

## Marine Life Protection Act Initiative



### Overview of the Science Guidance in the California Marine Life Protection Act Master Plan for Marine Protected Areas

Presentation to the MLPA Master Plan Science Advisory Team  
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## Science Guidance



- **Marine Life Protection Act (MLPA)**
  - Provides some specific and mandated requirements (e.g. goals)
  - Requires guidance be developed in other formats (e.g. Master Plan)
- **Master Plan for Marine Protected Areas**
  - Mandated by the MLPA
  - Provides guidance on size and spacing
  - Provides guidance on habitat representation and replication



## Summary of 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 habitats.
5. Clear objectives, effective management, adequate enforcement, and sound science.
6. To ensure that MPAs are designed and managed as a network.



## Science Guidance in the Master Plan

- From the ***California Marine Life Protection Act Master Plan for Marine Protected Areas***
  - Flexibility
  - Biogeographical regions (Goals 1, 2 and 4)
  - Species likely to benefit (Goals 1 and 2)
  - Levels of protection (Goals 1, 2, 4 and 6)
  - Habitat representation (Goals 1 and 4)
  - Habitat replication (Goals 1, 2, 3, 4 and 6)
  - MPA Size (Goals 2 and 6)
  - MPA Spacing (Goals 2 and 6)
  - Monitoring (Goals 3 and 5)

## Flexibility in MPA Design

\*The diversity of species and habitats to be protected, and the diversity of human uses of marine environments, **prevents a single optimum network design** in all environments.

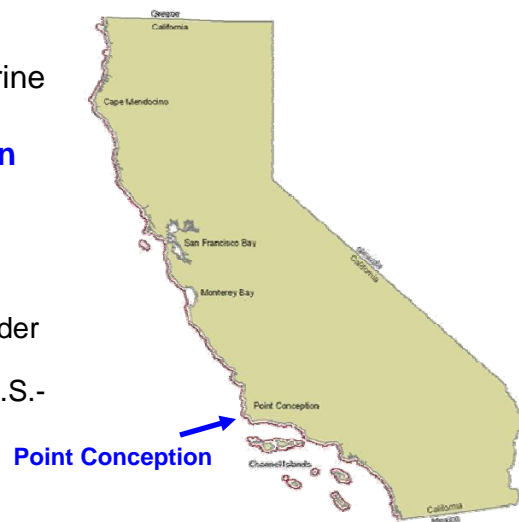


Photo: Steve Wertz

\*Science guidance from the California MLPA Master Plan for Marine Protected Areas

## Biogeographical Regions

- The MLPA requires marine reserves in each **biogeographical region** of California
- Two biogeographical regions were identified:
  - California-Oregon border to Point Conception
  - Point Conception to U.S.-Mexico border



## Biogeographical Regions

- The **north coast study region** falls entirely within the northern biogeographical region of California.

Study Region

- North Coast
- North Central Coast
- San Francisco Bay
- Central Coast
- South Coast

## Habitat Representation

“\*For an objective of protecting the diversity of species that live in different habitats and those that move among different habitats over their lifetime, every “key” marine habitat should be represented in the MPA network.”

Photo:  
Channel Islands National Marine Sanctuary

\*Science guidance from the California MLPA Master Plan for Marine Protected Areas

Key Habitats	
<b>Intertidal/Nearshore</b>	<b>Subtidal</b>
Rocky Shore	Hard/Soft Bottom
Sandy Beach	0-30 meters
Coastal Marsh	30-100 meters
Tidal Flats	100-200 meters
Estuary	>200 meters
Eelgrass	Kelp forest
Surfgrass	Canyons
<b>Oceanographic</b>	Seamounts
Upwelling centers	
Retention areas	
Freshwater plumes	

## Habitat Replication

- Science guidance in the Master Plan recommends **3 to 5 replicates** of each key habitat within reserves in each **biogeographical region** (Point Conception to California-Oregon border)
- For the south coast study region, scientists recommended at least **1 replicate** of each key habitat in each **bioregion**

**Study Region**

- North Coast
- North Central Coast
- San Francisco Bay
- Central Coast
- South Coast



## Habitat Replication

\*90% threshold for different habitats

Habitat	Area or Length of a Replicate	Data Source
Rocky Intertidal	~0.5 linear miles	PISCO Biodiversity
Shallow Rocky Reefs/Kelp Forests (0-30 m)	~1 linear miles	PISCO Subtidal Surveys
Deep Rocky Reefs (30-100 m)	~0.1 square miles	Starr Surveys
Sandy Beaches *	~1 linear miles	
Soft-Bottom Habitat (0-30 m)	~1 linear miles	Based on shallow rocky reefs
Soft-Bottom Habitat (30-100 m)	~10 square miles	NMFS Triennial Trawl Surveys (1977-2007)
Estuary	0.12 square miles (77 acres)	

\*Estimates for the north central coast study region



## Species Likely to Benefit

- The Master Plan identifies “select species or groups of **species likely to benefit** from MPAs.”
- Species likely to benefit include those:
  - directly **targeted** by fisheries
  - caught incidentally (**bycatch**)
  - **indirectly** affected through ecological changes within MPAs
- Species that **move long distances** likely will not benefit significantly from MPAs




Photo: Tom McHugh



Photo: Gus Van Vliet, USFWS

## Species Likely to Benefit



- The list of **species likely to benefit from MPAs in the north coast study region** will be developed by the science advisory team.
- An example list from the North Central Study Region can be found in appendix G of the Master Plan:  
[www.dfg.ca.gov/mlpa/masterplan.asp](http://www.dfg.ca.gov/mlpa/masterplan.asp)

Photo: Rick Heiser






Photo: Terrance J. Fidler



## Guideline for MPA Size

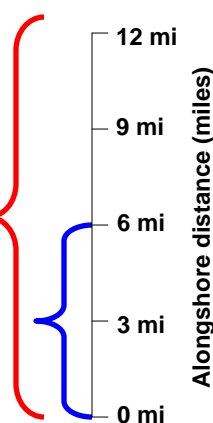


### Alongshore Span

“\*For an objective of protecting adult populations, based on adult neighborhood sizes and movement patterns, MPAs should have a minimum alongshore span of **5-10 kilometers (3-6 miles)** of coastline, and preferably **10-20 kilometers (6-12.5 miles)**.”

Preferred  
alongshore span  
(6-12.5 miles)


Minimum  
recommended  
alongshore span  
(3-6 miles)



Alongshore distance (miles)

\*Science guidance from the California MLPA Master Plan for Marine Protected Areas



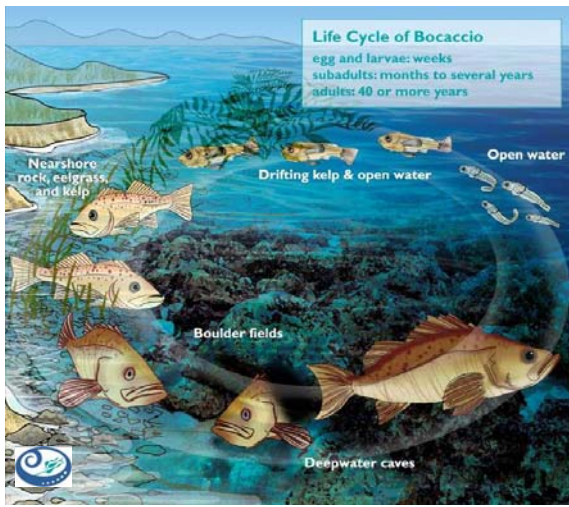
Scales of Adult Movement				
0-1 km	1-10 km	10-100 km	100-1000 km	>1000 km
<p><b>Invertebrates:</b> abalone, mussel, octopus, sea star, snail, urchin</p> <p><b>Rockfishes:</b> black &amp; yellow, brown, copper, gopher, grass*, kelp, quillback, starry, treefish, vermilion</p> <p><b>Other Fishes:</b> cabezon, eels, greenlings, giant seabass, black, striped and pile perch, pricklebacks</p>	<p><b>Rockfishes:</b> black, China, greenspotted*, olive, yelloweye</p> <p><b>Other Fishes:</b> walleye perch*</p> 	<p><b>Invertebrates:</b> Dungeness crab**</p> <p><b>Rockfishes:</b> blue, bocaccio, yellowtail</p> <p><b>Other Fishes:</b> California halibut, lingcod, starry flounder</p> <p><b>Birds:</b> gulls, cormorants</p> <p><b>Mammals:</b> harbor seal, otter</p>	<p><b>Rockfishes:</b> canary</p> <p><b>Other Fishes:</b> anchovy, big skate, herring, Pacific halibut, sablefish**, salmonids**, sole, sturgeon</p> <p><b>Birds:</b> gulls**</p> <p><b>Mammals:</b> porpoise, sea lion**</p>	<p><b>Invertebrates:</b> jumbo squid**</p> <p><b>Other Fishes:</b> sardine, shark**, tunas**, whiting**</p> <p><b>Reptiles:</b> turtles**</p> <p><b>Birds:</b> albatross**, pelican**, shearwater**, shorebirds**, terns**</p> <p><b>Mammals:</b> dolphins, sea lion**, whales**</p>

\* Studies of this species included fewer than 10 individuals  
 \*\* Seasonal migration

## Guideline for MPA Size

### Offshore Span

\*To protect species at different depths and ontogenetic movements, **MPAs should extend from the intertidal zone to deep waters offshore.**



**Life Cycle of Bocaccio**  
 egg and larvae: weeks  
 subadults: months to several years  
 adults: 40 or more years

Nearshore rock, eelgrass, and kelp

Drifting kelp & open water

Boulder fields

Deepwater caves

Open water

Art by Ryan Kleiner

\*Science guidance from the California MLPA Master Plan for Marine Protected Areas





## Guideline for MPA Size

\*Taking into account alongshore and offshore guidelines, the science advisory team recommended a minimum area of **9–18 square miles** for each MPA, and preferably **18–36 square miles**.

*\* Science guidance from the California Master Plan for Marine Protected Areas*



Photo: Gretchen Hofmann

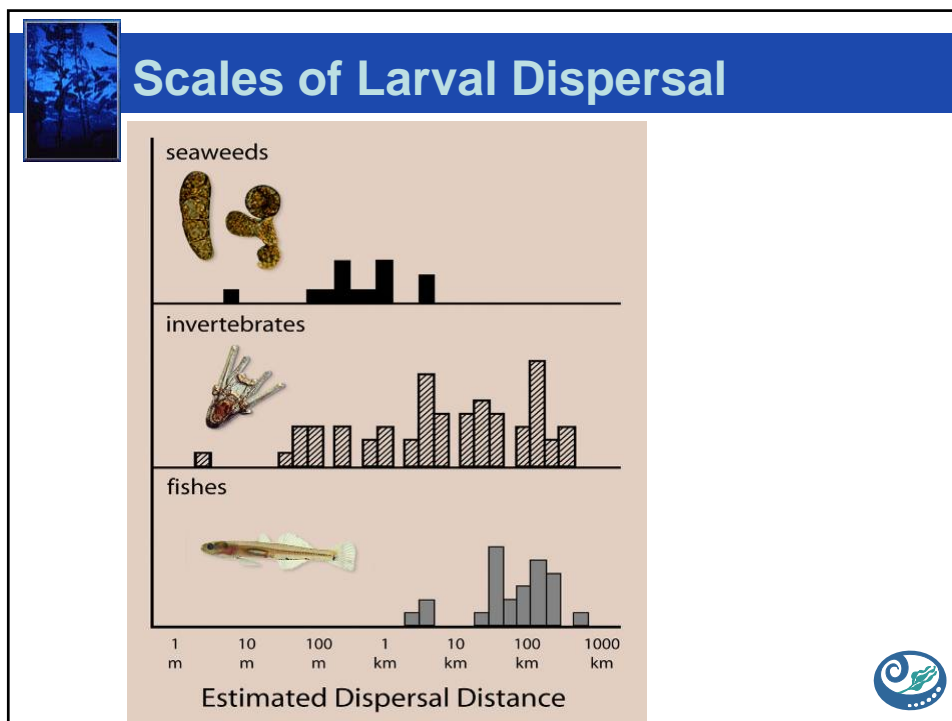


## Guideline for MPA Spacing

“\*For an objective of facilitating dispersal of important bottom-dwelling fish and invertebrate groups among MPAs, based on currently known scales of larval dispersal, **MPAs should be placed within 50-100 km (31-62 miles)** of each other.”



*\*Science guidance from the California MLPA Master Plan for Marine Protected Areas*



## Additional Guidelines

- For an objective of lessening negative impact while maintaining value, placement of MPAs should take into account local resource use and stakeholder activities
- Placement of MPAs should take into account the adjacent terrestrial environment and associated human activities
- For an objective of facilitating adaptive management of the MPA network into the future, and the use of MPAs as natural scientific laboratories, the network design should account for the need to evaluate and monitor biological changes within MPAs



## For More Information

### **For more information about science guidelines:**

- Master Plan for Marine Protected Areas  
<http://www.dfg.ca.gov/mlpa/masterplan.asp>