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KELP BED

The kelp bed is a most productive and interesting cold-water marine habitat. Kelp beds are near-shore areas dominated by the presence of very large brown algae, called kelps. These plants require cold sea water and a solid rocky bottom on which to attach. They also require significant water movement to insure a constant supply of dissolved nutrients to fuel their photosynthetic processes. Kelp beds commonly grow in about 20 meters (65 ft) of water; if the water is exceptionally clear, they may grow at depths up to 30 meters (100 ft). The kelp bed structure and some of its more conspicuous inhabitants are discussed here.

Color each organism as it is introduced in the text. Note that the invertebrates and fishes in the foreground are drawn on an exaggerated scale relative to the large kelps for purposes of illustration. The sea lions and sea otter are drawn in the background to suggest the extent of the kelp bed.

Kelp beds occur in cold temperate water of the Pacific and Atlantic oceans. In some areas the dominant kelp species are relatively short, a few meters in length, and they make up kelp "beds." Elsewhere, large dominant species form kelp "forests." Off the coast of southern and central California, the dominant kelp is the *giant kelp*. Stipes (Plate 21) of the giant kelp can grow to lengths of 30 meters (100 ft) from their holdfast anchor on the rocks to the surface of the water. Its blades spread to form a thick canopy that soaks up the sun's energy for photosynthesis. These giant plants are kept afloat by the bulb-shaped air bladders (pneumatocysts) at the base of each blade.

Beneath the overhead canopy created by the giant kelp, the smaller *palm kelp* grows. This species has a thick elastic

stipe that bends with the water movement, but is strong enough to hold the plant upright above the bottom. The palm kelp uses the light that filters through the overhead canopy for its photosynthesis.

On the rocky bottom is a turflike layer of small *red algae*. If the area is very densely shaded, it may contain a variety of attached invertebrates: *sponges*, *sea anemones*, *sea squirts*, and *barnacles* (not shown). Among these attached creatures live millions of smaller, motile animals. Brittle stars, gastropods, amphipods, and isopods abound.

The herbivorous (plant-eating) *sea urchins*, *sea hares*, and *abalones* can often be found on the bottom, where they take advantage of the large amounts of plant material produced in the kelp forest. The omnivorous (plant-and animal-eating) *sea bat* is variable in color; red, orange, brown, yellow, or green, and is a conspicuous kelp forest resident. The large pink to purple carnivorous *sunflower star* eats the prickly sea urchin, other sea stars, and a variety of other invertebrates.

The waters below the kelp canopy are rich in fish life. The *sheephead*, boldly colored in dark gray with a contrasting salmon-pink midsection and white lower jaw, comes to feed on larger invertebrates that live among the kelp stipes. The kelp forest is also home to several species of *rockfishes*, which feed on other fishes in the forest and a variety of invertebrates. Individual rockfish species occupy relatively discrete subhabitats within the kelp forest, thus avoiding direct competition with each other.

Two marine mammals that frequent kelp forests are the *sea lion* and the *sea otter*. The sea lion stalks fish and sometimes plays between the large kelp stipes. The sea otter may spend almost its entire life in the kelp forest and has a very important role in this habitat (Plate 113).

Name/Period/Date

Kelp Bed

1. What type of habitat does kelp require?
2. Where do kelp beds occur?
3. What is a pneumatocyst?
4. List three organisms that can be found in kelp forests.
5. Color!



SEA OTTER_n

SEA LION_m

GIANT KELP_a

SHEEPHEAD_k

ROCKFISH_l

PALM KELP_b

RED ALGAE_c

SEA HARE_c

URCHIN_f

SEA BAT_i

ANEMONE_e

SPONGE_d

ABALONE_h

SUNFLOWER STAR_j