

## Marine Life Protection Act Initiative



### SAT Evaluations of Existing Marine Protected Areas in the MLPA South Coast Study Region

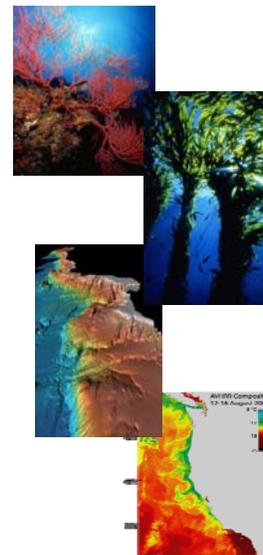
Presentation to the MLPA Master Plan Science Advisory Team

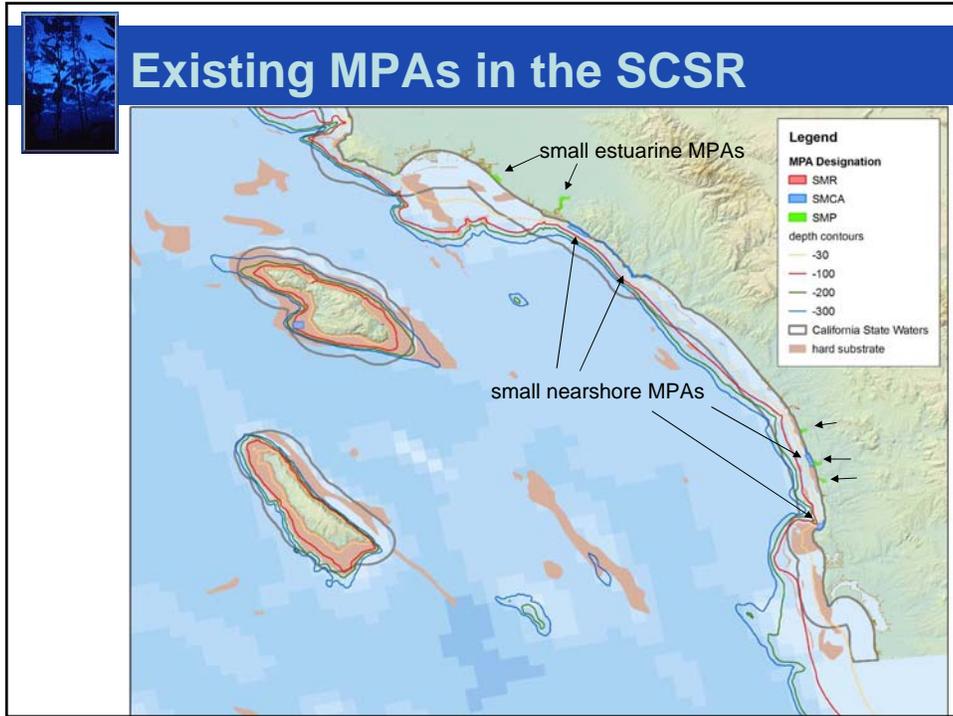
September 15, 2008 • El Segundo, CA

Presented by Dr. Mark Carr

## MLPA Goals

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**.





## Habitats and Ecosystems

### Key Marine Habitats

<p><u>Seafloor Habitats</u></p> <ul style="list-style-type: none"> <li>• Rocky reefs</li> <li>• Intertidal zones</li> <li>• Sandy or soft ocean bottoms</li> <li>• Underwater pinnacles</li> <li>• Submarine canyons</li> </ul>	<p><u>Depth Zones</u></p> <ul style="list-style-type: none"> <li>• Intertidal</li> <li>• Intertidal to 30 m</li> <li>• 30 to 100 m</li> <li>• 100 to 200 m</li> <li>• 200 m and deeper</li> </ul>
<p><u>Biogenic Habitats</u></p> <ul style="list-style-type: none"> <li>• Kelp forests</li> <li>• Seagrass beds</li> </ul>	<p><u>Oceanographic Habitats</u></p> <ul style="list-style-type: none"> <li>• Upwelling areas</li> <li>• Freshwater plumes?</li> <li>• Retention zones</li> </ul>



## Habitats Evaluation (Goals 1 and 4)

### Key Questions

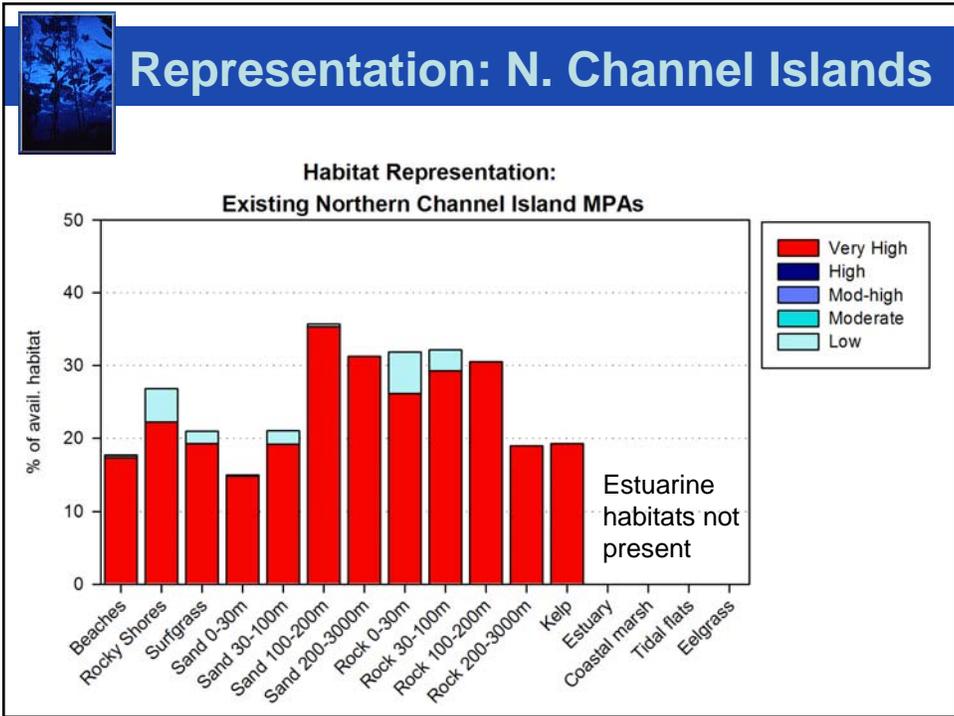
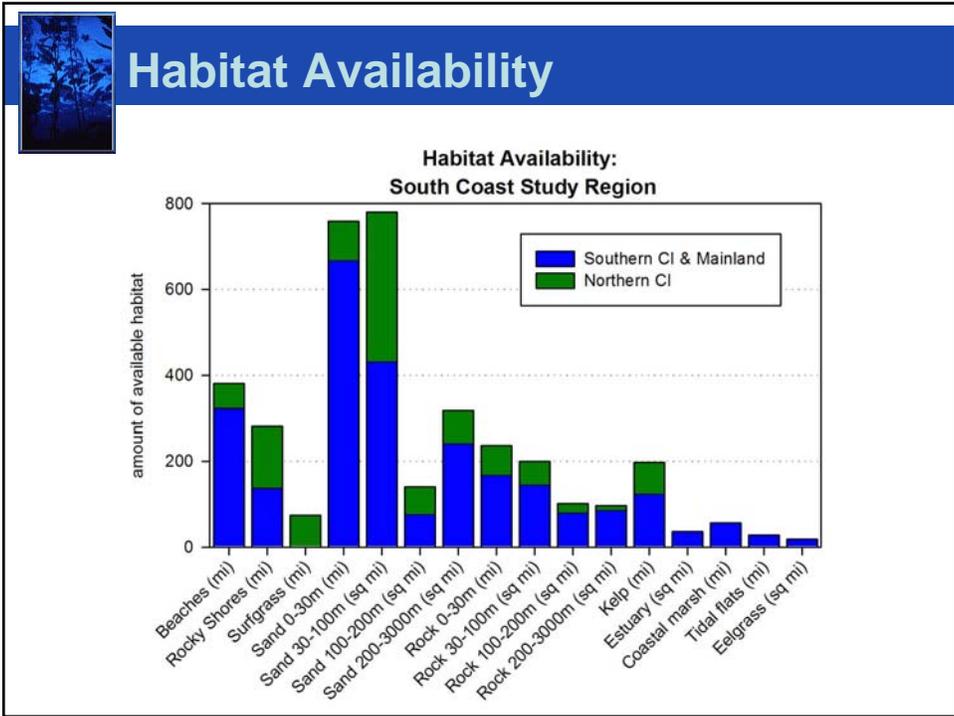
1. How well are key habitat types represented in proposed MPA arrays?
2. What are the proposed levels of protection for these habitat types?
3. How well are habitats and levels of protection distributed across the study region?



## SAT Guidelines: Levels of Protection

	Level of Protection	MPA Types	Activities associated with this protection level
	Very high	SMR	No take
	High	SMCA	In water depth > 50m: pelagic finfish (H&L) salmon by troll only, coastal pelagic finfish (pelagic seine)
	Mod-high	SMCA	Dungeness crab (traps/pots); squid (pelagic seine); In water depth <50m: pelagic finfish (H&L) salmon by troll only, coastal pelagic finfish (pelagic seine);
	Moderate	SMCA SMP	salmon (non-troll H&L); abalone (diving); halibut, white seabass, striped bass, shore-based finfish, croaker, and flatfishes (H&L); smelt (H&L and hand/dip nets); clams (hand harvest); giant kelp (hand harvest)
	Mod-low	SMCA SMP	Urchin (diving); lingcod, cabezon, greenling, rockfish, and other reef fish (H&L); surfperches (H&L), lobster (trap, hoop net, diving)
	Low	SMCA SMP	bull kelp and mussels (any method); all trawling; giant kelp (mechanical harvest); mariculture (existing methods in NCCSR)

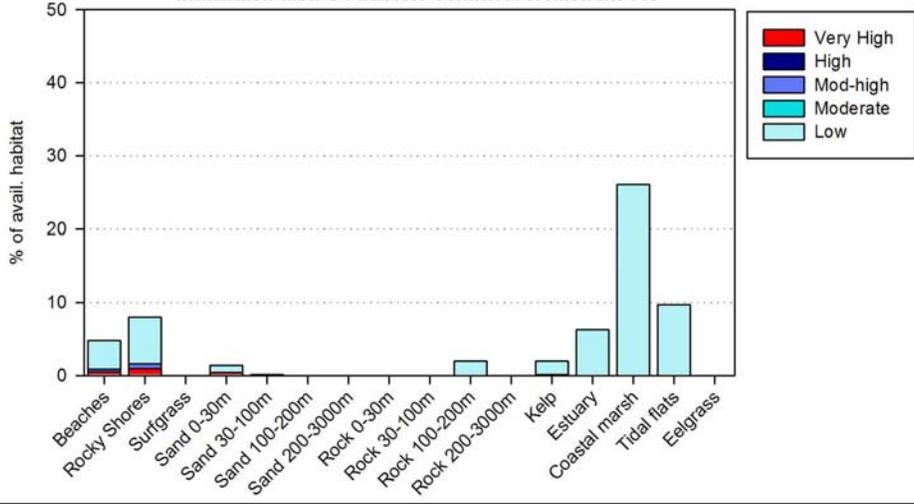
SMR = state marine reserve    SMCA = state marine conservation area    SMP = state marine park





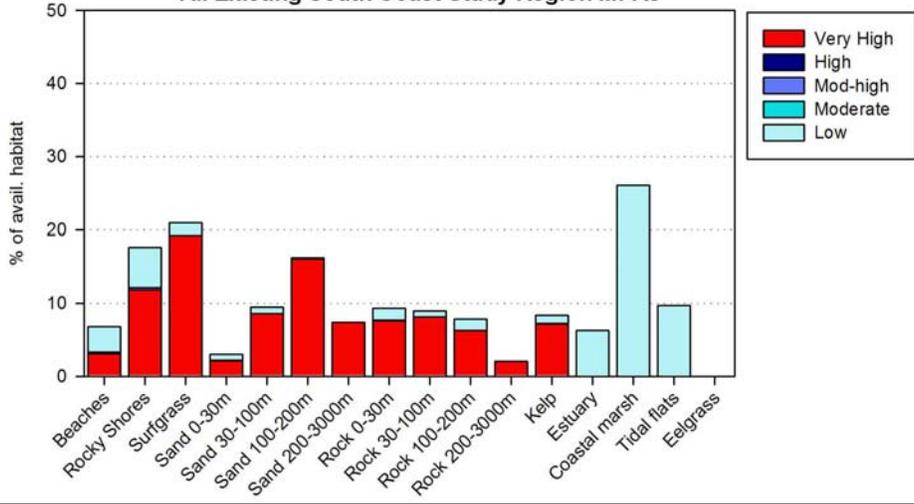
## Representation: Mainland and SCI

Habitat Representation:  
Mainland and Southern Channel Island MPAs



## Representation: All Existing MPAs

Habitat Representation:  
All Existing South Coast Study Region MPAs





## Habitat Representation

### Summary



#### **Northern Channel Islands**

15-35% of all available habitats included in SMRs  
Most MPAs are very high protection SMRs



#### **Mainland and southern Channel Islands**

Only shoreline and nearshore habitats included in MPAs  
Few MPAs above low protection  
Estuarine habitats are frequently targeted for MPAs



#### **All Existing MPAs**

Channel Island MPAs contribute most of the very high protection MPAs  
Few habitats have greater than 10% of available represented in SMRs



## Replication Analysis Methods

### Guidelines for replication:



3-5 replicates of habitat per biogeographic region (Point Conception to California/Mexico border)



MPA or cluster must meet the minimum size guidelines (9 square miles)



Habitat must meet the threshold identified to encompass 90% of biodiversity in that habitat type

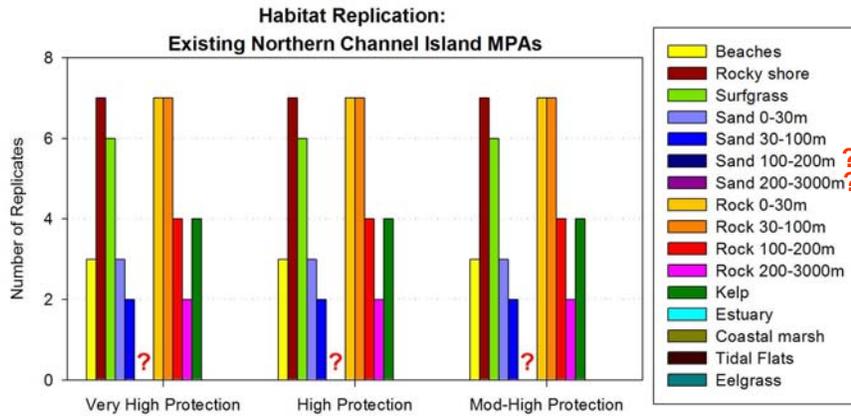


Estuarine MPAs do not have to meet size guidelines but must contain at least 0.12 mi<sup>2</sup> of estuarine habitat



## Replication: N. Channel Islands

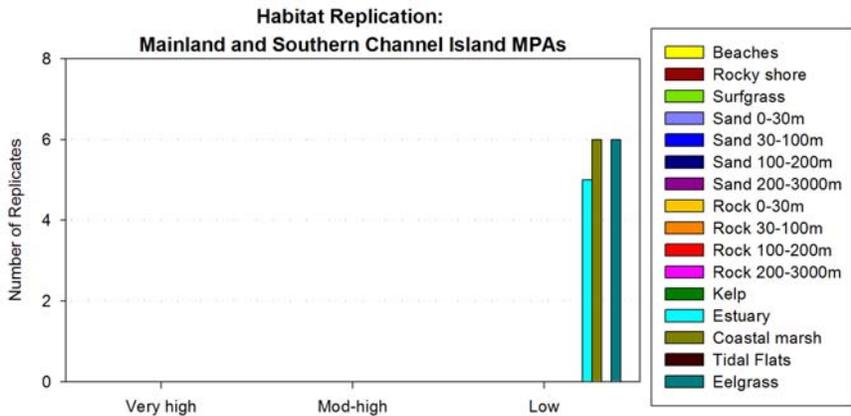
Estuarine habitats not present in the northern Channel Islands

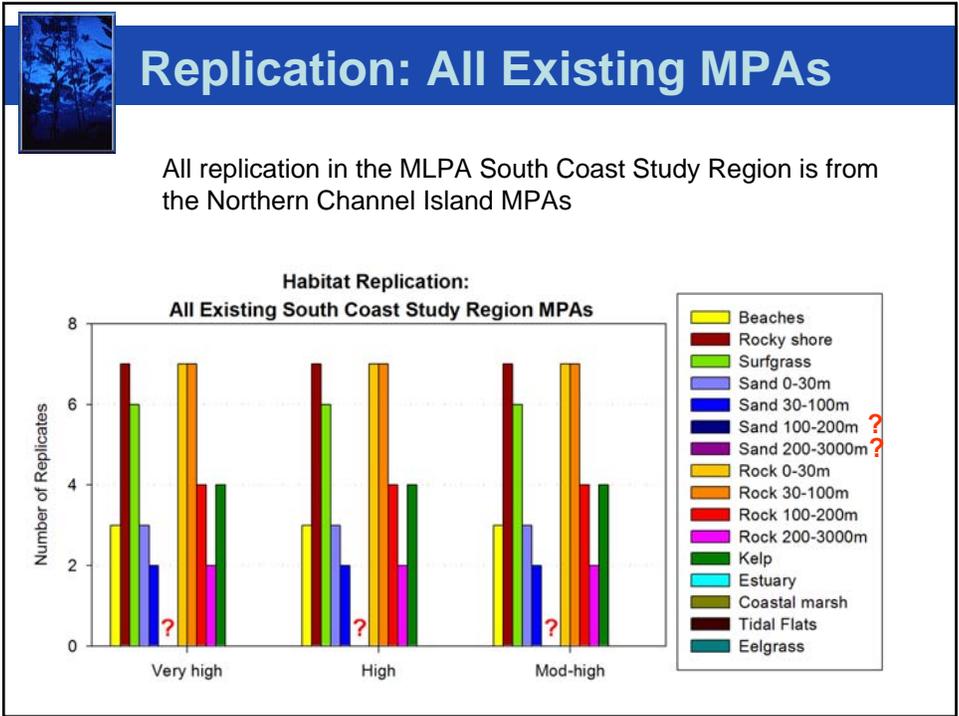


## Replication: Mainland & Southern CI

No replication of any habitat above low protection

No replication of open coast habitats at any level of protection (insufficient size)





## Habitat Replication

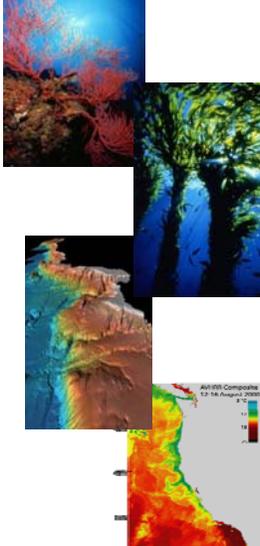
### Summary

- Northern Channel Islands**  
 All available habitats (for which replication could be calculated) have at least 2 replicates in SMRs  
 Shallower rocky habitats (rocky shore, surfgrass, kelp, 0-30, 30-100, and 100-200 meters rock) have the greatest replication (4-7)
- Mainland and southern Channel Islands**  
 No replication of any habitat above low protection  
 No replication of open coast habitats (no MPAs meet the 9 square mile minimum)  
 Estuarine habitats have no replication because of low levels of protection
- All Existing MPAs**  
 All replication from Channel Island MPAs



## 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**.




## Protecting Populations (Goals 2 & 6)

### Size and Spacing

-  MPAs should be large enough that adults don't move out of them and become vulnerable to fishing
-  MPAs should be close enough together that larvae can move from one to the next

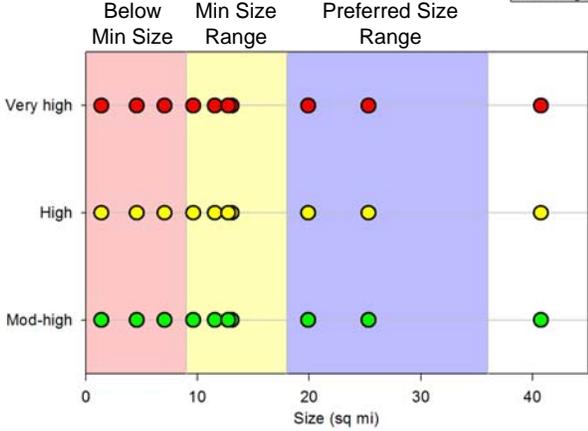


## Size Analysis Methods

-  Measure individual MPA lengths and area
-  Combine contiguous MPAs into MPA clusters
-  Consider level of protection
-  Tabulate MPA lengths and areas relative to minimum and preferred guidelines

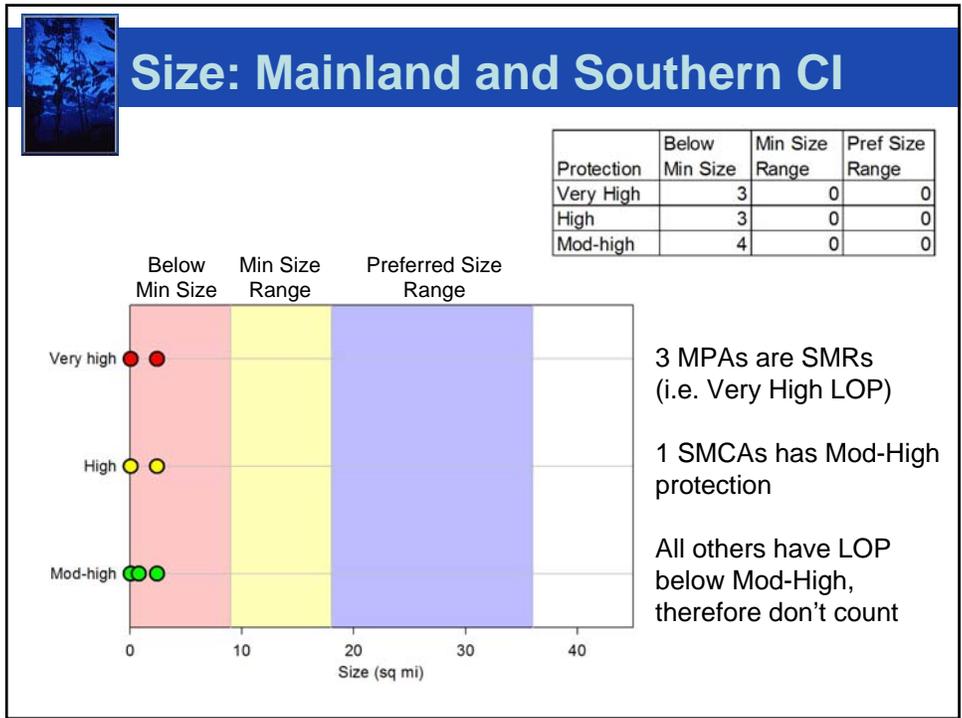
## Size: Northern Channel Islands

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



11 MPAs are SMRs (i.e. Very High LOP)

2 SMCAs have Mod-Low protection (don't count)





## MPA Size Conclusions

### Summary

-  **Northern Channel Islands**  
Most MPAs meet at least the minimum size guidelines  
~ 25% of MPAs in the preferred size range  
~ 25% of MPAs below the minimum size guideline
-  **Mainland and southern Channel Islands**  
All MPAs at or above mod-high protection are well below the minimum size guideline
-  **All Existing MPAs**  
All MPAs that meet the minimum or preferred size are located in the northern Channel Islands



## Protecting Populations

### Size and Spacing

-  MPAs should be large enough that adults don't move out of them and become vulnerable to fishing
-  MPAs should be close enough together that larvae can move from one to the next







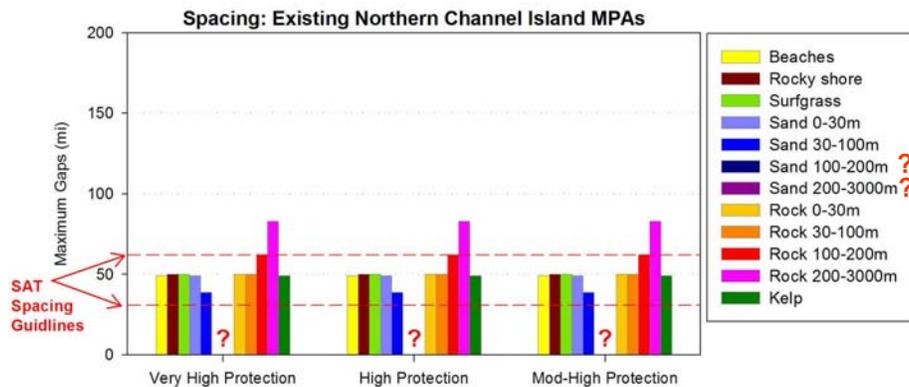
## Spacing Analysis Methods

- 
 MPAs or clusters must meet the minimum size guidelines (9 square miles) to count for spacing
- 
  - Identify the habitats included within each MPA cluster (for soft bottom habitats deeper than 100 meters this was not possible without more data)
- 
  - Measure gaps between adjacent MPA clusters that contain a given habitat



## Spacing: Northern Channel Islands

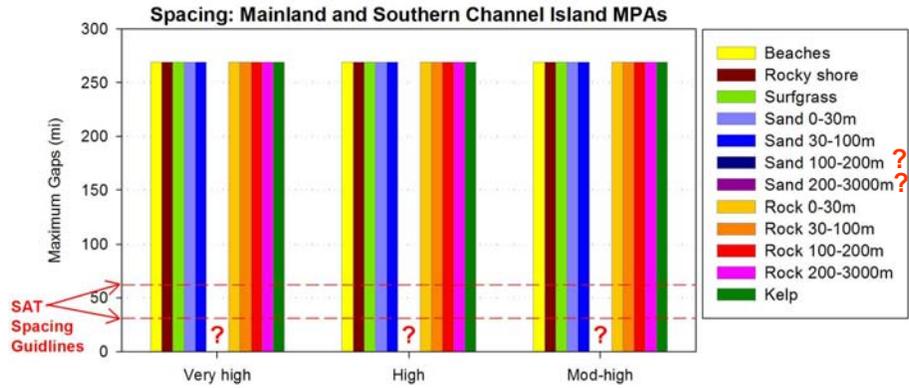
Assumed linear connectivity from Vandenberg SMR to the north and to Santa Barbara SMR in the south





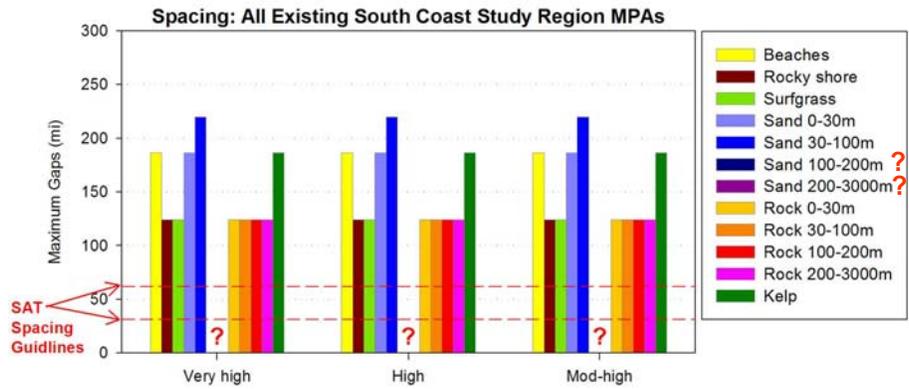
# Spacing: Mainland and Southern CI

Assumed linear connectivity from Vandenberg SMR to the north to the California/Mexico border



# Spacing: All Existing MPAs

Assumed linear connectivity from Vandenberg SMR to the north to the California/Mexico border





## MPA Spacing Conclusions

### Summary

- 
**Northern Channel Islands**  
 Most available habitats (for which spacing could be calculated) meet the spacing guidelines  
 Only rock 200-300 meter does not meet the spacing criteria (this habitat has low abundance in the Northern CI)
- 
**Mainland and southern Channel Islands**  
 MPAs greatly exceed the spacing guidelines (none meet the 9 square mile minimum to count for spacing)
- 
**All Existing MPAs**  
 Considering all existing MPAs in the MLPA South Coast Study Region, maximum gaps for all habitats exceed the spacing guidelines



## Information Gaps

### Evaluation of SCSR MPAs

- 
 Evaluation does not consider the ecologically-based bioregions
- 
 Only coarse resolution substratum (rock and sand) maps available now (likely over estimates availability of rock substratum)
- 
 Biogenic habitat (surf grass, eelgrass, marsh) maps have inadequacies
- 
 Need to revisit biodiversity-area relationships for regional relevance and for new habitats
- 
 Need to consider oceanographic patterns for connectivity estimates and spacing
- 
 Need to assign levels of protection as soon as possible