

## SUBTIDAL SOFT BOTTOMS

The previous six plates have dealt with intertidal habitats. Subtidal habitats of the near-shore, from the lowest intertidal zone to the edge of the continental shelf, will be treated in this and the next three plates. The distribution of soft bottom types in subtidal habitats is controlled by the same factors discussed for intertidal soft bottoms: the degree of water movement and the character of the materials in suspension determine the type and composition of the bottom.

Soft bottoms on the continental shelf are composed mainly of inorganic materials washed from the land by rivers or carried away by wind. The shallow bottom closest to shore experiences the strongest wave action and water currents. Here sandy bottoms predominate. At greater depths or in sheltered areas, water movement is reduced, and finer particles are deposited, forming mud. A gradient of soft bottom results, ranging from coarse sand near shore to muddy bottoms offshore over the continental shelf. As the water becomes calmer offshore and suspended organic detritus settles to the bottom, the fauna shifts from filter feeders to deposit feeders similar to the faunal patterns in tidal flats.

**Color the small and large illustration of each animal as it is mentioned in the text. The animals are grouped as epifauna, living on the surface, and infauna, which live in the substratum.**

Residing below the low-tide line along the central California coast is the large (15 cm, 6 in) *Pismo clam*. Pismos live in clam beds and feed on the large amount of suspended detritus in the surf zone. They depend on their heavy shells to keep them in place. Just beyond the surf zone, beds of the filter-feeding epifaunal *Pacific sand dollar* (Plate 105) may be found. These beds may be several meters wide and stretch for kilometers offshore of exposed sandy beaches, with the dark purple sand dollars numbering in the millions. Amongst the sand dollars, the scavenging *elbow crab* and *hermit crab* scuttle about looking for food trapped in the bed. Predators such as the sandy-gray *sand star* feed on the sand dollars, and the buff-brown *moon snail*

feed on the numerous, burrowed filter-feeding clams, like the bright white *sea cockle*. Many species of flatfish occur, including the camouflaged *sanddab* which blends into the sand bottom and feeds on small worms and crustaceans. Larger fish include the *angel shark* which conceals its flattened body by partially covering itself with sand when not actively foraging for burrowed prey. Other flat elasmobranch fishes like skates and rays (fishes that lack true bones, Plate 52) also hunt for food on these soft bottoms, often excavating deep pits with their broad pectoral fins to uncover clams and other prey.

In deeper, calmer water, large aggregations of pale gray *brittle stars* may be found swarming on the bottom, feeding on deposited material, or burrowed into the sediment, with only their arms protruding through the mud. Another spiny-skinned animal found here is the dark gray *heart urchin*, or sea porcupine, which ingests sediments as it burrows horizontally just below the surface, digesting the organic material contained therein.

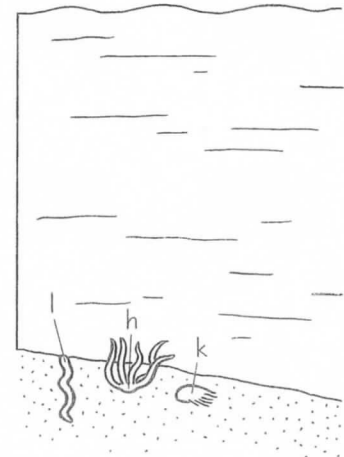
Worms are among the most abundant infaunal animals. Their sleek, elongated bodies are perfectly adapted for efficient burrowing. Many types of worms live in these soft bottom sediments. Some ingest the sediment as they burrow through it; others live in vertical tubes buried in the substrate and feed on detrital material deposited on the surface; still others filter suspended materials from the water above with elaborate tentacles while their bodies rest safely protected in a burrow (Plate 28). Shown here is the shimmy worm, *Nephtys*, a robust (5–10 cm, 2–4 in) silver-gray, burrowing *polychaete worm*. *Nephtys* is a carnivorous scavenger that can re-burrow very rapidly if uncovered.

The soft bottoms of the continental shelf are very monotonous, homogenous habitats that offer limited places for plants and animals to live. These habitats host a low diversity of organisms compared to the many different kinds of plants and animals that can occur in hard substrate habitats. However, individual members of the soft sediment fauna can be extremely abundant, like the sand dollar beds mentioned here, and can play important roles in marine food webs.

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1. What are soft bottoms on the continental shelf mainly composed of?
2. Explain the gradient present in this subtidal community.
3. List three organisms found in the subtidal soft bottom community.
4. Why do these habitats typically have a relatively low diversity?
5. Color!

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**EPIFAUNA\***

- PACIFIC SAND DOLLAR<sub>a</sub>
- ELBOW CRAB<sub>b</sub>
- HERMIT CRAB<sub>c</sub>
- SAND STAR<sub>d</sub>
- MOON SNAIL<sub>e</sub>
- SANDDAB<sub>f</sub>
- ANGEL SHARK<sub>g</sub>
- BRITTLE STAR<sub>h</sub>

**INFAUNA\***

- PISMO CLAM<sub>i</sub>
- SEA COCKLE<sub>j</sub>
- HEART URCHIN<sub>k</sub>
- POLYCHAETE WORM<sub>l</sub>
- BRITTLE STAR<sub>h</sub>

