Habitats and Ecosystems of North Central Region

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North Central Coast Regional
Stakeholder Group
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The Skinny

- Why ecosystems and habitats ?

- What is an ecosystem ?

- Critical habitats in the North Central Coast Region

MLPA Goals - Habitats

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.
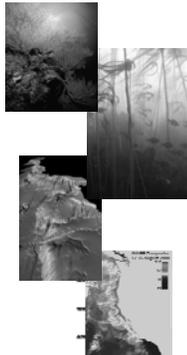
What Is an Ecosystem?

- A dynamic complex of plant, animal and micro-organism communities and the non-living environment interacting as a functional unit

- Humans are an integral part of ecosystems
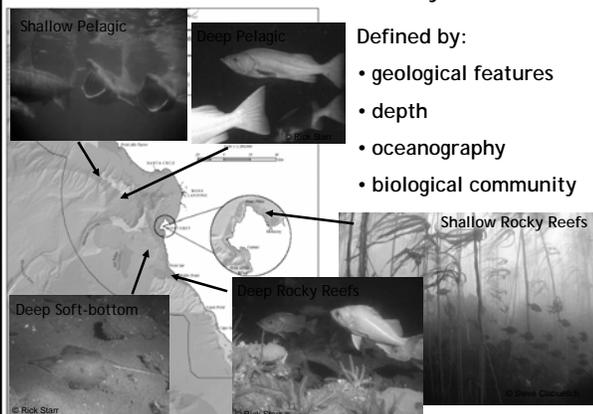
- Ecosystems vary greatly in size

Source: Millennium Ecosystem Assessment 2003

Large-Scale Marine Ecosystems

Large Marine Ecosystems of the United States and Linked Watersheds

Source: Large Marine Ecosystem Program, NOAA Fisheries

Smaller-Scale Marine Ecosystems

Shallow Pelagic

Deep Pelagic

Deep Soft-bottom

Deep Rocky Reefs

Shallow Rocky Reefs

Defined by:
- geological features
- depth
- oceanography
- biological community

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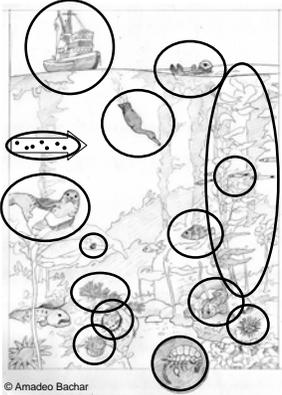
Attributes of Ecosystems
Structure

• Environmental features
   - geology, oceanography
• Species composition
• Species diversity
• Trophic levels – composition
   -primary producers
   -grazers, detritivores
   -planktivores
   -primary consumers
   -secondary, tertiary consumers
• Species that connect ecosystems

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Attributes of Ecosystems
Functions

larvae   juveniles

continental shelf
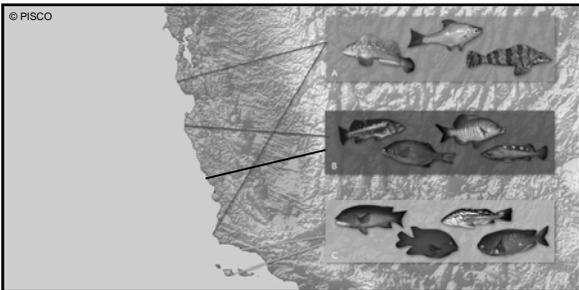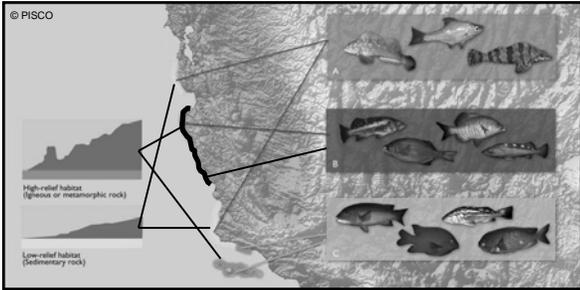
adults

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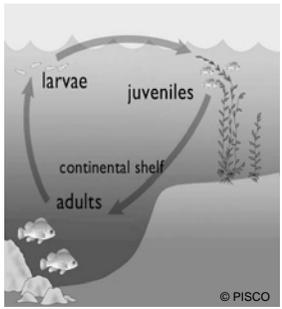
• Energy flow
• Productivity
• Trophic interactions
• Nutrient export and exchange
• Nutrient cycling
• Other species interactions
   (e.g., kelp produces habitat)
• Nursery habitat
• Larval production and export

Ecosystems are variable

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Ecosystems are variable
e.g. rock type affects species composition

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High-relief habitat
(Igneous or metamorphic rock)

Low-relief habitat
(Sedimentary rock)

MPAs along the coast protect diversity of an ecosystem

Ecological Setting: Habitats

Habitats that must be represented under the MLPA:

"...rocky reefs, intertidal zones, sandy or soft ocean bottoms, underwater pinnacles, seamounts, kelp forests, submarine canyons, and seagrass beds." [Fish and Game Code, Section 2856(a)(2)(A)]

Recommendation of SAT for additional habitats that should be represented:

• Five depth zones: intertidal, intertidal to 30 meters, 30 to 100 meters, 100-200 meters, and deeper than 200 meters
• Centers of upwelling typically associated with major points and headlands
• Plumes associated with streams and rivers
• Retention features characterized by restricted ocean currents such as gyres, eddies, or regions in the lee of headlands

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Key Marine Habitats

Seafloor Habitats

• Rocky reefs
• Intertidal zones
• Sandy or soft ocean bottoms
• Underwater pinnacles
• Submarine canyons

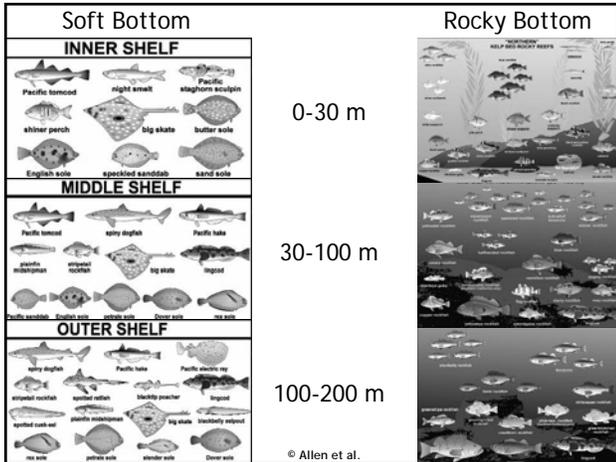**Oceanographic Habitats**

• Upwelling areas
• Freshwater plumes
• Retention zones

Depth Zones

• Intertidal
• Intertidal to 30 m
• 30 to 100 m
• 100 to 200 m
• 200 m and deeper

Biogenic Habitats

• Kelp forests
• Seagrass beds

Soft Bottom	Rocky Bottom	
INNER SHELF		0-30 m
MIDDLE SHELF		30-100 m
OUTER SHELF		100-200 m

© Allen et al.

Oceanographic Habitats

- Seasonal upwelling throughout northern half of region

- Fuels highly productive coastal and pelagic ecosystems

Cape Mendocino
cloud cover
San Francisco Bay
Point Conception

Key Habitats

- Identified Key Habitats Using
  - Bottom Type and Depth Categories
  - Biogenic Habitats
  - Oceanographic Features

Shoreline Habitats

Rocky shores
- ~46% of shore length
- Predominant north of Russian River
- Surfgrass ~19% of shore length

Shallow (0-30m) rocky reef
- Dominated by bull kelp (*Nereocystis lutkeana*)
- Kelp more abundant in northern half

Sandy beaches
- ~ 51% of shore length
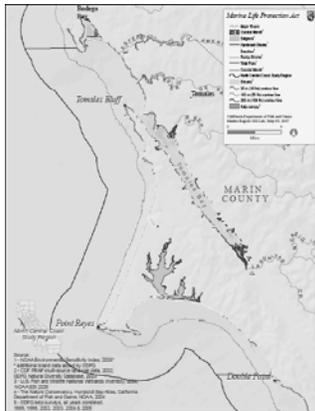- Predominant south of Russian River

Estuaries and Lagoons
- ~ 20 sq. miles or 2.5% of area
- Mainly in central study region

Estuary and Lagoon Habitats

Coastal Marshes
- ~14% of shore length
- Salt and brackish

Tidal Flats
- Exposed ~ 3 % of shore
- Sheltered ~14% of shore

Eelgrass
- ~ 1% of study area
- mostly in estuaries

Seafloor Habitats and Depth Zones

Study region is generally shallow
- 39% at 0-30m depth
- 60% at 30-100m depth
- 1% 100-200m depth

Seafloor habitats not present in region:
- deep water habitats (> 200m)
- submarine canyons
- seamounts

Seafloor Habitats and Depth Zones

High resolution seafloor mapping underway; current analysis based on existing coarse-scale data

Soft bottom more abundant than hard bottom: 15% hard / 85% soft overall
- 0-30 meters: 21% hard / 79% soft
- 30-100 meters: 12% hard / 88% soft
- 100-200 meters: 100% soft

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