



# Santa Monica Bay's Kelp Forest Habitat

On land, plants are essential organisms, forming not only an important part of habitat, but also providing homes and food for many different kinds of animals. While there are some plants found in the ocean (like surf grass or eel grass) algae usually fills the role left empty by plants in the ocean. In the Santa Monica Bay, you'll find red, green and brown algae in abundance, but the most common species in the kelp forest habitat is the giant kelp—a type of brown alga and one of the largest marine plant-like organisms in the world.

Kelp usually grows best in 20-80 feet of water. It needs cold water, healthy amounts of nutrients, and plenty of sunlight. Given these optimal conditions, kelp can grow to a length of more than 100 feet (up to 2 feet per day) and actually has been found up to 130 feet long!

Throughout human history, different types of seaweed have been harvested and used in a variety of ways. Since the 1600's we have used seaweed as a source of potash, a potassium-rich fertilizer. Today, one of its greatest uses is as a food source. Algae create gelatinous chemicals known as phycocolloids that are utilized in manufacturing various products as well as processing food. Read your food labels at home and see how big of a role algae plays in your life.

Algin, a phycocolloid derived from brown algae cell walls, is utilized as a smoothing agent and stabilizer (emulsifier) for dairy products like cheese, ice cream, and yogurt. It is also used in the baking industry, to keep pastries from drying out, and in the pharmaceutical industry, where it is used as a thickener for products like shaving cream, shampoos, paints, and cosmetics. Carrageenan, another phycocolloid, is derived from red algae like Irish moss. It's used as a smoothing agent in products like instant pudding and other processed foods. Agar, made from red algae, is important for its ability to form jelly and the ability to act as a thickener. It is used to protect meats and fish during canning, in laxatives, and in cosmetics and pharmaceuticals. Scientists also utilize agar as a medium to grow molds and bacteria.

## PROTECTING THE KELP FORESTS

During the 1950's, kelp forests began to disappear in Los Angeles and San Diego. Scientists began developing studies that would identify the cause of the destruction and to create methods to reverse it. Three major causes of kelp forest degradation were described then, and they still impact our oceans today:

**Pollution:** Effluents from industrial and human waste products as well as urban runoff can cause the seawater to become turbid (cloudy). When the seawater gets cloudy, sunlight doesn't penetrate the ocean and impairs the kelp's ability to photosynthesize.

**Sedimentation:** Dirt or sediment from construction sites can wash down streams and bury or erode the first growth stages of the kelp, preventing new plant-like organisms from establishing.

**Depletion of Predators:** If left unchecked, sea urchin populations will create what are known as urchin barrens. The urchins will literally devour everything in an area, breaking off the stipes of established kelp forests and making it impossible for new kelp to establish. In the past, sea urchin populations were kept in check by lobsters, sheephead, and sea otters. However, human populations have greatly decreased the population numbers of these animals, and urchins are allowed to exist practically predator free—and they wreak havoc on kelp forests.



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Santa Monica Baykeeper has been involved with kelp restoration in the Santa Monica Bay since 1996. Baykeeper works to relocate urchins to non-kelp forest habitat and to transplant healthy kelp to the newly urchin-free sites. The other good news is that waste treatment procedures have improved in the past 20 years and waste discharge regulations are stricter, which has reduced the amount of pollution in our oceans. You can help protect the kelp forests by keeping trash and other pollutants out of storm drains. You can also help by supporting groups like Heal the Bay and the Santa Monica Baykeeper.

## KELP FOREST ANIMALS

### Purple Sea Urchin (*Strongylocentrotus purpuratus*)

**Habitat:** Low intertidal zone, rocky reefs and kelp forests to 160 m from British Columbia to Baja California.

**Size:** Test size can grow to be 2 inches in diameter.

**Food:** Feeds on red and brown algae, including giant kelp (*Macrocystis*).

**Interesting Facts:** Purple sea urchins feed on the holdfasts of kelp causing the main frond of the kelp to become detached, float away, and die. To control this occurrence, predators keep the urchin populations in check. When predator population decline, entire areas of kelp forest may quickly be destroyed leaving behind an "urchin barren"

### Brittle Star (*Opiothrix spiculata*)

**Habitat:** Various habitats to 140 m from British Columbia to Southern California.

**Size:** Disk diameter from ½ inch to 2 inches with some species having arms 2-9 times as long as disk diameter.

**Food:** Feeds on organic particles, detritus and small animals.

**Interesting Facts:** This species gets its name due to the flexible, thin arms that are easily broken off but then can be regenerated.



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## **Norris's Top Snail (Kelp Snail) (*Norrisia norrisi*)**

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**Habitat:** Rocky intertidal zone from Point Conception to Baja California.

**Size:** Grows to 2 inches in length.

**Food:** Feeds on kelp and other brown algae.

**Interesting Facts:** Norris' top snails migrate up and down the kelp stipe (stem) as the intensity of sunlight changes throughout the day. This is called diurnal vertical migration.

## **Giant Kelpfish (*Heterostichus rostratus*)**

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**Habitat:** Kelp forests from British Columbia to Baja California.

**Size:** Adults can reach a length of 15 inches.

**Food:** Feeds on small fish, crustaceans, and amphipods.

**Interesting facts:** The coloration of the giant kelp fish varies from golden yellow to reddish purple and varies with the color of the kelp in which they are hiding. Juveniles can change color fairly easily, but adults have a harder time, with males having the hardest time of all.