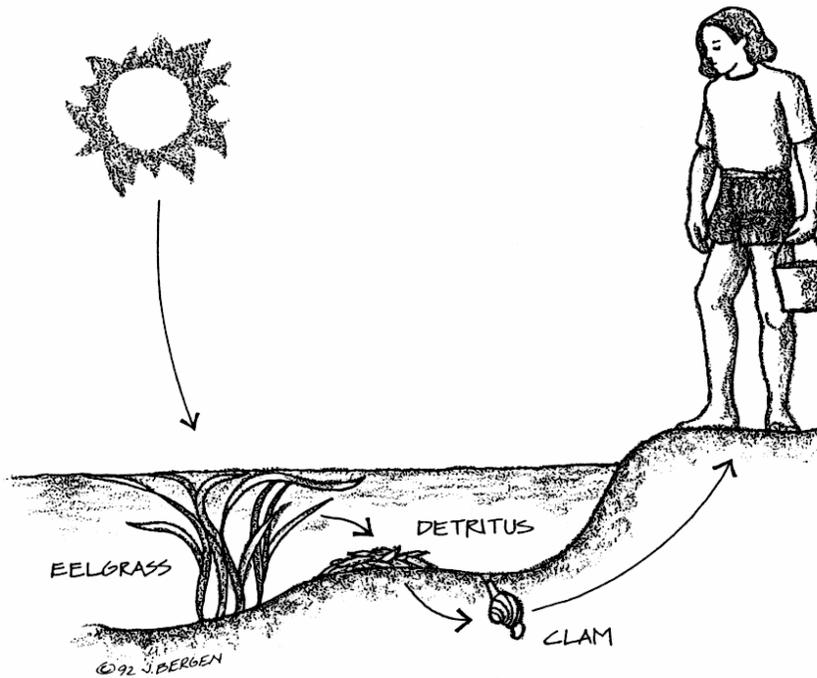


# Estuarine Food Chains and Webs

by Kenn Oberrecht



*Where the fresh water of a river meets and mingles with the tidal flow of the ocean's salt water, an estuary is formed. This is a highly complex environment where resident and visiting organisms must be able to tolerate frequent and rapid changes in salinity, currents, temperatures, and water levels.*

Food chains and food webs here are similar to those elsewhere. They have primary producers, primary feeders, secondary feeders, and tertiary feeders, ranging from single-celled algae to the highly efficient predators at the top of the chain.

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Ecologists refer to these increments as trophic levels. The term trophic derives from the Greek trophikos, which means, simply, "pertaining to food."

The ways in which food is consumed--that is, the pattern of consumption and how it changes with time--is called trophic dynamics. Inasmuch as an estuary is an environment characterized by rapid and frequent change, which leads to biological diversity, food chains and webs and trophic dynamics in an estuary are complex.

Unlike the open ocean, where phytoplankton are the sole primary producers, estuarine systems usually contain several types of primary producers. In addition to phytoplankton, they include algae, sea grasses, and salt-marsh plants.

Zooplankton graze on phytoplankton in the estuary. These, in turn, become food for plankton-eating fishes, such as herring, smelt, and the larvae and young of larger fishes. These, then, become food for carnivores and omnivores nearer the top of the food chain.

Some animals graze on the larger estuarine plants, but such plants are probably more important food sources after they die and begin to decompose. Here, bacteria and fungi enter the food chain to promote the breakdown of the dead plant material. This organic detritus, as it's called, is an essential source of nutrition for detritus-eating animals and supports a detrital food web.

*Estuaries are not only areas of great diversity, with complex and interrelated trophic patterns, but they also support a large number of top predators, including humans.*

Benthic, or bottom-dwelling, and bottom-oriented organisms are other important links in estuarine food chains and webs. Clams, for example, reside in the bottom sediments and feed on plankton and other organic matter by filtering it from the water. Oysters and mussels are other filter feeders.

Deposit feeders, such as the various kinds of worms found in the estuary, move over and through bottom sediments where they find food deposited in or on the sediments.

Shrimps, crabs, and other invertebrates are well adapted to bottom feeding, as are many of the estuarine fishes, such as sculpin, flounder, sole, and sturgeon. In fact, most fish species that reside in estuaries or move into them on feeding forays are bottom oriented in their feeding patterns.

Near the top of the estuarine food web are various carnivores and omnivores. Some show marked food preferences, while others are opportunistic feeders. These include diving birds, wading birds, waterfowl, gulls, terns, pelicans, ospreys, trout, perch, striped bass, sharks, and salmon.

At the top of the web are seals, sea lions, and humans, although seals and sea lions are preyed upon by killer whales and the larger sharks, which sometimes enter estuaries and frequent the larger ones.

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