

# SUSTAINABLE U.S. SEAFOOD: WHAT'S SCIENCE GOT TO DO WITH IT?

Join NOAA Fisheries Service in this five-part series to learn about the science behind responsibly managed U.S. fisheries.

## Solving the ecosystem puzzle

In the Bering Sea, survival is about eating or being eaten. This complex puzzle of predators and prey is the basis of the Bering Sea ecosystem. To better understand these relationships, scientists at the Alaska Fisheries Science Center annually collect and examine the stomachs of thousands of fish. Each organism is important in understanding what keeps an ecosystem in balance.



Sun

The sun's energy is converted into nutrients for plants through a process called photosynthesis. On land and in the ocean, plants or algae are the foundation of most food chains.



Phytoplankton

Phytoplankton are microscopic plants that drift in the ocean. They are at the base of all food chains in the Bering Sea. What organisms do you think eat phytoplankton? Zooplankton are planktivores — grazers of the sea!



Zooplankton

Zooplankton are microscopic animals and are found near the bottom of the Bering Sea food chain. Zooplankton such as amphipods and copepods are prey to many small fish. Even big baleen whales eat zooplankton. Can you name one? The humpback whale!



Herring

Small fish like herring and juvenile walleye pollock can be both predator and prey since they sit in the middle of the food chain. They feed on zooplankton below them and in turn are prey to larger fish from above.



Adult walleye pollock

Adult walleye pollock can also be both predator and prey. Even though they are high up in the food chain, they are not the top predator. Their diet includes krill and juvenile pollock (yes, they are cannibals!).



Northern fur seal

Humans are at the top of the food chain. This means that we are a top-level predator. We benefit from all the energy that has been put into a food chain.

In the Bering Sea, northern fur seals are also a top predator. Their diet includes fish such as walleye pollock, Atka mackerel and Pacific cod.



Humans

## Making connections in the Bering Sea

Just like how our highway system connects our cities and towns, an ecosystem connects organisms. A simple way to draw an ecosystem is to first draw a food chain and then a food web.

### Food chain

One way to show how organisms are connected is a simple food chain. A food chain shows us one-to-one connections about who feeds on whom from the highest predator to the lowest prey. For example, if you had a hamburger for lunch, the food chain may look like this: grass — cow — you. Look at the list of Bering Sea ecosystem organisms at left and below, and then create a Bering Sea food chain. How many different food chains

### Food web

To make a web, a spider attaches many strands of silk together. In a food web, connections are made from one organism to many to show how animals are interconnected through their prey and predators. To make a Bering Sea food web, you will need to think about what other organisms eat the organisms in your Bering Sea food chain. On a separate piece of paper, write down the three organisms you picked for your food chain. Draw lines attaching them to their predator and prey. You can use different colors for predator and prey. Remember to draw multiple lines to different organisms if many others eat one of your organisms. This can be quite puzzling!

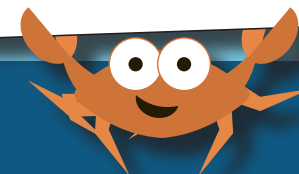


### Websites

Check out the Bering Sea ecosystem report card for 2011. You can see the large amounts of data necessary to understand an ecosystem.  
<http://access.afsc.noaa.gov/reem/ecoweb/EbsReportCard2011.pdf>



**What is a stock assessment?** A stock assessment tries to explain the biological and ecological processes that influence the health of fish populations. Stock assessments give the scientific basis used in making responsible management decisions.



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