Reading 5.1 – Where have all the puffins gone?

Getting Ready

Do you eat cheese on pizza? Do you ever have ice cream or frozen yogurt? Do you drink milk or eat it on your cereal? What would happen if you could no longer get any kind of dairy product (milk, ice cream, and cheese)? Would this cause you or your family to have to change its eating habits? Would it affect your health? Explain the effect it would have on your family.

In class, you created a model of the Eugene wetlands food wab using varh. You investigated the relationships between organisms in an ecosystem. You saw that those relationships can have both direct and indirect effects or populations. In this reading, you will learn about what happened to a population of birds, the puffin, when there was a change in the ecosystem where they live. As you read, look for both direct and indirect effects of the change to the ecosystem.

Something Is Wrong

Recently, on the island of Shetland, off the coast of Scotland, there were more than 24,000 puffin nests almost all entirely empty. There were no pear-shaped eggs, no chicks, and no new generation of puffins. This same phenomenon was observed off the coast of England where these sea birds nest. (See map on next page.)

Puffins are sea birds that build their nests in the cliffs along the coasts of the ocean. They eat sand eels, a small, silvery fish that normally lives in the surrounding waters of the North Sea. In the past year, though, the sand eels have disappeared and the adult birds are starving.

There are not many different types of food for the puffin, so they have to fly farther and farther in search of sand eels. They fly many miles out from shore and dive up to 300 feet underwater in search of food. These long flights use up a lot of energy. When they return to shore, most have not found enough sand eels to provide the energy they need to produce eggs.

What do you think could be happening to the sand eels?

Highlight the answer. What is the problem with the puffin population? Highlight an example of a direct relationship and an indirect relationship.

Where Have All the Sand Eels Gone?

After lots of investigating, scientists think they have figured out why the sand eels are disappearing. The sand eels eat cold-water plankton. In the food web activity in this lesson, you learned that plankton are small plants and animals that float in the water. Plankton are at the beginning of the food web in the ocean. Just like you saw in the Great Lakes food web, almost everything in the sea eats plankton, or eats the consumers of plankton, or eats the predators of those consumers.

Food Chain: Plankton—>sand eel—>puffin

Looking at the food chain previously shown, notice that the sand eel would be directly affected by a loss of plankton, because that is what it eats. The puffin would be indirectly affected by a loss of plankton. If there is less plankton for the sand eel to eat, that means fewer sand eels would survive. If fewer sand eels survive, then the puffin will have less to eat.

The Move Is On

Some of the plankton that used to be found in the North Sea have moved farther north. Over the past 40 years, the temperature of the water in the North Sea between the United Kingdom and



Norway has become too warm for the plankton to survive there. Cold-water plankton have been leaving the area and moving toward the North Pole where the water is still cold.

Why Not Eat Something Else?

The North Sea sand eels prefer feeding on cold-water plankton because these species are bigger than warm-water plankton, and provide more calories. Scientists think that this difference in plankton size is what has led to fewer sand eels. Smaller plankton means less food to go around. There are not enough of these smaller plankton for all the sand eels, so sand eels die. Other seabirds, not just the puffins, suffer because they also eat sand eels. Competition for the same food source means there are fewer seabirds of all kinds in the area.

Why Should We Care about a Bird?

The puffin is not alone. Less plankton also means fewer whales, cod, penguins, seals, and other seabirds. And those are just some of the species that will be affected. Although plankton live at the ocean's surface, a rapid drop in its population could affect life all the way down to the ocean floor. Remember, just like in the Great Lakes food web you studied, a decrease in the number of plankton can lead to many changes in the ecosystem. Scientists now believe that the greatest number of species on Earth may exist in the deepest parts of the oceans, where up to 10 million plants and animals could live. If the water continues to get warmer, a large number of ocean-floor species might quickly disappear.

Use the oceanic food web to answer the following question .:

Choose one organism in the food web and name two other organisms that are not directly connected to it. Explain how those organisms would be affected if the organism you chose were removed from the food web.

Original organism:

Two organisms not directly connected to it:

How would those two organisms be affected if the original organism was removed?

Highlight the answer. Why can't the sand eels just eat something else?

Highlight the answer to this question.