



Tennessee Aquarium Science Streams

Presented by



Wild Return

Video Focus Question: What are the effects of introducing a new species to an area? What are the effects of returning a species to an area?	Length of video: 9 minutes 38 seconds
<p>Science Standards</p> <p>TN 4.LS2.4 Develop and use models to determine the effects of introducing a species to, or removing a species from, an ecosystem and how either one can damage the balance of an ecosystem. (Addressed, not completed)</p> <p>TN 4.ESS2.3 Provide examples to support the claim that organisms affect the physical characteristics of their regions.</p> <p>NGSS 3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change</p>	
<p>Main Learning Goal: Introducing a new (non-native) species into an area can have serious consequences, but scientists are using responsible methods to reintroduce species that become extinct from local areas.</p>	
<p>Science Content Storyline</p> <p>Invasive species can cause problems in ecosystems because they use the resources and often do not have natural predators to keep their populations low. Scientists are working in many areas to reintroduce species that have become locally extinct. To do this, they must first determine what caused the population to be lost in the area, address the problems, then raise and release the species. They continue to track and study the animals to determine if the reintroduction is successful, which then helps to balance the ecosystem.</p>	
<p>Ideal Student Response to Focus Question: Some species are invasive species that do not usually live in an area. They cause problems because they eat the food, drink the water, and take the shelter and space from other living things. They also do not have predators so the population can keep growing. Sometimes scientists do work to reintroduce species that no longer live in an area. When they take the steps to reintroduce a species, it can help to balance the ecosystem.</p>	

Preparation

<p>In Advance</p> <ul style="list-style-type: none"> • Preview the video. • Decide if you will have students complete any of the activities in the guide or in the extensions. 	<p>Materials</p> <p>Teacher</p> <ul style="list-style-type: none"> • None <p>Student</p> <ul style="list-style-type: none"> • Paper and pencil or pen
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Key Activities and Reflection

Timestamp	Science Content Outline	Guidance to Support Students
0:22	Introduction	<p>Play the introduction to the video for students. Ask if they have heard the word “invade.” Help them make the connection that if something “invades” a space, it is “invasive.” A plant or animal that is introduced to an area and causes harm to the existing plants or animals is an “invasive species.”</p>
0:58	Invasive species in the U.S.	<p>Play the video until timestamp 3:18. Then hold a class discussion about invasive species. First, ask students for examples that they heard in the video, such as kudzu, privet, Zebra Mussels, Silver Carp, wild pigs, and Burmese Pythons. Ask students to share why invasive plants and animals cause problems in an area. They may remember hearing ideas such as the following.</p> <ul style="list-style-type: none"> • The invasive species may eat the food so that native species do not have enough food. • The invasive species takes water so native species do not have enough. • There are no predators for the invasive species so they can take over the shelter and space of native species. <p>Be sure the students connect these ideas to animal needs of food, water, shelter, and space. When there are plants or animals that do not belong in an area, they take the food, water, shelter, and space that native plants and animals use. Without natural predators in an area, it makes it easier for the invasive plants and animals to take the limited amounts of each of these resources.</p> <p><i>Note: The remainder of this video focuses on the work the Tennessee Aquarium Conservation Institute does to reintroduce species that have become extinct in a local area. We chose to focus on reintroduction to help students understand that sometimes species can be safely returned to an area, and it may have positive effects as opposed to the negative effects that are often the focus when learning about invasive species. If you feel like your students need more understanding of invasive species, consider using some of the activities in the Extension section of this guide.</i></p>
3:18	Losing a species can cause problems	<p>The video introduces the idea that losing a species can have some of the same effects as introducing a species. Have students watch the video through timestamp 3:48. Then ask students how losing a species is similar to an invasive species being introduced. Students should recognize that there are some of the same concerns because each can cause shifts in the number of animals eating food, drinking water, and using shelter and space.</p>

3:48	Reintroducing Lake Sturgeon	<p>Students have likely heard the word “ecosystem,” but before playing the next section make sure they know that this simply means the plants and animals that live in an area, along with the habitat itself. Have students listen to the introduction to what the Tennessee Aquarium is doing to reintroduce Lake Sturgeon. You may wish to pause the video at timestamp 4:30 to emphasize certain points, such as</p> <ul style="list-style-type: none"> • Lake Sturgeon have been around for a long time but were no longer living in the Tennessee River, • the Tennessee Aquarium has been working for 20 years to reintroduce Lake Sturgeon to the River, and • each year the Aquarium gets eggs and raises the fish until they are about 6 inches long, then releases them into the river.
4:30	Why Lake Sturgeon disappeared	<p>The next section of the video describes some of the problems that caused Lake Sturgeon to disappear from the Tennessee River, along with steps that were taken to make sure that Lake Sturgeon could live in the river again. Consider having students listen and write down one or two problems that caused the Lake Sturgeon to disappear, along with the action that was taken to solve each problem. Hold a class discussion to talk about the different problems and solutions. Make sure students understand that once the problems were addressed, scientists thought that the sturgeon might be able to live in the area again.</p>
5:42	Steps for reintroduction of an animal	<p>As students watch the next three minutes of the video, they will hear about the steps that scientists take to reintroduce a species to a place it lived previously. Challenge them to try to make a flowchart or outline of the steps that the scientists have to take. Share with them that the educator and the scientist both repeat some of the same steps with different details, so they should listen carefully and think about the order of the steps. You may want to play this section again for students if you have them take on this challenge.</p>
8:49	Conclusion	<p>Allow students to listen to the conclusion of the video. Hold a class discussion about how reintroducing a species that previously lived in an ecosystem can help to keep that ecosystem balanced, while invasive species can disrupt an ecosystem. Students should understand that all organisms play an important role in the ecosystem.</p>

Extension Activities

- Each of the videos in the Science Streams series has an introduction by people in different departments at the Aquarium. This offers an opportunity to talk about the many different types of jobs it takes to run an Aquarium.
- The Science Streams Behind the Scenes: Conservation video offers more information about the work that the Tennessee Aquarium Conservation Institute does, including a description of some other species that scientists are reintroducing to streams and rivers in the area.
- Ask students to research other animals that zoos and aquariums are reintroducing to their native habitats. Have them share the variety of work that is being done across the world to maintain biodiversity.

- Tell students that in the mid- to late-1990s scientists reintroduced wolves to Yellowstone National Park. After a number of years, the population of beavers increased. Have students explain what happened, either through their own research or by giving them a food web of animals that live in the Yellowstone ecosystem.