

Marine Life Protection Act Initiative

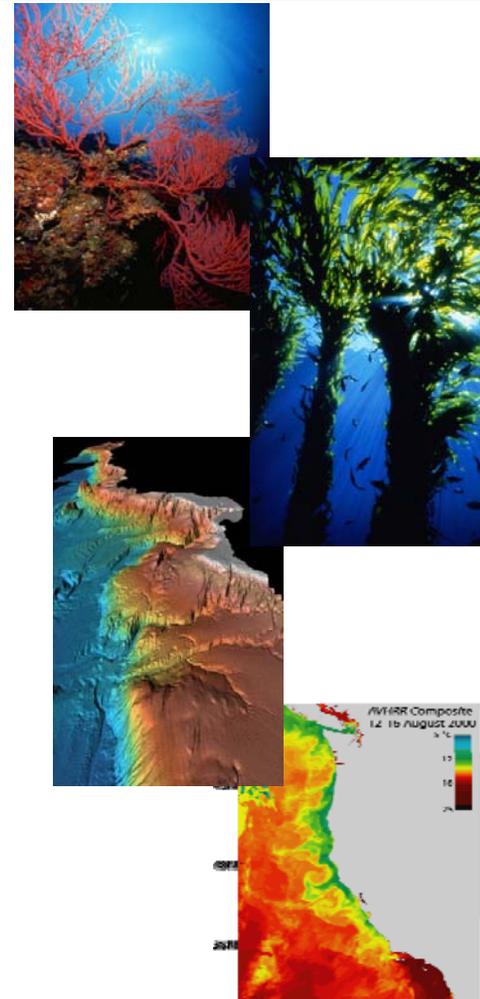


Science Guidelines for Marine Protected Area Planning



Marine Life Protection Act Goals

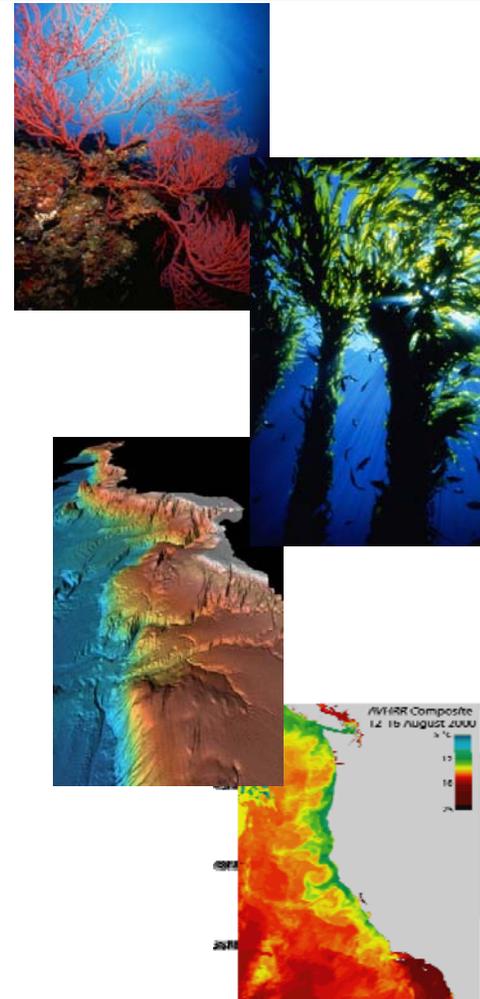
1. Protect **natural diversity** and **ecosystem functions**.
2. Sustain and restore marine life **populations**.
3. Improve recreational, educational, and study **opportunities**.
4. Protect representative and unique **habitats**.
5. Clear objectives, effective management, adequate enforcement, sound science.
6. Ensure that MPAs are designed and managed as **a network**.





Goals for Habitats and Ecosystems

1. Protect **natural diversity** and **ecosystem functions**.
2. Sustain and restore marine life **populations**.
3. Improve recreational, educational, and study **opportunities**.
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6. Ensure that MPAs are designed and managed as a **network**.





Habitat Representation (Goals 1 and 4)

- For an objective of protecting key and unique marine habitats and to include a range of species likely to benefit, MPAs should extend from intertidal to offshore areas





Habitat Representation (Goals 1 and 4)

- 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: Mark Conlin

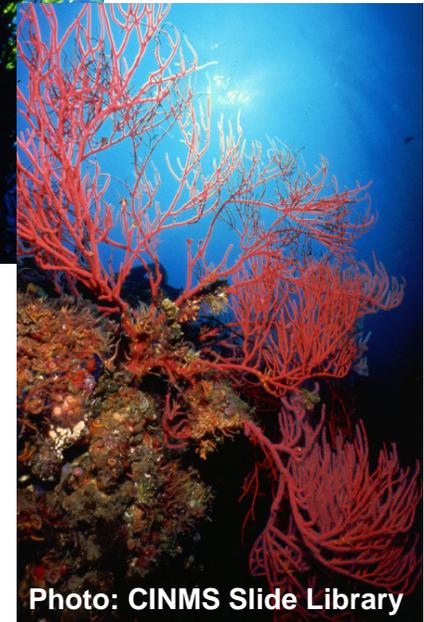


Photo: CINMS Slide Library



Key Marine Habitats

Marine Habitats

- Intertidal zones
- Estuaries
- Rocky reefs
- Sandy/soft ocean bottoms
- Underwater pinnacles
- Submarine canyons

Biogenic Habitats

- Kelp forests
- Seagrass beds

Depth Zones

- Intertidal
- Intertidal to 30 meters
- 30 to 100 meters
- 100 to 200 meters
- 200 meters and deeper

Oceanographic Habitats

- Upwelling areas
- Freshwater plumes
- Retention zones



Unique Marine Habitats

- Surfgrass beds
- Eelgrass beds
- Oil seeps and shallow hydrothermal vents
- Elk kelp beds





Habitat Replication (Goals 1 and 4)

- Protect each habitat type in three to five MPAs within each biogeographic region
- Set aside enough habitat in each MPA to include 90% of biodiversity for that habitat

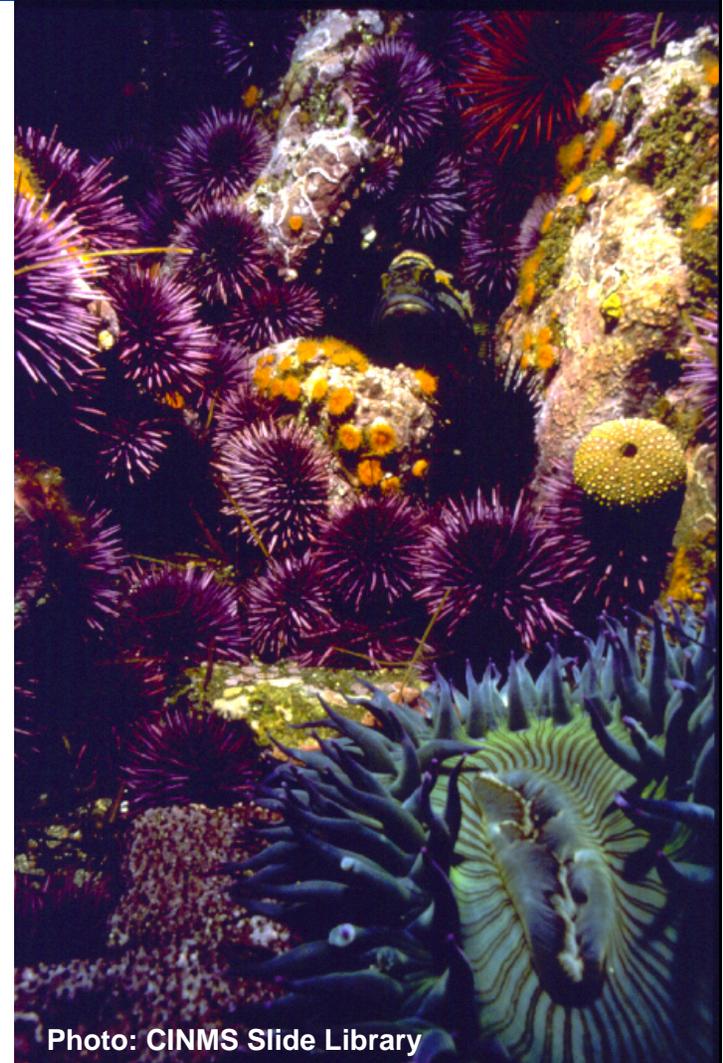


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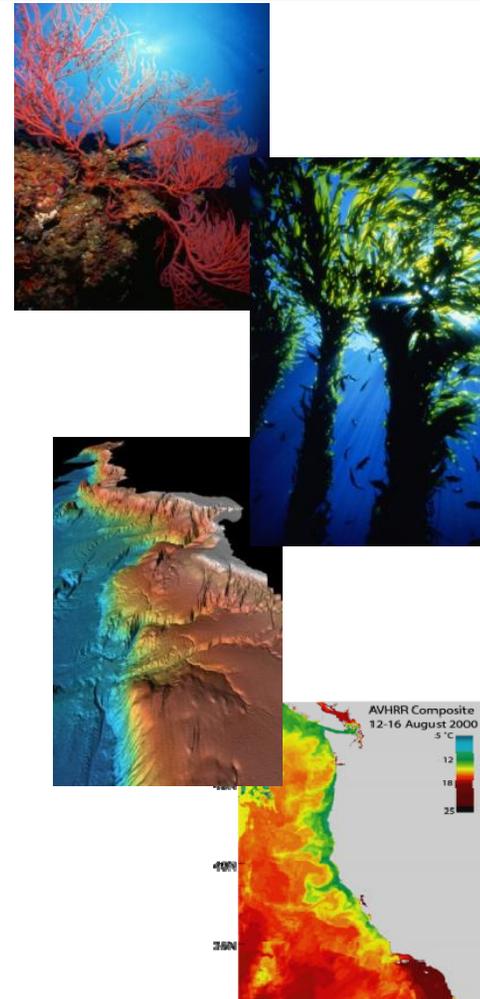
Habitat Representation

Habitat	Representation needed to encompass 90% of biodiversity	Data Source
Rocky Intertidal	~0.5 linear miles	PISCO Biodiversity
Shallow Rocky Reefs/Kelp Forests (0-30 M)	~1 linear mile	PISCO Subtidal
30-100m Rocky Reefs	~0.30 square miles	Love surveys
100-200m Rocky Reefs	~0.28 square miles	Love surveys
Sandy Beaches	~1 linear mile	
Sandy Habitat (0-30 M)	~1 linear mile	Based on shallow rocky reefs
Sandy Habitat (30-100 M)	~10 square miles	NMFS triennial trawl surveys 1977-2007
Estuary	~0.12 square miles	SONGS mitigation team surveys



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**.





Size and Spacing (Goals 2 and 6)

- Are proposed MPAs large enough to encompass adult movements for a range of species?
- Are proposed MPAs close enough together so that larvae can move from one MPA to another?



Photo Credit: Claire Fackler/NOAA



Guideline for Alongshore Span of MPAs

- For an objective of protecting adult populations, based on adult neighborhood sizes and movement patterns, MPAs should have an alongshore span of 5-10 kilometers (3-6 miles) of coastline, and preferably 10-20 kilometers (6-12.5 miles). Larger MPAs would be required to fully protect marine birds, mammals, and migratory fish.

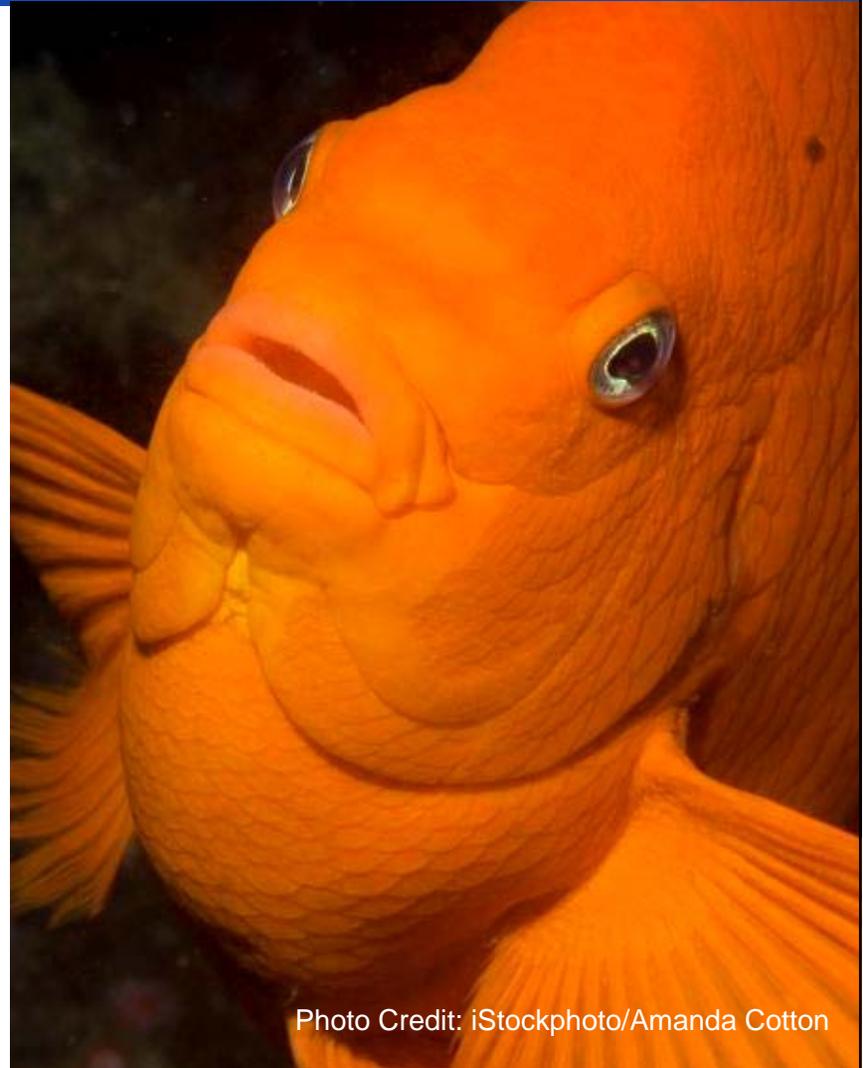
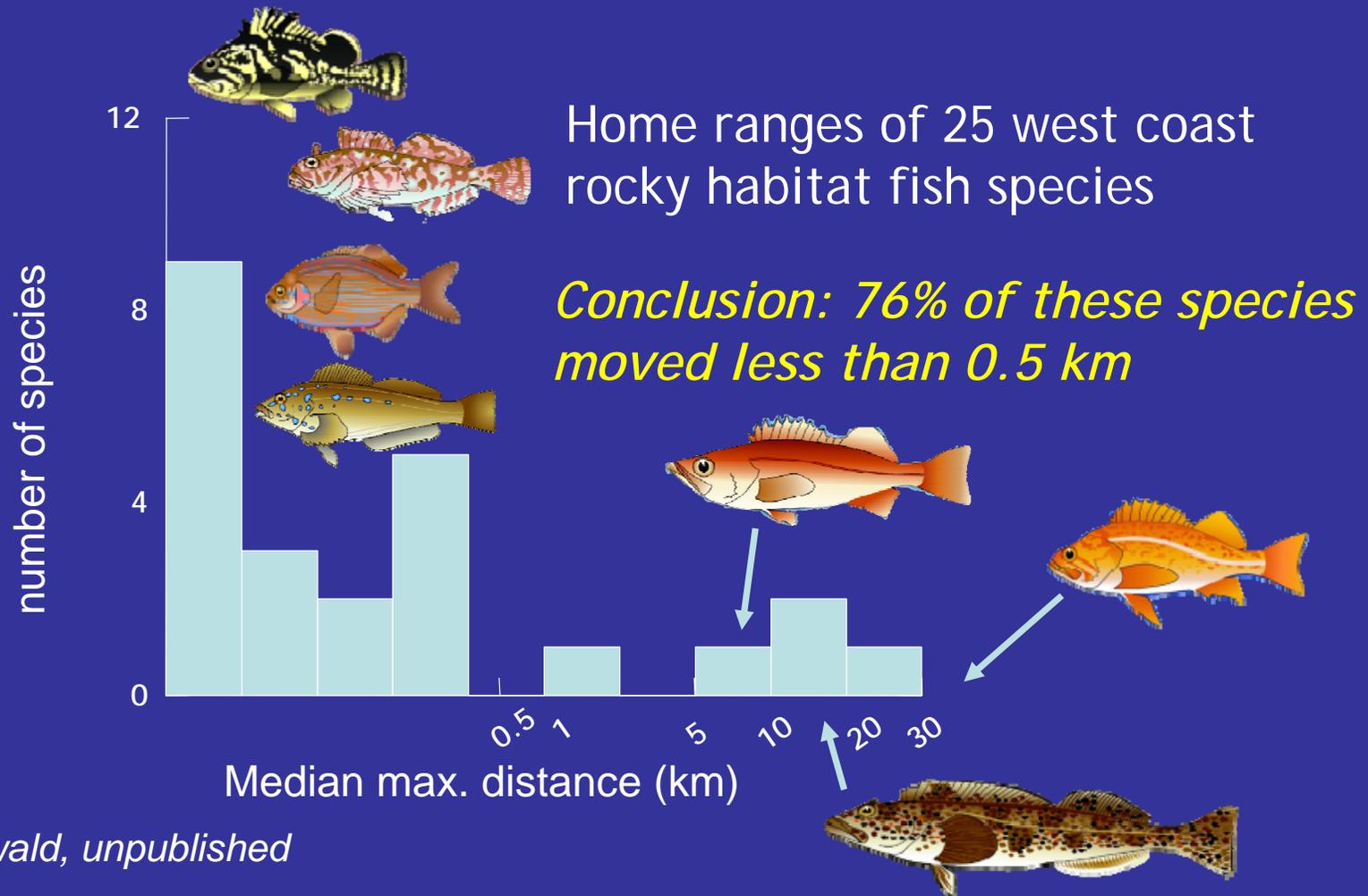


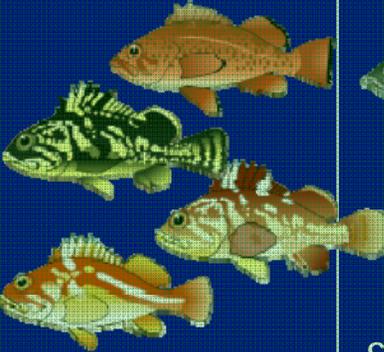
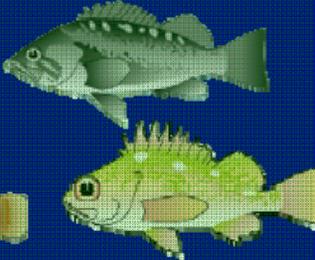
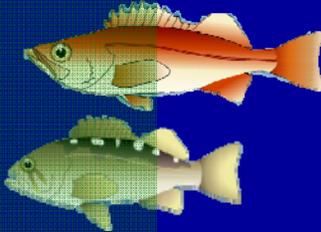
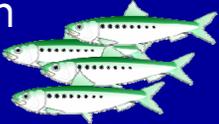
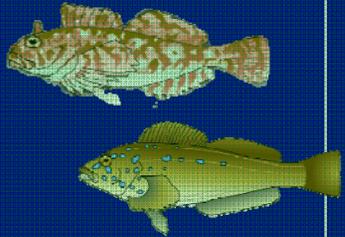
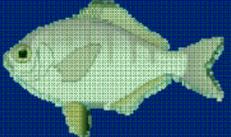
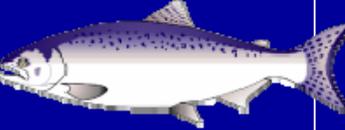
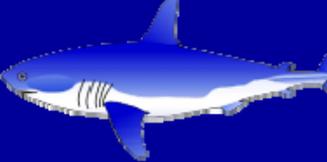
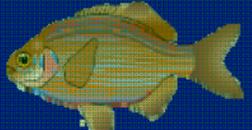
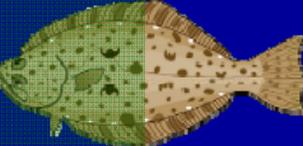
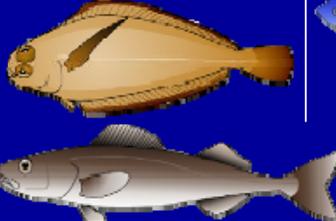
Photo Credit: iStockphoto/Amanda Cotton



Scales of Adult Movement



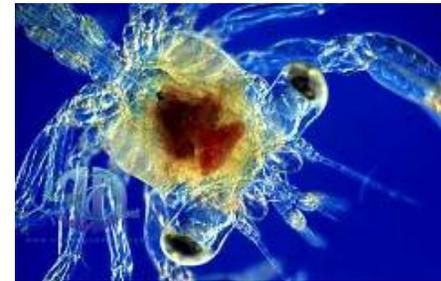
Scales of Adult Movement

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



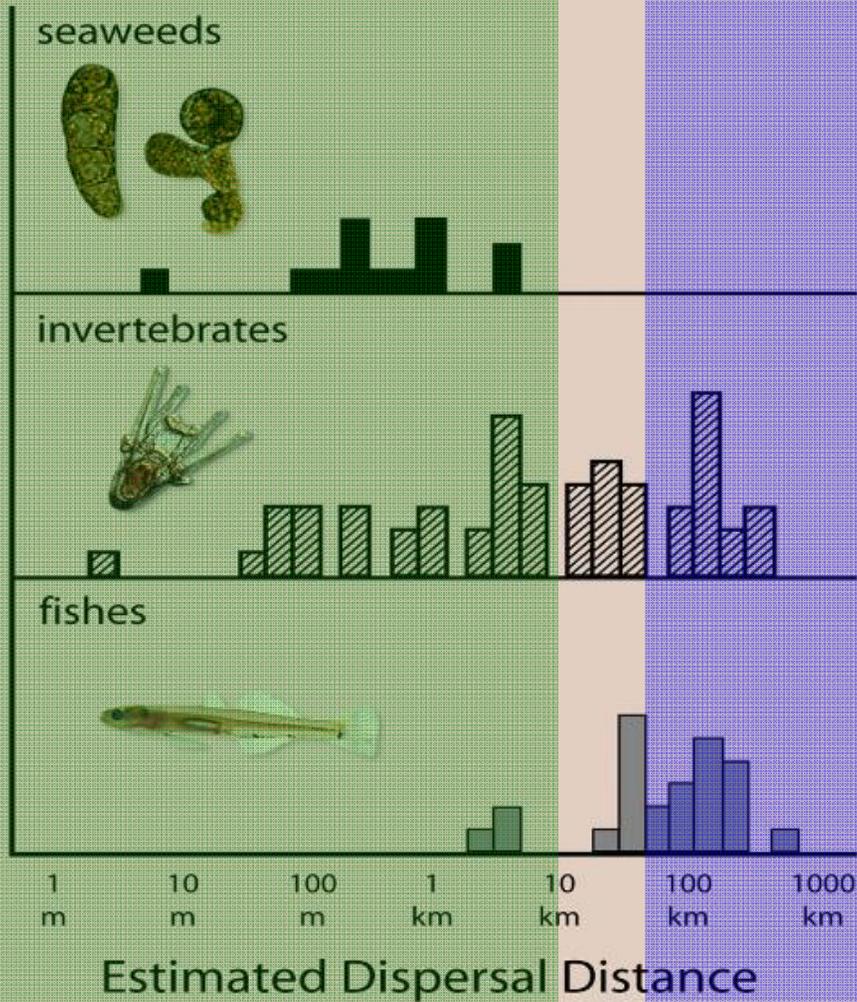
Guideline for MPA Spacing

- 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 kilometers (31-62 miles) of each other.





Scales of Larval Dispersal



Recommended
spacing:
50-100
kilometers

Palumbi 2003
Kinlan and Gaines 2003



Marine Birds and Mammals (Goal 2)

- Include breeding and resting areas for marine birds and mammals within MPAs
- Include foraging areas within MPAs

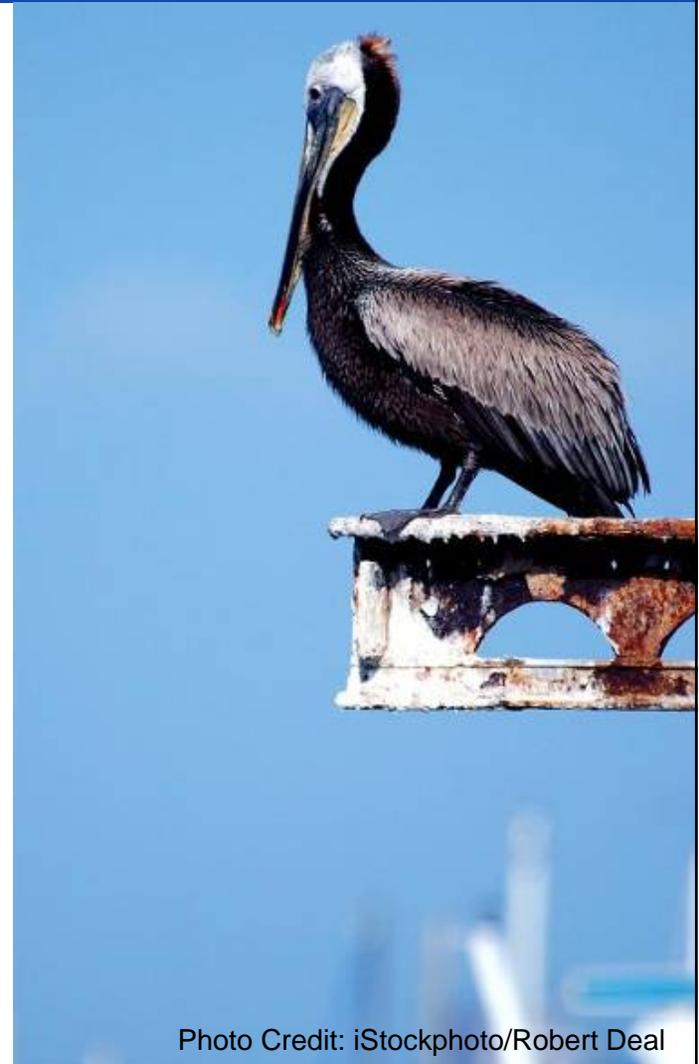


Photo Credit: iStockphoto/Robert Deal



Science Guidelines for MPA Design

- **No single optimum network design**
- **Include:** all bioregions
all 'key' marine habitats
- **Extent:** intertidal to deep water
- **Alongshore span:** 3-6 miles (5-10 km; minimum)
6-12.5 miles (10-20 km; preferred)
- **Spacing:** 31-62 miles (50-100 km)
- **Replication:** 3-5 replicates
- **Species:** include breeding, feeding and resting areas for birds and mammals