

MATERIALS

For each student

- 1 Student Sheet 1.1, “Intra-act: The Miracle Fish?”

PROCEDURE

1. Work with your group to read the story of Nile perch in Lake Victoria. Each person will experience the story from the perspective of one of four characters:
 - James
 - James’s father
 - An owner of a fishing company
 - An environmentalist
2. From the perspective of your character, mark whether you agree or disagree with the statements on Student Sheet 1.1, “Intra-act: The Miracle Fish?”
3. Take turns sharing how your character responded to each statement, and circle the responses of other group members as they share them. Discuss the statements with your group.

NILE PERCH

Lake Victoria, the second largest lake in the world, contains some extremely large fish. One type of fish found there, known as Nile perch (*Lates niloticus*), can grow to 200 kilograms (kg) (440 pounds), though its average size is 2–4 kg (4–9 lb). But Nile perch weren’t always found in Lake Victoria. Until the 1980s, the most common fish in Lake Victoria were cichlids (SICK-lids), small freshwater fish about 5–10 centimeters (cm) (2–4 inches) long. If you’ve ever seen aquarium fish, such as oscars, Jack Dempseys, or freshwater angelfish, you’ve seen a cichlid.

Lake Victoria cichlids interest **ecologists**—scientists who study relationships between organisms and environments—because there are so many species of these fish. Although they all belong to the same scientific family, at one time there were over 300 different species of cichlids in Lake Victoria. Almost

Nile perch caught in Lake Victoria



99% of those species could not be found anywhere else in the world!

There used to be many other kinds of fish in the lake as well, including catfish, carp, and lungfish. The 30 million people who lived around Lake Victoria relied on the lake, including the cichlids, for food. Because most of the fish were small, they could be

caught by using simple fishing nets and a canoe. The fish were then dried in the sun and sold locally.

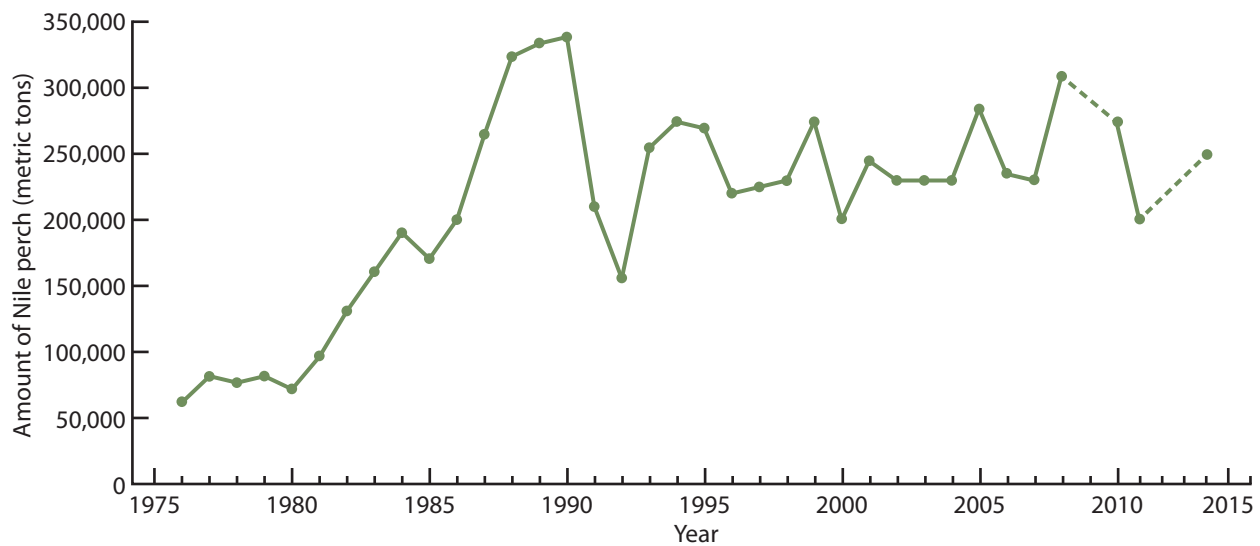
By the late 1950s, the British government (which ruled this part of Africa at that time) grew concerned that the fish species that commercial fishers relied on were being overfished. As a result, the British government decided to introduce new fish species, such as Nile perch, into the lake. They wanted to increase the amount of fish that was available to catch and sell so that people could earn money. Ecologists were opposed to this idea. They were worried that the introduction of Nile perch, which had no natural enemies within the lake, would negatively affect the lake's ecosystem. Before a final decision could be made, Nile perch were secretly added into the lake. Eventually, more Nile perch were deliberately added by the government in the early 1960s.

During the 1960s and 1970s, before there were a lot of Nile perch in the lake, fishers caught about 100,000 metric tons of fish (including cichlids) each year. (A metric ton, also called a tonne, is 1,000 kg.) By 1989, the total catch of fish from Lake Victoria had increased to 300,000 metric tons, most of it Nile perch and almost none of it cichlids. Today, each of the three countries surrounding the lake (Uganda, Kenya, and Tanzania) sells extra fish to other countries. In the graphs on the following page, you can see how the amount of Nile perch caught has changed since 1976, and how the percentage of cichlids caught has changed over time.



Cichlids are one of the many small types of fish commonly found in Lake Victoria.

Amount of Nile Perch Caught in Lake Victoria, 1976–2014

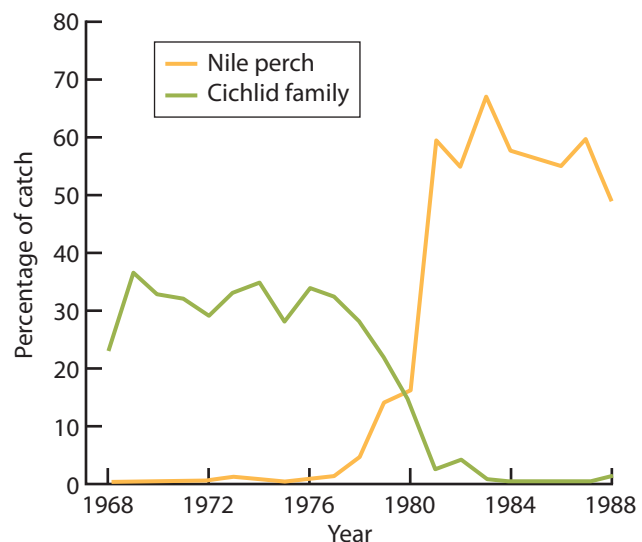


Besides increasing the amount of fish available for the commercial fishery, there have been other consequences of introducing Nile perch into the lake. Because Nile perch are large and eat other fish, they are believed to have caused the extinction of as many as 200 species of cichlids. The populations of other types of fish, including catfish and lungfish, have also declined. Many ecologists are upset that their predictions have come true.

Some of the cichlids that have become extinct ate algae. With their extinction, the amount of algae in the lake has increased five-fold. As they break down the dying algae, decomposers use up a lot of oxygen, making it difficult for other tiny plants and animals to survive in the lake. Today, many of the deeper parts of the lake are considered “dead” because they don’t contain much living matter.

However, many of the original goals have been met. In 1979, there were 16,000 fishers along the Kenyan shores of the lake. In 1993, there were 82,300, and today there are over 200,000. Many people

Cichlids And Nile Perch Caught by Commercial Fisheries on Lake Victoria in Kenya



are now employed by companies that process and sell Nile perch overseas. Over time, these fish have brought more money into the African countries surrounding the lake. Some local people, who now eat Nile perch as part of their diet, consider Nile perch a “miracle fish.” However, other local people, especially the poorest people, don’t have enough to eat because there aren’t enough cichlids for them to catch with nets, and they can’t afford to buy the Nile perch from the big commercial fisheries.

Some ecologists wonder how long the current situation can last. Nile perch are predators. As populations of other fish decline, the Nile perch’s food sources are declining. The stomachs of some large Nile perch have been found to contain smaller juvenile Nile perch. The metric tons of Nile perch caught has decreased after the peak in 1990, and in the table below, you can see that the catch per unit effort has gone down. This means that it takes more work to catch each fish—more fishers, more boats, and more time. What will happen to the population of Nile perch if their food supply decreases even further? Will the Nile perch population be overfished like the fish populations before it? Only time will tell.

Catch Per Unit Effort for Nile Perch in Lake Victoria

<i>Year(s)</i>	<i>Catch rate (metric tons per year)</i>
2000	8.8
2006	6.3
2011–2012	5.3

EXTENSION

Make a list of plants and animals around your school, home, and neighborhood. To determine which of these species are introduced and which are native to your area, use the websites and other resources on the SEPUP Third Edition Ecology page of the SEPUP website at www.sepuplhs.org/middle/third-edition.

ANALYSIS

1. Based on the reading, how did the amount of fish caught in Lake Victoria change from the 1960s to 1990?
2. Based on the graph showing amounts of Nile perch caught in Lake Victoria, describe how the amount of Nile perch caught changed from 1980 to 1990 and from 1990 to the present.