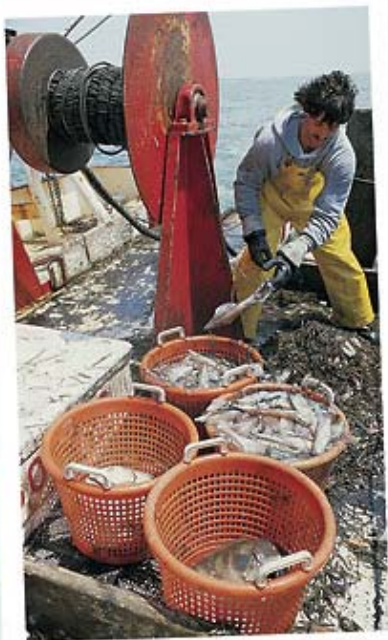


SOCIETY & the Environment

EATING THE BAIT

Most of the food we eat comes from agriculture and farming, but we also rely heavily on the fishing industry to provide us with fresh fish. Because of a high demand for fish, however, many fish species have been overharvested. Many organisms depend on these *fisheries*, places where fish are caught, to survive. The swordfish and cod fisheries of the North Atlantic and the salmon fishery off the northwestern coast of the United States are examples of fisheries that have become depleted. These fisheries now contain so few fish that harvesting the fish is not economical.

► **Overfishing** of organisms from higher trophic levels has forced the commercial fishing industry to harvest organisms in lower trophic levels in order to fulfill the demand for fresh fish.



Fishing Down the Food Chain

Fish such as cod, tuna, and snapper are top carnivores in ocean food chains and food webs. As these fish have disappeared, species from lower trophic levels have begun to appear in fish markets. Fish that were once swept back into the sea when they were caught in nets by accident are now being kept and sold. Organisms from lower trophic levels such as mullet, squid, mackerel, and herring, which were typically used as bait to catch larger fish, now appear on restaurant menus.

According to data from the United Nations on worldwide fish harvests, the overall trophic level at which most fish are caught has declined since the 1950s. Overfishing of organisms in lower trophic levels disrupts food chains and food webs. If the food webs of ocean ecosystems collapse, the commercial fishing industry will also collapse. For example, in the North Atlantic cod fisheries, the cod began to disappear, so the fishers concentrated on the cods' prey, which is shrimp. Cod are higher trophic level organisms, while shrimp are in the lower trophic levels and feed on algae and detritus. If the shrimp become overfished, the cod and other organisms that depend on both the shrimp and cod to survive are affected.

Creating Sustainable Fisheries

One aim of environmental science is to determine how fisheries can be managed so that they are sustainable or capable of supplying the same number of fish to be harvested each year. However, few, if any, countries manage their



► A squid is an example of an organism from a lower trophic level that was used for bait but is now sold in restaurants.

fisheries in this way. Almost all countries permit unsustainable, large harvests. One solution to overfishing is to establish "no-take" zones. These are areas of the sea where no fishing is permitted. Studies have shown that fish populations grow rapidly in "no-take" zones. When a population grows in a "no-take zone," the higher trophic level organisms leave the zone and become available to fishers. "No-take" zones help populations recover and allow food chains and food webs to remain intact.

What Do You Think?

The next time you go to a fish market or seafood restaurant, take note of the different types of species for sale. Write down the names of the species, and try to assign each species to a trophic level. How many of the species for sale belong to lower trophic levels? How many belong to higher trophic levels? How do prices differ between the species for sale?