protection. Inclusion of high and mod-high protection MPAs in the analysis increases sandy beach representation in proposal JA from 11% to 19%.

Farallones Subregion: Farallon Islands

Comments: Proposals JA, JB, TA, and TB protect 100% of sandy beach habitat in very high protection MPAs. Proposals EA, A, B, and C protect 60-64%, and EB protects 23%. Proposals D and 0 do not include any sand beach habitat in high protection. Inclusion of high and mod-high protection MPAs does not change habitat representation.

Overarching comments:

- The Russian River SMCA [North region] in proposals TA and TB includes a good amount of sandy beach in mod-high protection because of crab harvest.
- The Point Reyes SMCA in proposal JA includes quite a bit of sandy beach at mod-high (6) protection because of undefined salmon gear and crab. Duxbury SMCA [South region] also has a lot of sand but allows halibut (moderate protection)
- There are just three very small sandy beaches on the Farallons
- Most proposals do not target sandy beach areas for MPAs
- all packages are an improvement over Proposal 0

Habitat: Rocky Intertidal

Rocky intertidal represents a substantial proportion of the shoreline in all subregions. The north subregion has the greatest linear extent (~100 linear miles) and south and Farallones subregions have 58 and 7 linear miles respectively.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA, JA, JB, TB, B, C, and D [[MOST PROPOSALS]] include 18-31% of available rocky intertidal habitat in very high protection MPAs. EB, TA, and A protect 10-11% and proposal 0 protects just 1% in very high protection. Inclusion of high and mod-high protection MPAs in the analysis raises rocky intertidal representation in proposal TA from 10% to 14% and TB from 24% to 29%

South Subregion: Point Reyes to Pigeon Point

Comments: Proposal EB protects 17% of available rocky intertidal habitat. All other proposals protect 21-42% except for proposal 0 which does not include rocky intertidal habitat in any MPAs. Inclusion high and mod-high protection MPAs in the analysis does not change this representation.

Farallones Subregion: Farallon Islands

Comments: Proposals TB, TA, JB, and JA include 87-100% of rocky intertidal habitat in very high protection MPAs. EA, EB, A, B, and C include 27-50% while proposals 0 and D do not protect rocky intertidal habitat in any MPA. Inclusion high and mod-high protection MPAs in this analysis does not change this representation.

Overarching comments:

- The Russian River SMCA [north region] in proposals TA and TB includes a good amount of rocky intertidal in mod-high protection because of crab harvest.
- all packages are an improvement over Proposal 0

Coastal marsh

Coastal marsh habitat is confined almost exclusively to estuarine embayments and river mouths. Tomales Bay in the north subregion and Drakes Estero in the south contain the largest concentrations of this habitat. The north and south subregions contain 20 and 30 linear miles respectively. There is no coastal marsh in the Farallones subregion.

North Subregion: Point Arena to Point Reyes

Comments: All internal proposals include 30-41% of coastal marsh habitat in very high protection MPAs. Proposals C and B contain 5% and 1% respectively, while proposals D, A, and 0 do not include coastal marsh in any high protection MPA. Inclusion of high and mod-high protection MPAs in the analysis increases the representation of coastal marsh in proposals TA and TB from 30% to 41%.

South Subregion: Point Reyes to Pigeon Point

Comments: Most proposals include 36-76% of coastal marsh in very high protection MPAs. Exceptions are proposal A (21%) and proposal 0 which does not include coastal

marsh in any high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Farallones Subregion: Farallon Islands

Comments: There is no coastal marsh in the Farallones subregion.

Overarching comments:

- The Russian River SMCA [north region] in proposals TA and TB includes a good amount of coastal marsh in mod-high protection because of crab harvest.
- In southern region, EA and EB have large areas at moderate LOP because they did not specify post-lease fate of mariculture.
- all packages are an improvement over Proposal 0

Tidal Flats

Tidal flat habitat is confined almost exclusively to estuarine embayments and river mouths. Tomales and Bodega bays in the north subregion and Drakes Estero and Bolinas Lagoon in the south, contain the largest concentrations of this habitat. The north and south subregions both contain approximately 9 linear miles of tidal flat. There is no tidal flat habitat in the Farallones subregion.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA and EB include 19% of tidal flat habitat in very high protection MPAs. All other proposals include less than 2% of this habitat in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

South Subregion: Point Reyes to Pigeon Point

Comments: Most proposals include 34-55% of coastal marsh in very high protection MPAs. The exceptions is proposal 0 which does not include tidal flats in any high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Farallones Subregion: Farallon Islands

Comments: There is no tidal flat in the Farallones subregion.

Overarching comments:

- The proposed SMRs at Estero Americano, Estero San Antonio [north region] and proposed expansion of the Tomales Bay south SMR in proposals EA and EB are responsible for the greater representation of tidal flats in these proposals.
- Other EA and EB, most proposals did not target protection of this habitat in the north (i.e Tomales Bay).
- A substantial amount of tidal flat in the proposed Tom's point MPA [also north region, mouth of Tomales Bay] (EA and EB) received a moderate level of protection because the fate of mariculture activities was not specified.
- all packages are an improvement over Proposal 0

Surfgrass:

Surfgrass is associated with rocky shorelines and present in all three subregions. The south subregion has the greatest extent of surfgrass (49 linear miles) followed by the north subregion (20 linear miles) and the Farallones (0.4 linear miles).

North Subregion: Point Arena to Point Reyes

Comments: All proposals include 16-33% of surfgrass habitat in very high protection MPAs except proposals A (13%) and 0 (6%). Inclusion of high and mod-high protection MPAs in the analysis has little effect on representation.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposal C includes 46% of surfgrass habitat in very high protection MPAs. All other packages include 21-29% in high protection except for proposal 0 which does not include surfgrass in any high protection MPA. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Farallones Subregion: Farallon Islands

Comments: Proposals JA, JB, TA, and TB protect 100% of the surfgrass habitat in very high protection MPAs. Proposals C, A, and EA protect 60% and proposals EB, D, and 0 do not include surfgrass in any high protection MPAs.

Overarching comments:

- Many of the proposals include additional area at the moderate LOP.
- all packages are an improvement over Proposal 0

Eelgrass

Eelgrass habitat is confined to estuarine embayments; Tomales Bay in the north subregion and Drakes Estero in the south contain the largest concentrations of this habitat. The north and south subregions contain 2.4 and 3.7 square miles respectively. There is no eelgrass in the Farallones subregion.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA and EB include 10% of eelgrass habitat in very high protection MPAs. No other proposals include eelgrass in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

South Subregion: Point Reyes to Pigeon Point

Comments: Most proposals include 100% of eelgrass in very high protection MPAs. Exceptions are proposal A (25%) and proposals 0, EA, and EB which do not include coastal marsh in any very high protection MPAs. Proposals EA and EB protect 100% of eelgrass under a moderate level of protection due to the unspecified fate of oyster farming activities. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Farallones Subregion: Farallon Islands

Comments: There is no eelgrass in the Farallones subregion.

Overarching comments:

- Lack of MPAs in Tomales Bay indicate that most proposals did not target this habitat for protection in the north region.
- The proposed SMR at Estero Americano and proposed expansion of the Tomales Bay south SMR in proposals EA and EB are responsible for the greater representation of eelgrass in these proposals.
- A substantial amount of eelgrass in the proposed Tom's point and Drakes Estero MPAs (EA and EB) received a moderate level of protection because the fate of mariculture activities was not specified.
- all packages are an improvement over Proposal 0

Estuaries:

Estuarine habitat is confined to embayments and river mouths; Tomales Bay in the north subregion and Drakes Estero in the south contain the largest concentrations of this habitat. The north and south subregions contain 13.7 and 5.7 square miles respectively. There is no estuarine habitat in the Farallones subregion.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA and EB include 14% of estuarine habitat in very high protection MPAs, JA, JB, TA, and TB contain 5-7%, and all other proposals contain 2% or less. Inclusion of high and mod-high protection MPAs in the analysis has little effect on representation.

South Subregion: Point Reyes to Pigeon Point

Comments: Most proposals include 67-68% of estuaries in very high protection MPAs. Exceptions are proposal EA and EB (31%), A (14%) and proposals 0 which does not include coastal marsh in any very high protection MPAs. Proposals EA and EB protect an additional 67% of estuaries under a moderate level of protection due to the unspecified fate of oyster farming activities in Drakes Estero. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Farallones Subregion: Farallon Islands

Comments: There is no estuarine habitat in the Farallones subregion.

Overarching comments:

- Lack of MPAs in Tomales Bay indicate that most proposals did not target this habitat for protection in the north region.
- The proposed SMR at Estero Americano [north region] and proposed expansion of the Tomales Bay south SMR in proposals EA and EB are responsible for the greater representation of estuaries in these proposals.

- A substantial amount of estuarine habitat in the proposed Tom's point [north region] and Drakes Estero [south region] MPAs (EA and EB) received a moderate level of protection because the fate of mariculture activities was not specified.
- all packages are an improvement over Proposal 0

Shallow soft bottom (0-30m):

Shallow soft bottom represents a substantial proportion of the bottom in the north and south subregions. The south subregion has the greatest area (117 square miles) and north and Farallones subregions have 31 and 7 square miles, respectively.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA and EB include 13-15% of shallow soft bottom habitat in very high protection MPAs. Proposals JA, JB, B, and C contain 9-11% and the remaining proposals include less than 6% of shallow soft bottom under very high protection. Inclusion of high and mod-high protection MPAs in the analysis increases representation in TA from 6% to 15% and TB from 6% to 16%.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposal C contains 13% of shallow soft bottom in very high protection MPAs. All other proposals contain less than 8% except proposal 0 which does not include shallow soft bottom above a low level of protection. Inclusion of high and mod-high protection MPAs in the analysis has little effect on representation.

Farallones Subregion: Farallon Islands

Comments: Proposals EA, JA, JB, TA, TB, A, and C protect 90-100% of shallow soft bottom habitat in very high protection MPAs. Proposals EB, and B contain 43% and 47% respectively. Proposals D and 0 do not include any shallow soft bottom in very high protection. Inclusion of high and mod-high protection MPAs in the analysis does not change representation.

Overarching comments:

- Few proposals appear to specifically target shallow soft bottom habitat for protection.
- Lower percentages for this habitat reflect the greater absolute amount available
- Proposals that include MPAs with a large alongshore span succeed in protecting a greater percentage of shallow soft habitat.
- Proposals TA and TB include a substantial amount of shallow soft bottom in the Russian River SMCA, which allows crabbing (mod-high protection).
- all packages are an improvement over Proposal 0

Deep soft bottom (30-100m):

Deep soft bottom represents a substantial proportion of the bottom in all subregions. The north subregion has the greatest area (215 square miles) and south and Farallones subregions have 122 and 77 square miles, respectively.

North Subregion: Point Arena to Point Reyes

Comments: Proposals JA and C include 14% and 19% respectively of deep soft bottom habitat in very high protection MPAs. All other proposals protect 7% or less in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis more than doubles representation of deep soft bottom for all proposals except A and B.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposals EB and C include 13% and 18% respectively of deep soft bottom habitat in very high protection MPAs. All other proposals protect 3% or less in very high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation in a number of proposals: EA (2% to 11%), EB (13% to 21%), JA (3% to 38%), TB (3% to 15%), C (18% to 36%) and D (3% to 11%).

Farallones Subregion: Farallon Islands

Comments: Proposals EA and C protect 33% and 100% respectively of deep soft bottom habitat in very high protection MPAs. All other proposals include less than 5% in very high protection. Inclusion of high and mod-high protection MPAs in the analysis increases representation in a number of proposals: EB (5% to 21%), JA (4% to 33%), JB (3% to 14%), TA (2% to 54%), and TB (4% to 17%).

Overarching comments:

- Lower percentages for this habitat reflect, in part, the greater absolute amount available
- Proposals JA and C and EB achieved very high protection of soft bottom habitat through SMRs that extend all the way to the boundary of state waters.
- Fishing activities that lowered protection levels for deep soft bottom habitat include salmon fishing with non-troll gear (mod-high), crabbing (mod-high) and halibut (moderate)
- all packages are an improvement over Proposal 0

Shallow hard bottom (0-30m):

Shallow hard bottom represents a substantial proportion of the bottom in all subregions. The north subregion has the greatest linear extent of shallow rocky reef (41 linear miles) and south and Farallones subregions have 21 and 5 linear miles respectively.

North Subregion: Point Arena to Point Reyes

Comments: Most proposals include 20-38% of shallow hard bottom habitat in very high protection MPAs. The exceptions are proposals A (12%) and 0 which does not protect any shallow rocky reef in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation of shallow hard bottom.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposals EB and C include 34-36% of shallow hard bottom habitat in very high protection MPAs. All other proposals include 17-18% with the exception of TA, TB, and A which include 13% and proposal 0 which does not protect any shallow rocky reef in

high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation of shallow hard bottom.

Farallones Subregion: Farallon Islands

Comments: Most proposals include 77-100% of shallow hard bottom habitat in very high protection MPAs. The exceptions are proposals A and EB (44-46%), B (32%), and D and Z which do not protect any shallow rocky reef in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis does not change representation of shallow hard bottom.

Overarching comments:

- Most proposals appeared to target shallow rocky reef habitat for protection.
- Proposals that included two MPA clusters (instead of one) south of SFB were generally more successful at protecting shallow hard bottom habitat in the south subregion.
- all packages are an improvement over Proposal 0

Deep hard bottom (30-100m):

Deep hard bottom represents a substantial proportion of the bottom in all subregions. The north subregion has the greatest area of rocky reef (32 square miles) and south and Farallones subregions have 9 and 11 square miles, respectively.

North Subregion: Point Arena to Point Reyes

Comments: Most proposals include 20-40% of deep hard bottom habitat in very high protection MPAs. The exceptions are proposals EA, JB, and B which include 10-11%, proposal A (5%) and 0 which does not protect any deep rocky reef in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of shallow hard bottom in proposal EB from 20% to 29%, in JB from 11% to 31%, in C from 40% to 47%, and in D from 31% to 36%.

South Subregion: Point Reyes to Pigeon Point

Comments: Proposals EB and C include 15% and 26% respectively of deep hard bottom habitat in very high protection MPAs. All other proposals include 5-10% with the exception of proposals A and 0 which include less than 1% of shallow rocky reef in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of shallow hard bottom in proposal EA from 8% to 10%, in JA from 8% to 14%, and in TB from 7% to 12%.

Farallones Subregion: Farallon Islands

Comments: Proposal C include 100% of shallow hard bottom habitat in very high protection MPAs. Proposals EA, EB, JA, TA, and TB include 24-41%, JB includes 13%, and all other proposals include less than 7% of shallow rocky reef in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of shallow hard bottom in proposal JA from 40% to 49%.

Overarching comments:

- Most proposals appeared to target deep rocky reef habitat for protection but most packages were more successful at encompassing a large proportion of this habitat in the north subregion.
- Fishing activities that lowered protection levels for deep hard bottom habitat include salmon fishing with non-troll gear (mod-high), crabbing (mod-high) and halibut (moderate)
- Proposals that included two MPA clusters (instead of one) south of SFB were generally more successful at protecting deep hard bottom habitat in the south subregion.
- all packages are an improvement over Proposal 0

Average kelp

The aerial images used by CDFG to estimate kelp coverage do not reliably capture presence of the dominant kelp species in the study region, bull kelp (*Nereocystis luetkeana*). Therefore, kelp coverage estimates for the region are low and indicate that kelp is only present in the north study region. This is incorrect, but shallow hard bottom can be used as a reasonable proxy for this habitat.

North Subregion: Point Arena to Point Reyes

Comments: Proposals EA, JA, TB, C, and D protect 27-33% of the kelp in very high protection MPAs. Proposals JB, TA, and A include 11-16%, proposal EB includes 5% and proposal 0 does not protect any kelp in high protection MPAs. Inclusion of high and mod-high protection MPAs in the analysis increases representation of kelp in proposal TA from 14% to 20%, in TB from 31% to 38%.

South Subregion: Point Reyes to Pigeon Point

Comments: Kelp maps do not show kelp in the south subregion.

Farallones Subregion: Farallon Islands

Comments: Kelp maps do not show kelp in the Farallones subregion.

Overarching comments:

- Where kelp is absent on the maps, protection of shallow rocky reef should ensure protection of kelp habitat.
- Fishing activities that lowered protection levels for kelp habitat include salmon fishing with non-troll gear (mod-high), crabbing (mod-high) and halibut (moderate)
- all packages are an improvement over Proposal 0

Summary

The SAT was asked to provide an evaluation of how well each of the proposed MPA packages achieves the statutory requirements of MLPA goals one and four. To evaluate the packages, we first reviewed the information provided by the proponents for each proposed MPA. We then identified levels of protection afforded by each proposed MPA, based on our knowledge of the habitats and species in the proposed MPAs and the types and magnitudes of impacts that we expect would be created by the proposed allowable activities in each MPA. The next step in our analysis included an evaluation of the habitats available in each of seven subregions in the

central coast study region, and the percentage of habitats protected by packages in each subregion. We used the percentage of habitat protected as the primary tool to determine the levels of habitat representation and protection for each package. These analyses provided quantitative estimates of the amount of habitats protected in all habitats, depths, and subregions of the central coast study area. This subregion approach provided an indication of how well proposed packages protect representative marine habitats (Goal 4) in central California.