

Directions

Use the technical passage below and the Coastal Food Web on page 9 to answer Numbers 13 through 15.

WHY ARE SEA OTTER POPULATIONS DECLINING?

The number of sea otters living along Alaska's Aleutian Islands has fallen to 10% of what it was a decade ago. The investigation into what is happening to this population is revealing a great deal of information about the complex nature of food webs. It is also showing how fragile the links in a food web can be.

The immediate cause of the sea otters' decline seems to be predation by killer whales, which are turning to sea otters as a food source. James Estes, a University of California marine ecologist, first witnessed a killer whale eating a sea otter in 1991. Since then, a dozen such attacks have been reported. Estes suspected that these attacks were ultimately caused by disruption of the marine food web.

Many fish populations have declined dramatically, and species that marine mammals feed upon have been hit especially hard. The cause of this decline is not entirely understood, but it is thought to be due to a combination of overfishing, warming ocean temperatures, and other factors. Killer whales normally eat sea lions and harbor seals, but with local fish populations so low, these seal populations have rapidly declined. This has caused killer whales to resort to a new food source, the smaller and less nutritious sea otter.

This decline in the sea otter population has disrupted much of the coastal ecosystem along the Aleutian Islands. Sea otters prey upon sea urchins, which, in turn, feed upon kelp, a type of large seaweed that is abundant in many coastal ecosystems. Kelp beds provide protection for many species of fish and other small animals, and are an important basis of the coastal food web. (The food web is shown on page 9.)

In Estes' view, these changes are "an ecological chain reaction," with events that occur far out at sea causing massive changes to the coastal ecosystem.



COASTAL FOOD WEB

