

# Marine Life Protection Act Initiative

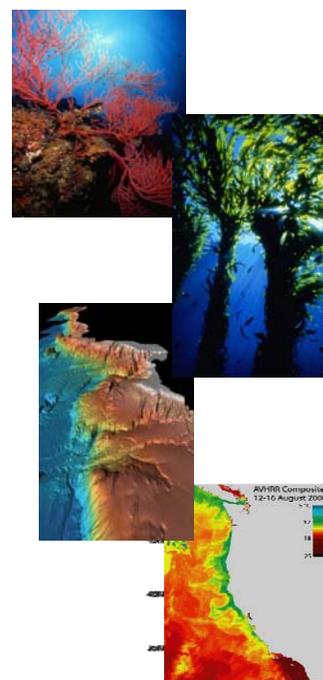


## Marine Habitats and Ecosystems

Larry Allen, Science Advisory Team  
California State University, Northridge  
Southern California Marine Institute  
Presentation to the Regional Stakeholder Group  
November 18, 2008 • Ventura, CA

## Marine Life Protection Act Goals

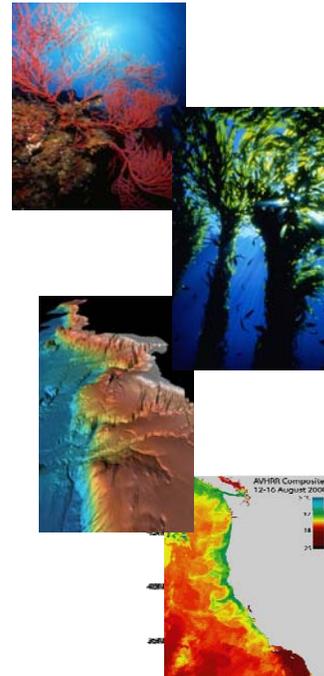
1. Protect **natural diversity** and **ecosystem functions**.
2. Sustain and restore marine life **populations**.
3. Improve recreational, educational, and study **opportunities**.
4. Protect representative and unique **habitats**.
5. Clear objectives, effective management, adequate enforcement, sound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



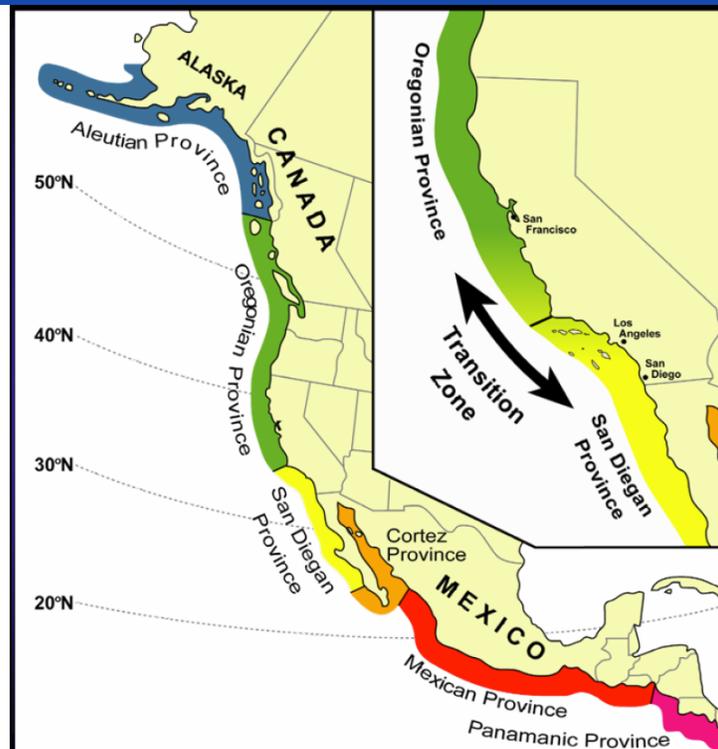


# Goals for Habitats and Ecosystems

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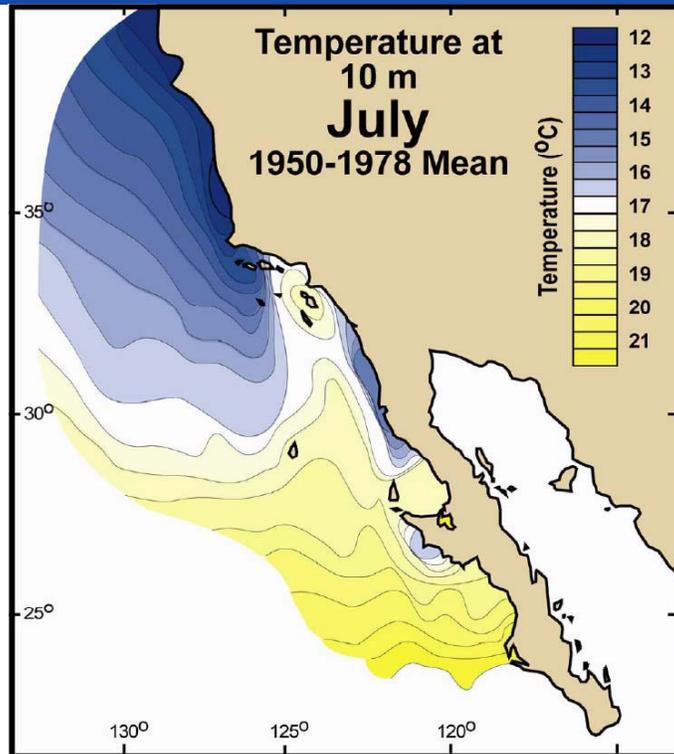


# Biogeographical Regions (Provinces)

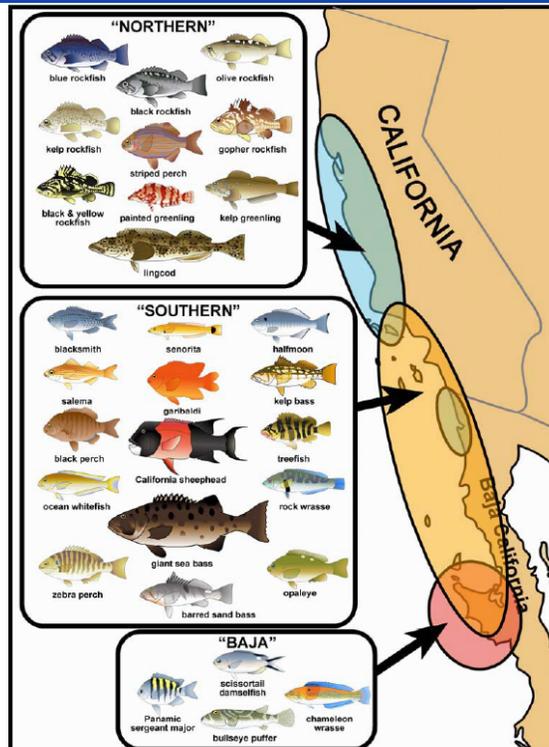


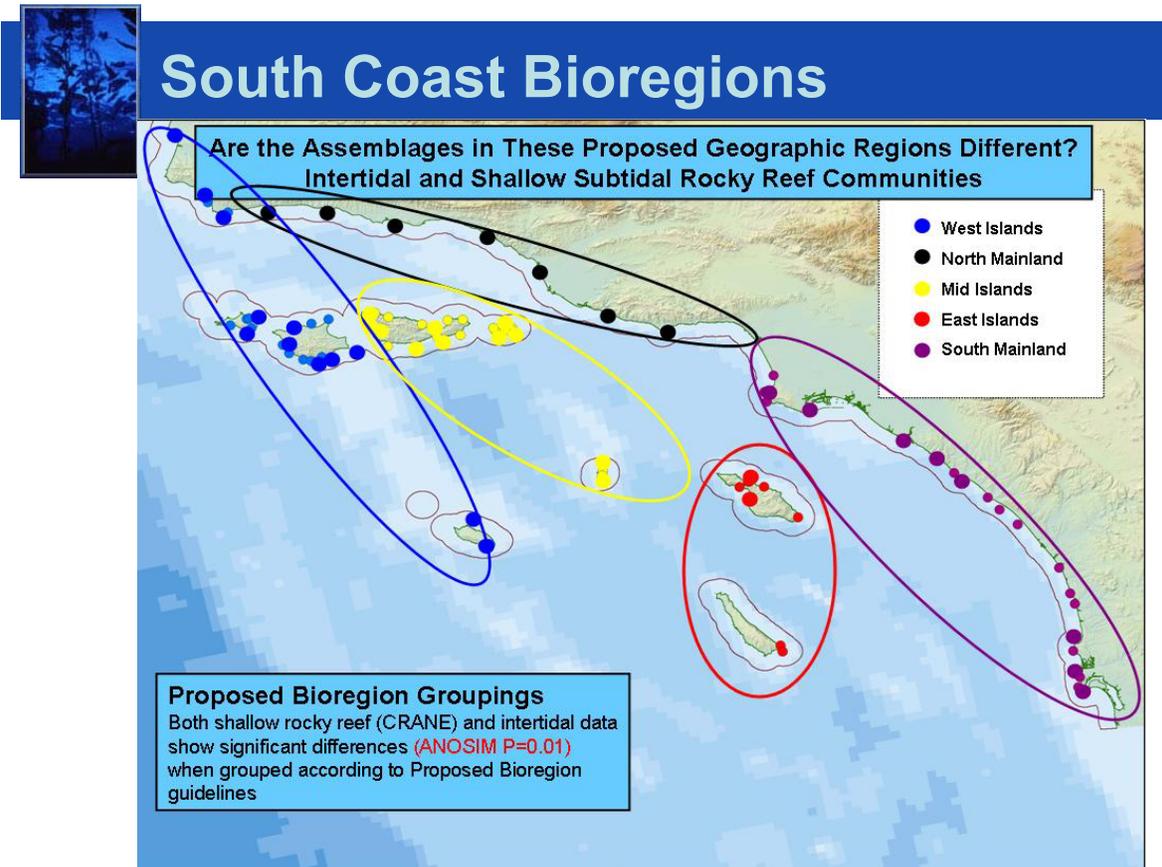


# Oceanographic Habitats



# Fish Assemblages by Biogeographical Regions





## 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



Photo: Stanford University Slide Library

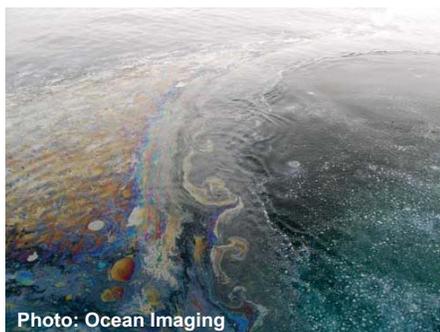


Photo: Ocean Imaging



Photo: Starthrower.org



## South Coast Marine Habitats

From the Regional Profile of the MLPA South Coast Study Region

| Habitat                 | Total Amount<br>(linear or square miles) |
|-------------------------|--|
| Total Study Area        | 2354.5 square miles                      |
| Sandy or gravel beaches | 379.9 miles                              |
| Rocky intertidal        | 280.5 miles                              |
| Coastal marsh           | 3.1 square miles                         |
| Tidal flats             | 28.6 miles                               |
| Estuary                 | 36.6 square miles                        |
| Surfgrass               | 57.9 miles                               |
| Eelgrass                | 18.1 square miles                        |
| Persistent Kelp         | 21.7 square miles                        |



## South Coast Seafloor Habitats

From the Regional Profile of the MLPA South Coast Study Region

| Habitat (Bottom Type)    | Total Amount<br>(linear or square miles) |
|--------------------------|--|
| Total Study Area         | 2354.5 square miles                      |
| Soft (0 - 30 meters)     | 466.6 square miles                       |
| Soft (30 - 100 meters)   | 780.1 square miles                       |
| Soft (100 - 200 meters)  | 140.6 square miles                       |
| Soft (200 - 3000 meters) | 317.0 square miles                       |
| Hard (0 - 30 meters)     | 190.1 square miles                       |
| Hard (30 - 100 meters)   | 200.2 square miles                       |
| Hard (100 - 200 meters)  | 101.1 square miles                       |
| Hard (200 - 3000 meters) | 97.1 square miles                        |



## Shoreline Habitats (Intertidal)

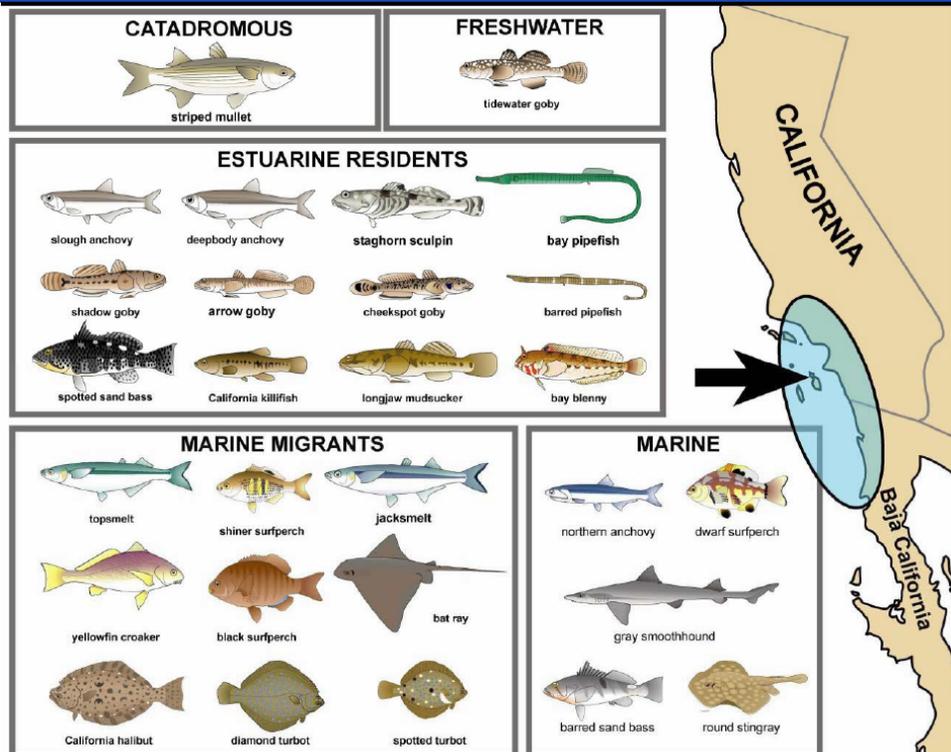
- Sandy beaches cover more than 35% of the south coast study region
- Rocky shores cover approximately 25% of the south coast study region
- Marshes and tidal flats are important habitats, but are less common



Photo: National Park Service



# Bays and Estuaries



Allen et al. 2006



# Seagrass Beds

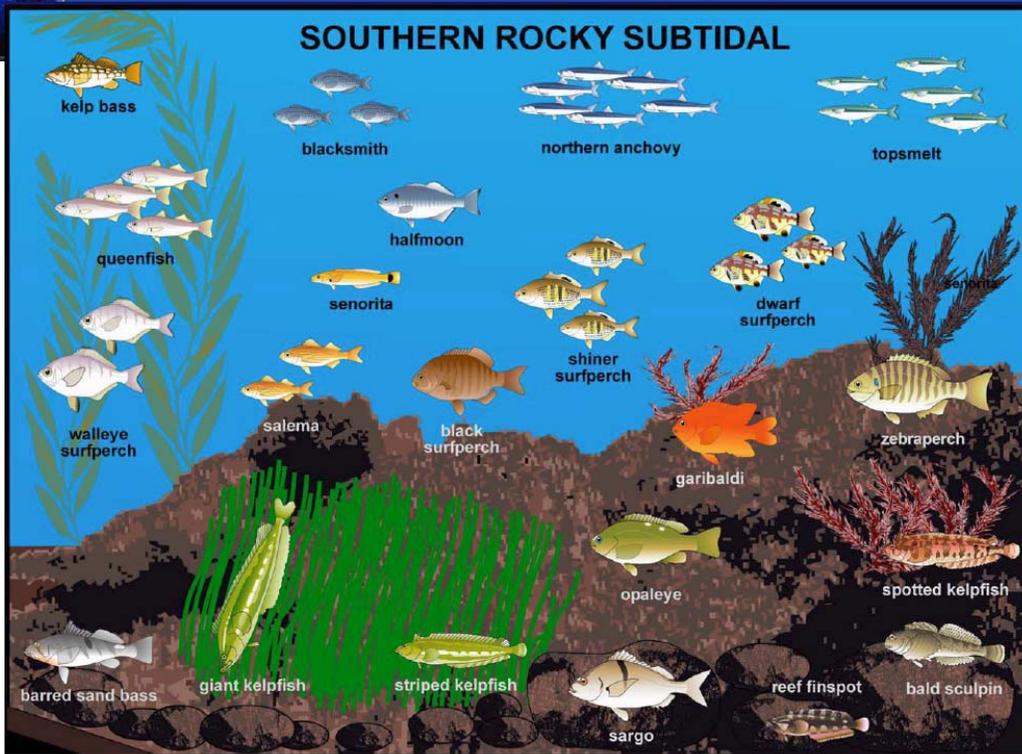


- Surfgrass (*Phyllospadix* spp.) occupies 7.1% of the nearshore coast of southern California.
  - Forms beds that fringe rocky coastline in shallow waters.
  - Important habitat for a variety of fish, invertebrates, and algae.

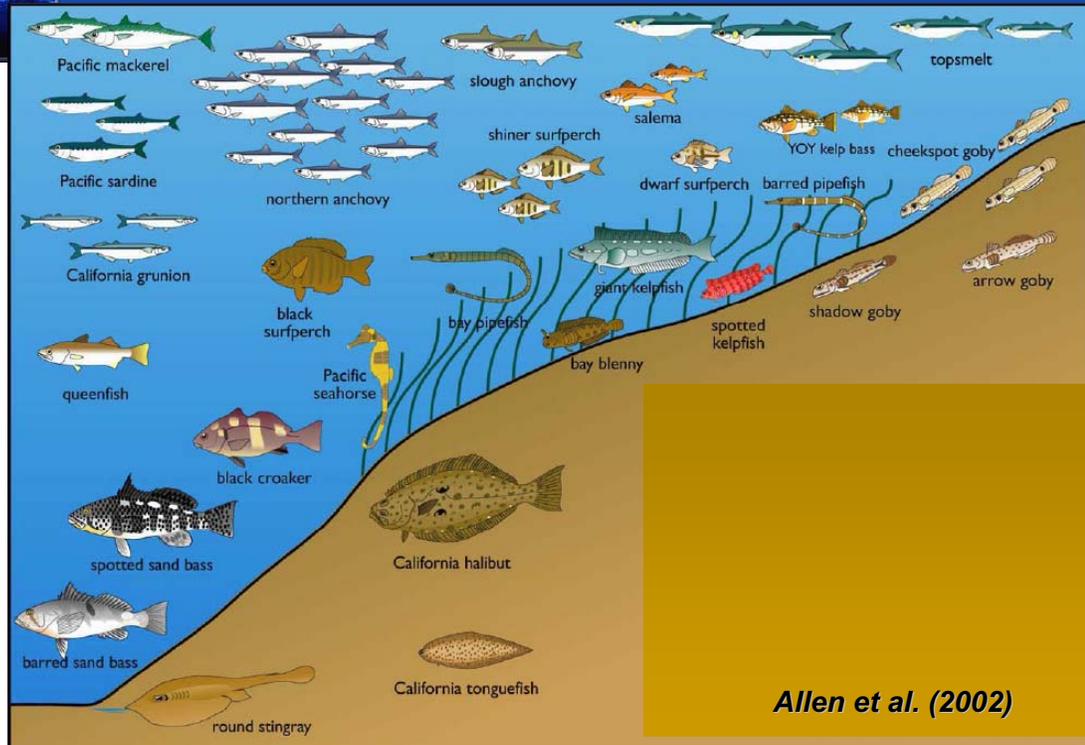


- Eelgrass (*Zostera* spp.) occupies less than 1% of the coastline of southern California.
  - Forms beds in estuaries and sheltered coves and bays.
  - Provides refuge, foraging, breeding and nursery areas for invertebrates, fish and birds.

# Surfgrass Beds



# Eelgrass Beds



Allen et al. (2002)



# Soft and Hard Bottom Habitats

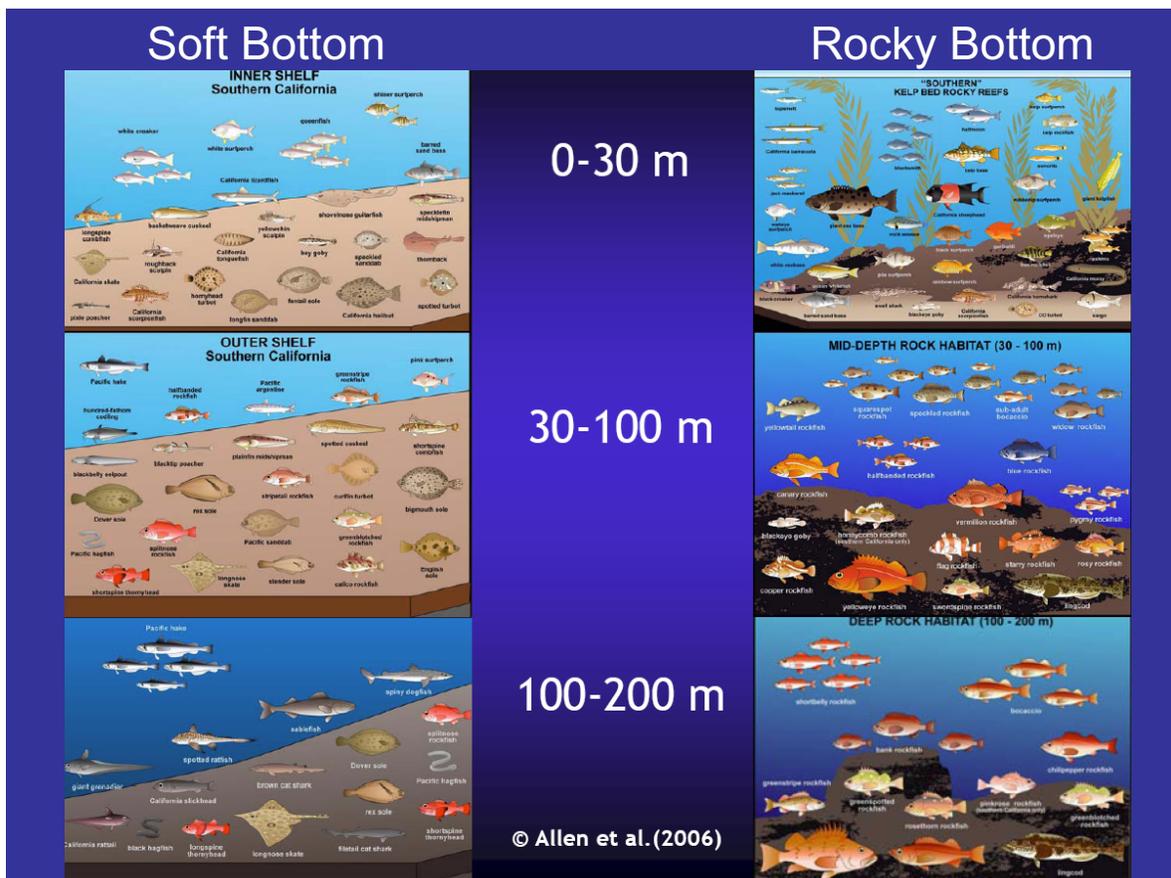


Photo: CINMS/NOAA Slide Library



Photo: CINMS/NOAA Slide Library

- Soft bottom dominates the seafloor within the south coast study region covering almost 75%.
- Hard bottom, including rocky reef, bedrock and boulder, is less common, but supports higher diversity, including kelp forests, deep coral and sponges.





# Kelp Forest

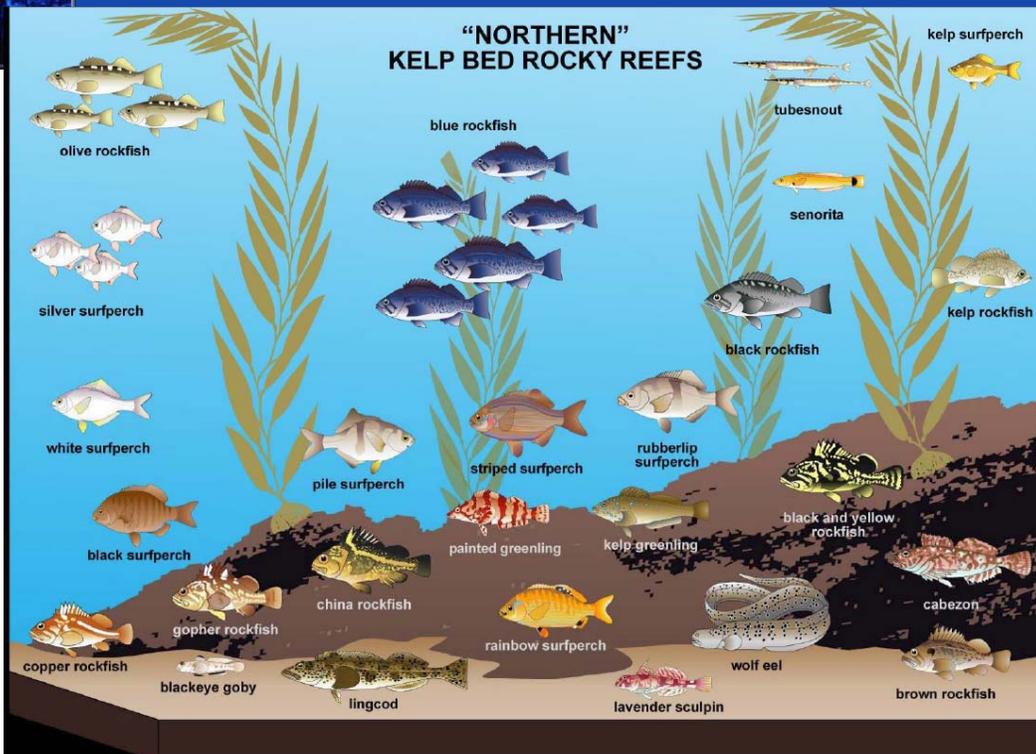
- Kelp forest averages nearly 22 square miles (0.9% of the south coast study region)
- Dominated by giant kelp (*Macrocystis pyrifera*)
- Occupies cool water from 20 to 100 feet depth, generally on bedrock, boulders and reefs
- Provides habitat, feeding grounds and nursery areas for fish, invertebrates, and marine mammals

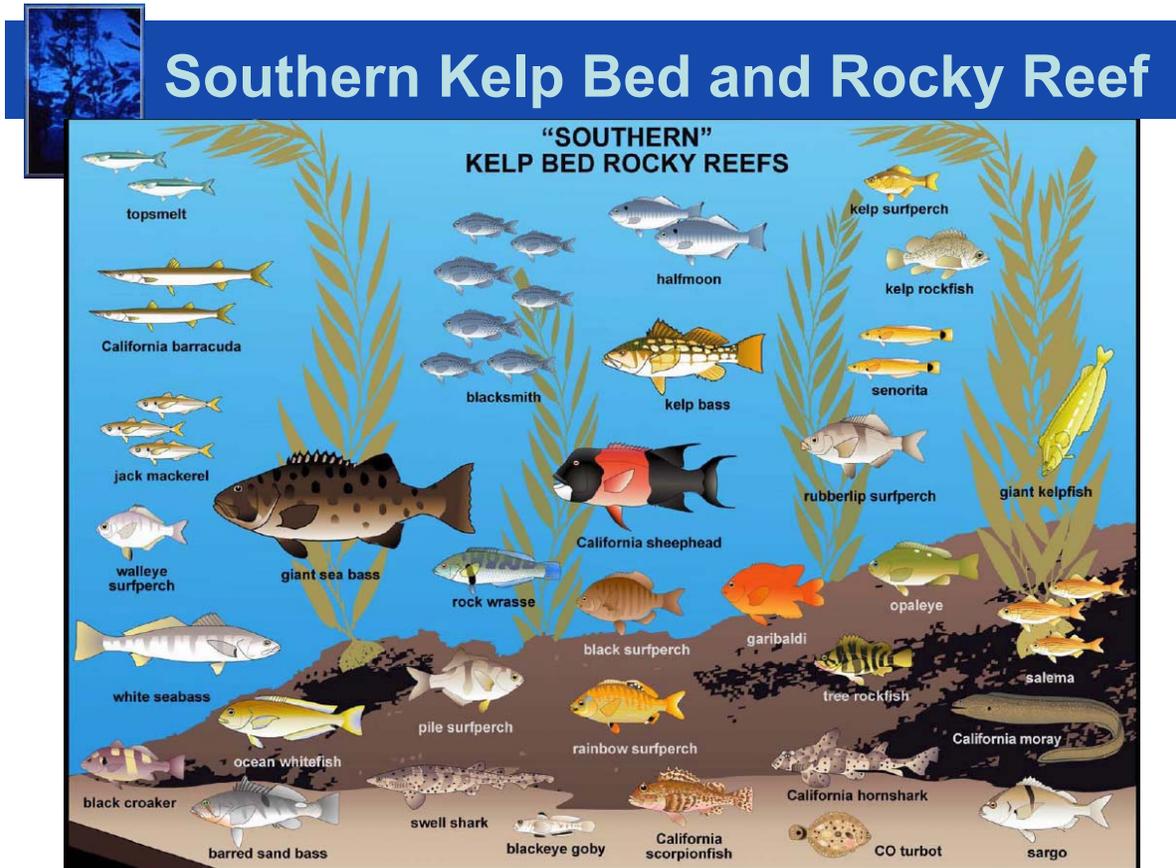
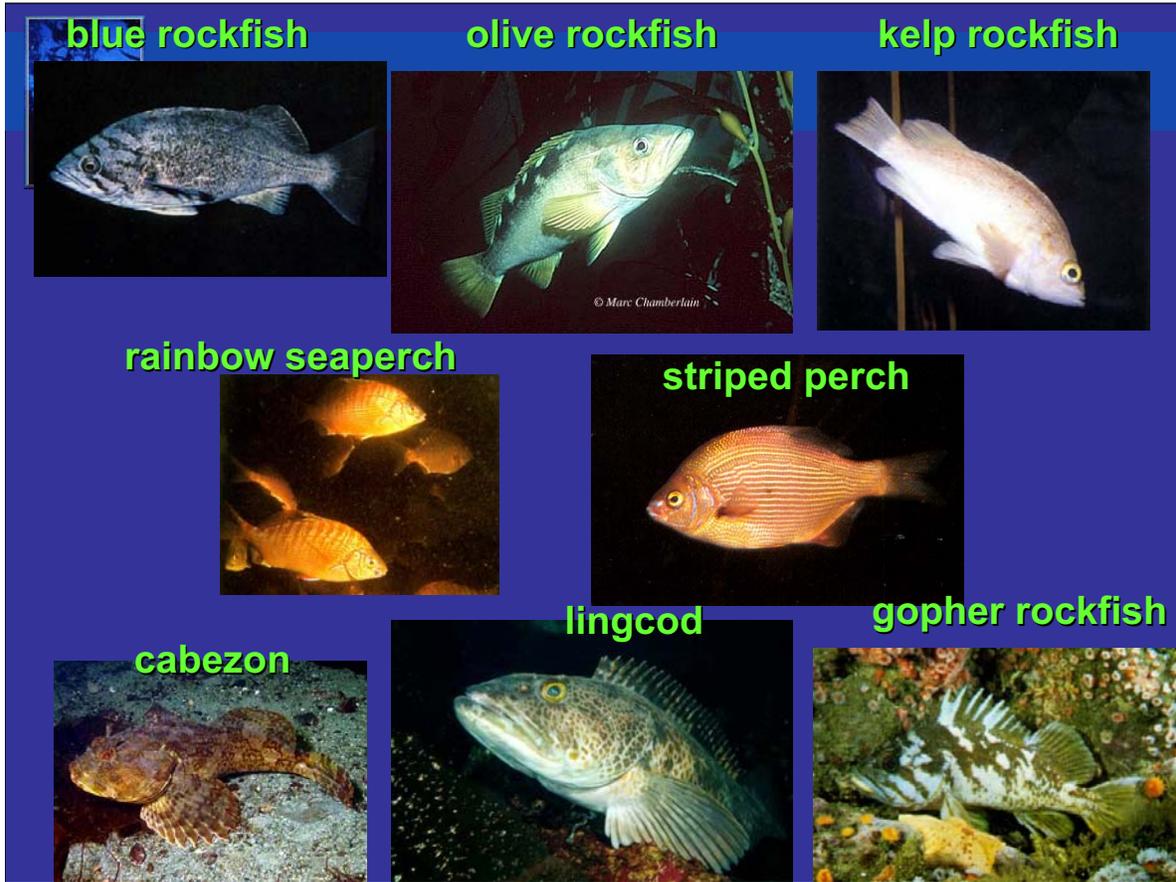


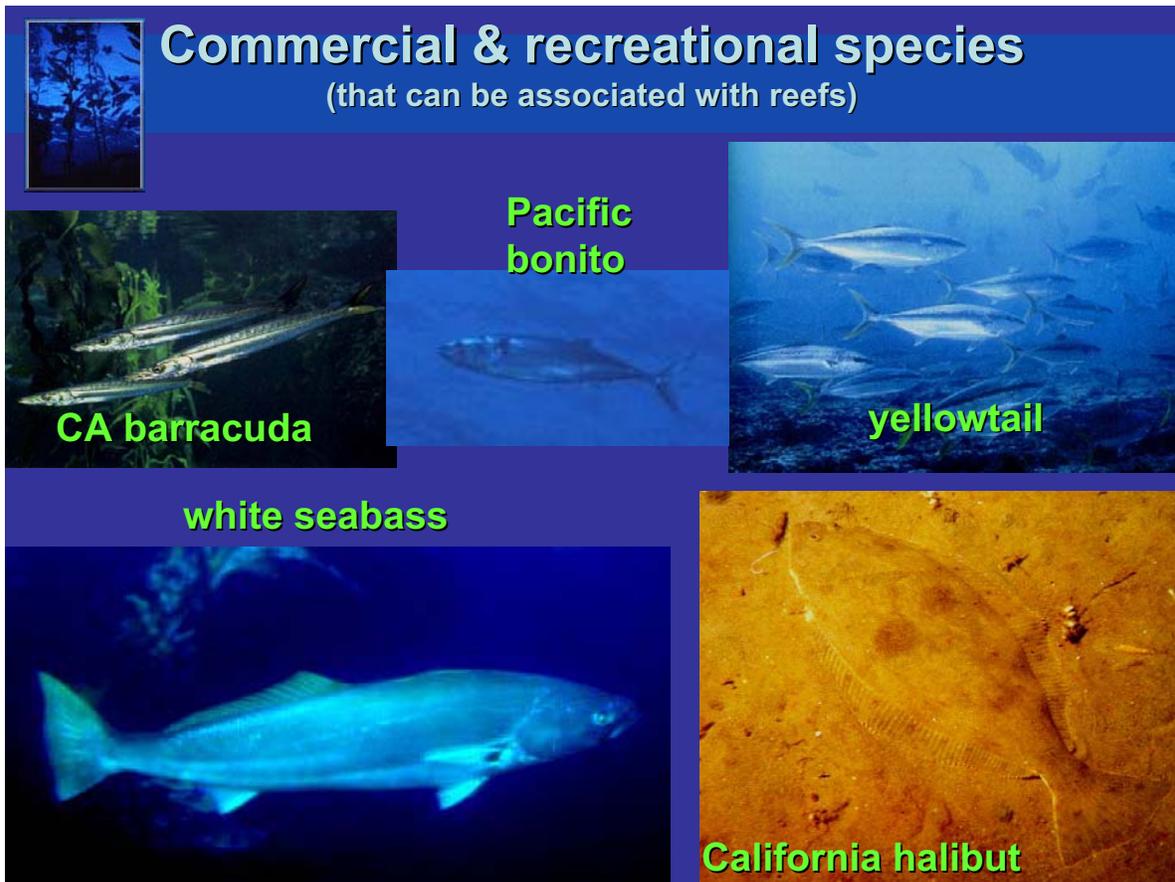
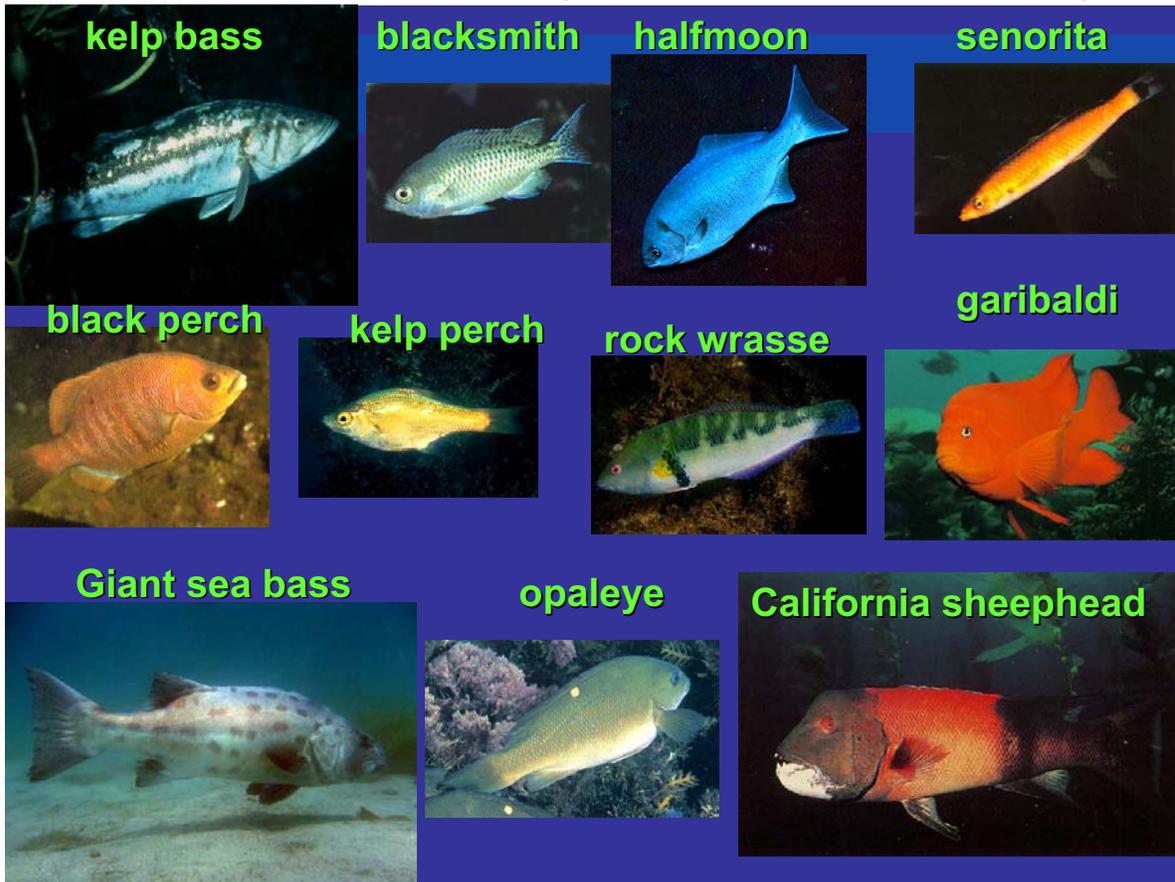
Photo: Mark Conlin



# Northern Kelp Bed and Rocky Reef









## Applying Habitat Knowledge

***Given the **complexity** and **variability** of marine habitats, design MPAs to include:***

- Key and unique marine habitats, characterized by seafloor type, depth, oceanographic properties and biogenic structure.
- Multiple examples (replicates) of each habitat type within a network of MPAs.
- A mixture of habitat types in each MPA to protect the greatest number of species.