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Marine Life Protection Act Initiative

Size and Spacing Evaluations of Round 2 NCRSG Draft MPA Proposals for the MLPA North Coast Study Region

Presentation to the MLPA Blue Ribbon Task Force
July 21, 2010 • Fort Bragg, CA

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Notes on Round 2 Evaluations

- **No high protection marine protected areas (MPAs) recommended in any proposal**, thus evaluations at high protection omitted from all evaluation materials
- All proposals **include undefined, tribal, consumptive uses in some MPAs**, however insufficient information provided to allow assignment of level of protection for uses
  - MPAs proposed to allow ***only*** tribal, consumptive uses: Assigned an "undetermined" level of protection
  - All other MPAs, including MPAs proposed to allow undefined, tribal, consumptive uses ***and*** other defined uses: Assigned level of protection based on defined uses only
  - No very high protection SMRs propose consumptive uses (including tribal consumptive uses) in Round 2

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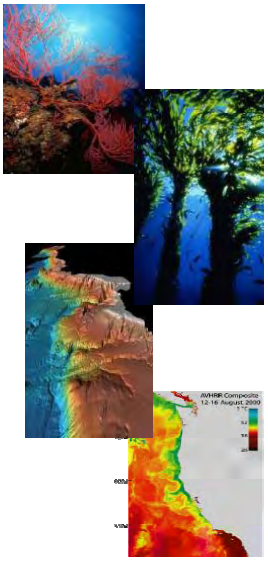
MLPA Goals*: Populations

1. To protect the natural diversity and function of **marine ecosystems**.
2. To help sustain and restore **marine life populations**.
3. To improve **recreational, educational, and study opportunities** in areas with minimal human disturbance.
4. To protect representative and unique **marine life habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. To ensure that MPAs are designed and managed as **a network**.



** Note that this language paraphrases the MLPA goals*

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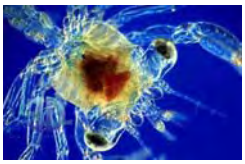
Protecting Populations (Goals 2 & 6)

Size and Spacing

- MPAs should be large enough that adults do not move out of them too frequently and become vulnerable to fishing
- MPAs should be close enough together that sufficient larvae can move from one to the next



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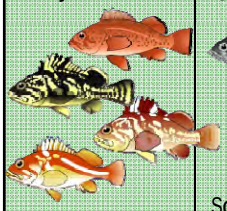
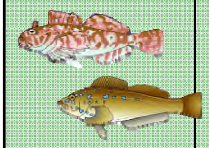
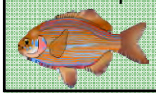
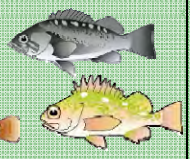
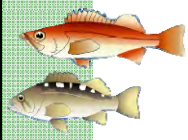
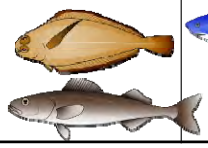
Reserve Size and Species Protected

0 – 1 kilometers	1 – 10 km	10 – 100 km	100 – 1000 km	> 1000 km
Many rockfish  Other reef fish  Some surfperch 	Some rockfish  Some surfperch 	Some rockfish  Other reef fish  Some flatfish 	Few rockfish  Some schooling fish  Salmon  More flatfish 	Some schooling fish  Tunas  Many sharks 

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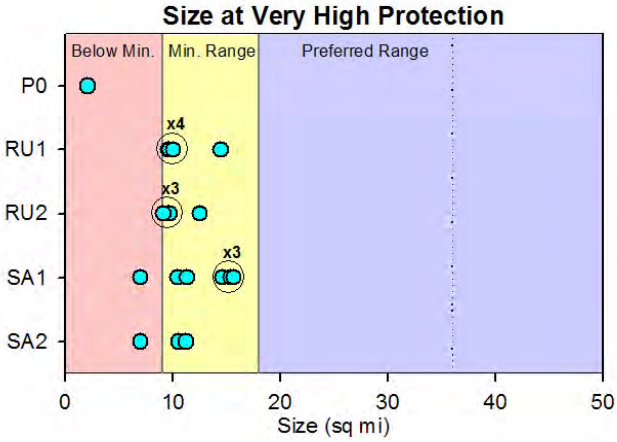
Size Guidelines

- **MPAs should have an alongshore span of 5-10 kilometers (3-6 miles) of coastline, and preferably 10-20 kilometers (6-12.5 miles)** to protect adult populations, based on adult neighborhood sizes and movement patterns. Larger MPAs should be required to fully protect marine birds, mammals, and migratory fish.
- **MPAs should extend from the intertidal zone to deep waters offshore** to protect the diversity of species that live at different depths and to accommodate the ontogenetic movement of individuals to and from nursery or spawning grounds to adult habitats.
- Combined and simplified, these two guidelines yield:
  - **Minimum range of 9-18 square miles**
  - **Preferred range of 18-36 square miles**

Size Analysis Methods

- Measure individual MPA areas
- Consider level of protection
- Combine contiguous MPAs into MPA "clusters"
- Tabulate MPA cluster areas relative to minimum and preferred guidelines
- Estuarine MPAs are not included in size evaluation

Cluster Sizes: Very High Protection



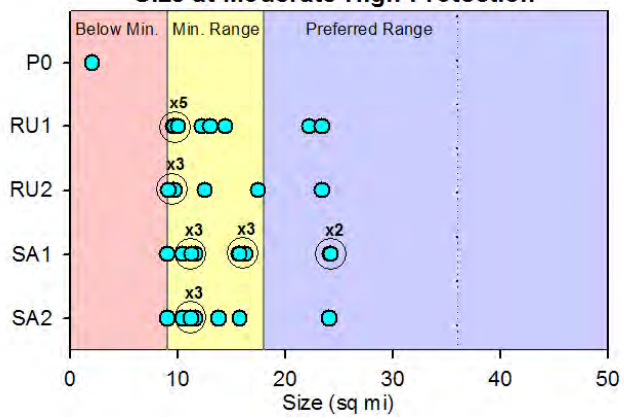
Number of MPA Clusters at Very High Protection

Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
P0	1	0	0	1
RU1	0	5	0	5
RU2	0	4	0	4
SA1	1	5	0	6
SA2	1	2	0	3

- **RU1 and SA1 include most clusters in minimum size range at very high protection**
- **No proposal includes any preferred size MPAs at very high protection**

Cluster Sizes: Moderate-High Protection

Size at Moderate-High Protection[1]



Number of MPA Clusters at Moderate-High Protection

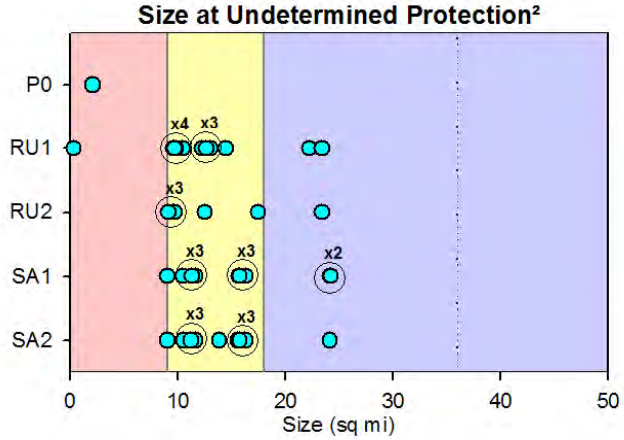
Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
P0	1	0	0	1
RU1	0	8	2	10
RU2	0	5	1	6
SA1	0	7	2	9
SA2	0	6	1	7

- **All clusters in all proposals meet size guidelines at moderate-high protection**
- **RU1 and SA1 include largest number of MPA clusters and most preferred size clusters at moderate-high protection**

[1] Evaluated for all open coast MPAs at or above moderate-high protection

Cluster Sizes: Undetermined Protection

Size at Undetermined Protection[2]



Number of MPA Clusters at Undetermined Protection

Proposal	Below Min. Size	Min. Size Range	Pref. Size Range	Total # Clusters
P0	1	0	0	1
RU1	1	8	2	11
RU2	0	5	1	6
SA1	0	7	2	9
SA2	0	8	1	9

- **Inclusion of MPAs with undetermined protection in size evaluations increases size of several clusters slightly, but changes little from evaluations at moderate-high protection**

[2] Evaluations at undetermined protection include MPAs with undetermined protection, plus all MPAs at moderate-high protection and above.

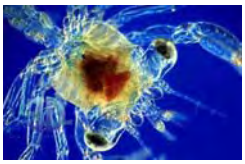
Size: Conclusions

- RU1 and SA1 include most MPA clusters
- No proposals include preferred size clusters at high or very high protection
- RU1 and SA1 include two preferred size clusters at moderate-high protection
- All MPAs across all proposals meet minimum size guidelines at moderate-high protection
- Ranking of arrays for median (middle-sized) cluster size:
  - At moderate-high protection: SA1 > SA2 > [RU1, RU2]
  - At undetermined protection: SA1 > SA2 > RU1 > RU2

Protecting Populations

Size and Spacing

- MPAs should be large enough that adults do not move out of them too frequently and become vulnerable to fishing
- MPAs should be close enough together that sufficient larvae can move from one to the next



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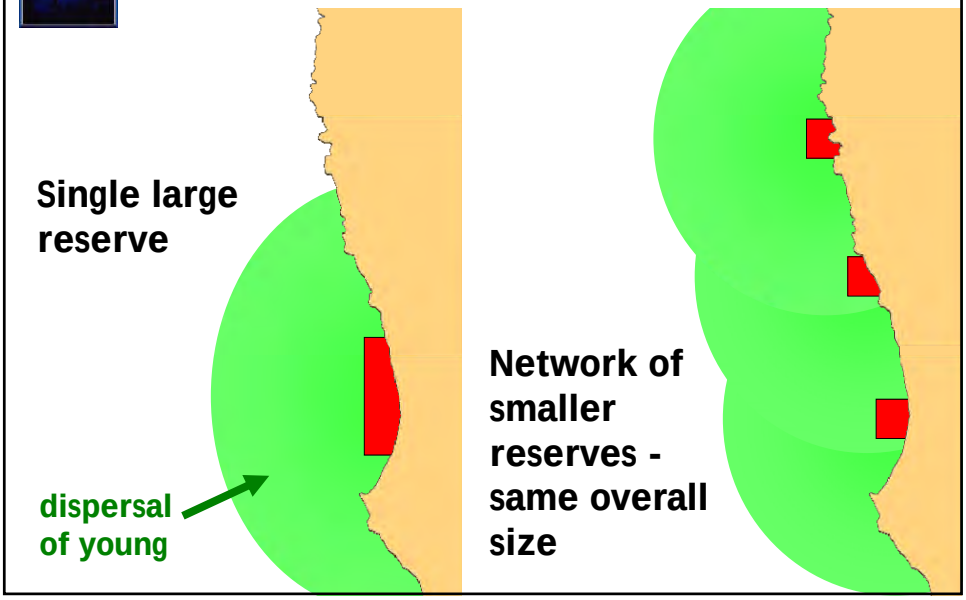
Characteristics of Networks



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Design Guidelines: Goals 2 and 6

- **MPAs should be placed within 50-100 kilometers (31-62 miles) of each other** to facilitate dispersal and connectedness of important bottom-dwelling fish and invertebrate groups among MPAs
- Because many populations are habitat-specific, spacing is evaluated for each habitat

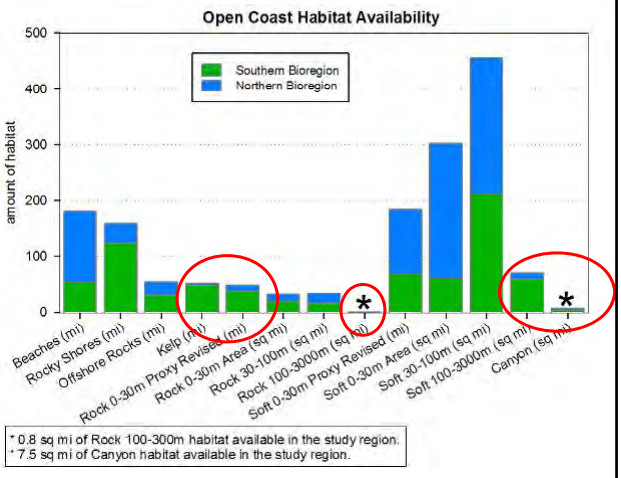
Spacing Analysis Methods

- MPAs or clusters must meet minimum size guidelines (9 square miles) to be included in spacing analysis
- Identify the habitats included in sufficient amounts to count as a “replicate” within each MPA cluster
- Measure gaps between adjacent MPA clusters that contain a given habitat (MPA edge to MPA edge without crossing land)

Habitat Availability and Spacing

Habitat availability and distribution limits spacing:

- Kelp and 0-30 meter (m) rock rare in northern bioregion
- >100m depth habitats are relatively rare across region, occurring mostly in canyons and southern bioregion



Note: The 0-30 meter (m) proxy line has been revised since Round 2 draft MPA proposals were developed

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Spacing to Existing MPAs in NCCSR

- Spacing is calculated to the nearest protected habitat to the south (in north central coast MPAs)
- Recent changes to Stewarts Point State Marine Reserve (SMR) will add 30 miles to spacing for sandy beach habitat
  - Nearest sandy beach replicate is now at Bodega Head SMR, approximately 58 miles south of north coast study region boundary
- This change not reflected in spacing analyses

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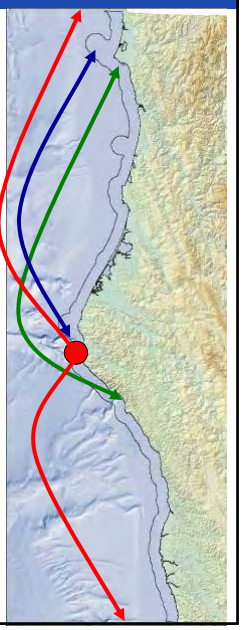
Spacing: Unevenly Distributed Habitats

- **For some unevenly distributed habitats, spacing guidelines are impossible to meet**
- Minimum possible spacing for these habitats:

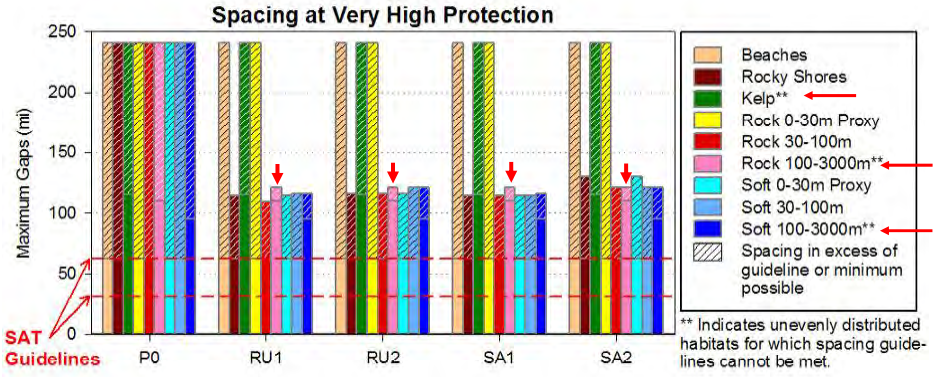
  Kelp: 115 miles (mi)

  Deep soft bottom (100-3000m): **95 mi**

  Deep rock (100-3000m)**: 110 mi**
  only available in one area in the north coast study region

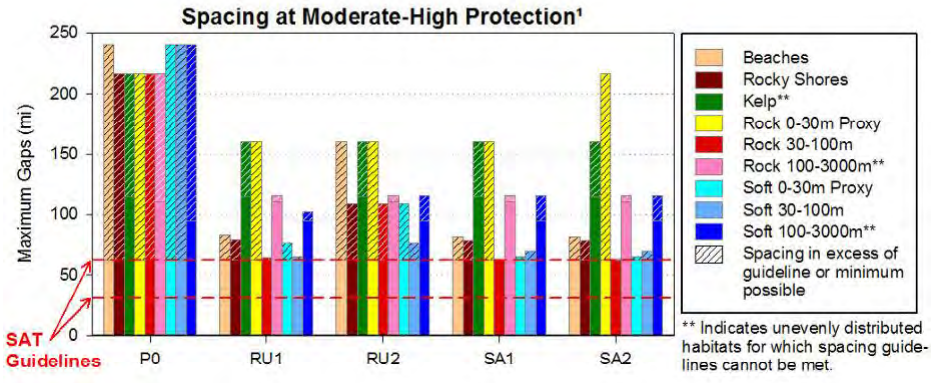


Max Gaps: Very High Protection



- **Not possible to meet spacing guidelines for kelp, rock 100-3000m, or soft bottom 100-3000m**
- **No proposal meets spacing guidelines or minimum possible spacing for any habitat at very high protection**
- **All proposals approach minimum possible spacing for deep rock (100-3000m)**

Max Gaps: Mod-high Protection

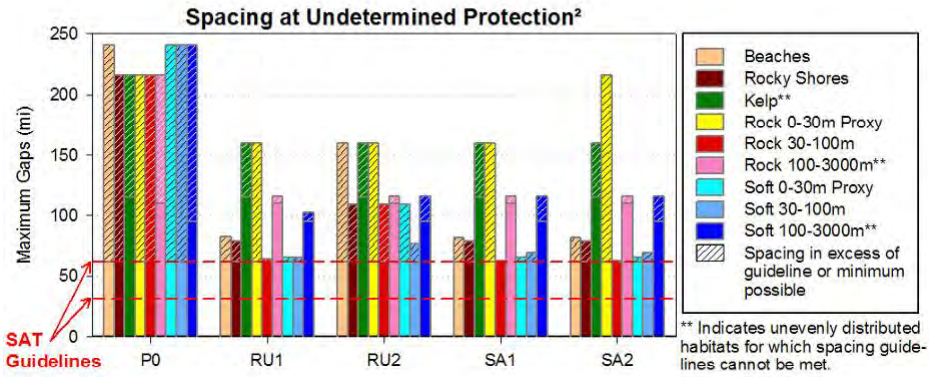


- **No proposal <u>falls within</u> spacing guidelines for any habitat**
- **Number of habitats for which spacing is close to maximum guideline (or minimum possible spacing):**

  RU1 = 4 RU2 = 1 SA1 = 4 SA2 = 4

¹ Evaluated for all open coast MPAs at or above moderate-high protection

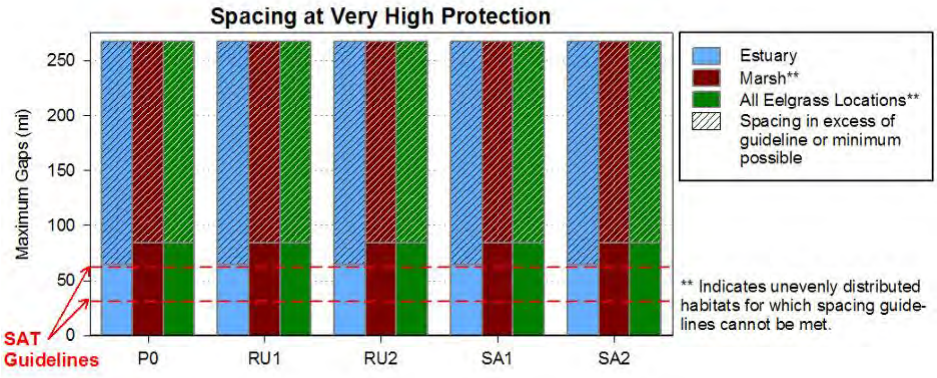
Max Gaps: Undetermined Protection



- **Largest gaps for kelp and 0-30m rock in most proposals, with largest gap for 0-30m rock in SA2**
- **In RU1, SA1, and SA2 SMRs at Petrolia very close to achieving replicates of 0-30m rock, which would reduce spacing for this habitat by ~40 mi**

² Evaluations at undetermined protection include MPAs with undetermined protection, plus all MPAs at moderate-high protection and above.

Estuarine Spacing: Very High Protection



- **Not possible to meet spacing guidelines for marsh or eelgrass habitats due to uneven distribution of habitats**
- **No proposal replicates estuarine habitats at very high protection so spacing gaps span study region for all proposals**

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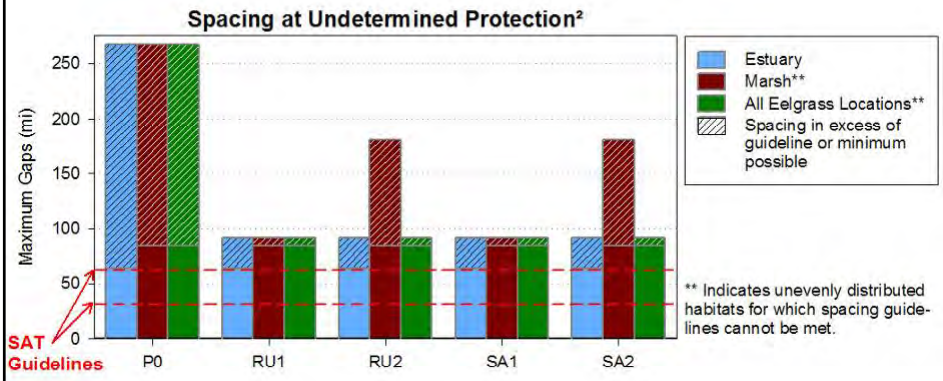
Estuarine Spacing: Undetermined Protection



When MPAs with undetermined level of protection are included:

- All proposals approach minimum possible spacing for eelgrass
- RU1 and SA1 approach minimum possible spacing for marsh
- All proposals exceed spacing guidelines for estuary habitat

² Evaluations at undetermined protection include MPAs with undetermined protection, plus all MPAs at moderate-high protection and above.

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Spacing: Conclusions

- No Round 2 proposal meets spacing guidelines for any habitat at any level of protection, with especially large gaps for 0-30m rock and kelp
- At moderate-high protection, RU1, SA1, and SA2 approach guidelines or minimum possible spacing for 30-100m and 100-3000m rock and soft bottom
- At undetermined protection, RU1 has fewest gaps that greatly exceed guideline or minimum possible, followed closely by SA1 and SA2, while RU2 has most large gaps
- RU1 and SA1 most closely approach spacing guidelines for estuarine habitats at undetermined protection
- Ranking of arrays based on average gap in excess of the guideline or minimum possible spacing for open coast habitats:
  - At moderate-high protection: [RU1, SA1] < SA2 < RU2
  - At undetermined protection: RU1 < SA1 < SA2 < RU2