# Kelp Forest Communities

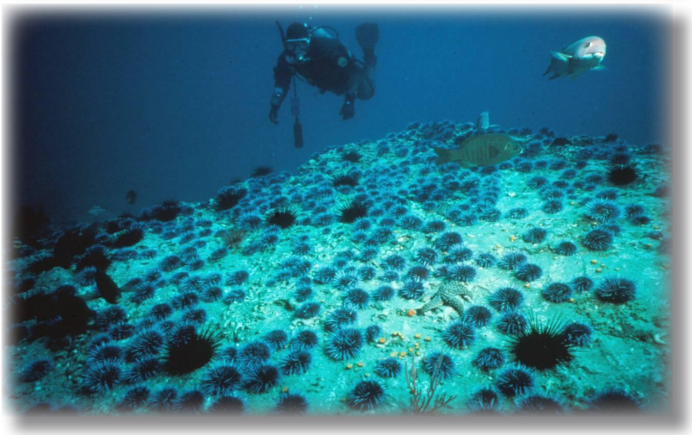
## IMPORTANCE

The nearshore waters along the coastline southern California host one of the most productive marine ecosystems on earth, giant kelp forests (*Macrocystis pyrifera*). Like tropical rainforests, these towering seaweeds provide structure, food, and hiding places for more than 1,000 species of plants and animals, providing necessary habitat for species as diverse as giant black sea bass and tiny blue-banded gobies.

Kelp forests are influenced by both natural events and human activities. Strong storms associated with El Niño years and fluctuating water temperatures can cause dramatic changes in kelp forest communities. Human activities also affect the health and survival of kelp forests through coastal development, sedimentation, pollution, and, in particular, fishing. Removal of predators can alter predator-prey interactions. For example, with the elimination of sea otters, and the overharvesting of spiny lobster and California sheephead, herbivore populations like purple sea urchins can increase decimate kelp beds through overgrazing. These areas quickly transition into "barren" landscapes supporting relatively few species and lower biomass. Loss of kelp beds also eliminates nursery grounds for many species whose young live in the kelp until they are large enough to venture into open waters. Without shelter and food from the kelp forest, these populations may be dramatically reduced.

## OBJECTIVES

- Determine the status and health of the islands' kelp forests
- Document the types of changes occurring in the marine environment
- Develop management strategies needed to protect the kelp forest ecosystem



"Barren" sea floors remain after kelp beds are overgrazed by high numbers of herbivores (like the sea urchins pictured), which result from the removal of larger predators.

View from inside the kelp forest canopy.

## MONITORING EFFORTS

The Kelp Forest Monitoring Program was established by Channel Islands National Park in 1982 to collect baseline information about the kelp forest ecosystem in the Park. Each year the program collects size and abundance data for 70 categories (taxa) of algae, invertebrates and fish that are indicators of ecosystem health.

## MANAGEMENT IMPLICATIONS

Park researchers have documented widespread and dramatic changes in the marine ecosystem around the Channel Islands since the program began, including declines in fished species like abalone and the loss of kelp beds around several of the islands.

- Information from park monitoring was instrumental in establishing marine reserves, areas of the ocean granted complete protection from fishing and extractive activities, at the Channel Islands, placing nearly 20% of Park waters into state marine protected areas.
- In 2008, a 5-year review of data collected by the Park and others demonstrated some positive trends in the new marine reserves including:
  1. greater overall biomass inside reserves,
  2. larger average body size of some species like kelp bass and spiny lobster in unfished reserves,
  3. kelp beds around the Channel Islands have recently increased, after experiencing substantial declines in the 1980s and 1990s.

For more information:
Dan Richards, dan_richards@nps.gov
David Kushner, david_kushner@nps.gov