

Southern Walleye (*Sander vitreus*)

Grade Levels: Middle, High

Subject Areas: Science, Math



Objectives:

Students will learn about a hatchery's role in Fisheries conservation efforts. Students will use basic math skills and knowledge of fish biology to fill a "stocking request."

Vocabulary/Keywords:

- **Fisheries Conservation** – the efforts by Fisheries biologists to manage and protect fish populations and their habitats in public waters of Mississippi
- **Habitat** – a natural environment where fish species live, grow, and reproduce
- **Tributary** – a stream or small river that empties or merges with another larger river or water body
- **Hatchery** – a facility that collects eggs from fish and incubates those eggs until hatching occurs
- **Spawning** – when a fish releases eggs
- **Fry** – newly hatched fish
- **Fingerlings** – fish that are roughly 2 – 4 inches in size
- **Population** – total number of individual fish of a certain species
- **Overfishing** – to fish a species until depleted or remaining fish cannot sustain population numbers
- **Substrate** – a surface on which an organism lives, grows, or obtains its nourishment.

How Hatcheries Help:

Hatcheries supply fish to areas suffering from overfishing, fish kills (as a result of pollution, etc.), or to newly created lakes.

Background Information: What you need to know . . .

What: The southern walleye, sometimes called the Gulf Coast walleye, is a genetically unique strain native to the Mobile River basin in Mississippi and Alabama. In Mississippi, southern walleye occur in the Tennessee-Tombigbee Waterway and its tributaries.

Some freshwater fish species, such as bream and bass, spawn in “nests,” which are made by the male fish. Males use their tail fin to create a depression or “nest” at the bottom of a water body. The males then guard the fertilized eggs until they hatch.

Walleye, however, are different. Walleye are broadcast spawners releasing their egg over vegetation or rocky substrate. Fertilized eggs stick to the plants or rocks on which they land.

These fish are named walleye because of the fish’s large, glossy eyes. Their unique eyes give them excellent vision in low light conditions. Some anglers may call them marble eyes, jack fish, pike, or snaggle-toothed bass.

Walleye have a long slender body with a yellow to olive color on the sides and a white belly. The bottom tip of the tail has a distinct white mark and they have needle sharp teeth. Walleye typically weigh 1-8 pounds.

Why: Stocking is used to maintain or restore declining walleye populations.



Where: The southern walleye is a river fish; however, they will also survive in lakes and ponds. In rivers, walleye occur in close proximity to the bottom where current meets calm water.

Walleye enter shallow water to feed when light levels are low. Fish may feed at dawn, dusk, and into late evening or when the water is murky. They capture their prey with their sharp teeth.

In the spring, walleye migrate up rivers and into smaller tributaries to spawn. Spawning areas are usually shallow with rocky substrate. Hatchery staff collect walleye at night in nets when the walleye are in shallow water.

When: Spawning occurs in March when water temperatures are 50-55°F.

How: Beginning in March, walleye are collected from the Tennessee-Tombigbee Waterway and transferred to the hatchery for spawning. Inside the hatchery, fish are stocked into tanks supplied with chilled water. Inside the hatchery, water temperature and light are controlled to mimic conditions in the wild.



Hatchery staff collect the eggs. Walleye will have about 20,000-25,000 eggs per pound of body weight. Milt (sperm) is introduced into the egg bowl along with a small amount of water for fertilization. This mixture is stirred gently with a turkey feather for about 2 minutes. After 2 minutes each egg begins to form an adhesive layer and will eventually begin sticking to everything including each other.



To prevent the eggs from sticking together a mixture of fine clay particles and water is introduced into the egg bowl. This mixture coats the eggs preventing them from sticking together. This mixture is stirred for 20 minutes. The eggs are rinsed to remove the excess particles and then the eggs are transferred to incubation jars. What about in the wild? Walleye are broadcast spawners. They usually prefer spawning over shallow rocky substrate. During spawning the eggs sink to the bottom where they stick to a rock. The eggs may be spread over a large area and usually are not clumped together.



The eggs hatch in 10 - 15 days. The hatchery has an average hatching success rate of 50%. The fry (newly hatched fish) are stocked into hatchery ponds where they eat plankton. An average of 200,000 fry are stocked into one pond. After 30 - 40 days the fish will be fingerlings (1 - 2 inches in length) and are large enough to be harvested and released into the wild. The hatchery has a harvest success rate of 50 - 80%, which is better than in the wild. In the hatchery there are no predators, pollution, etc.



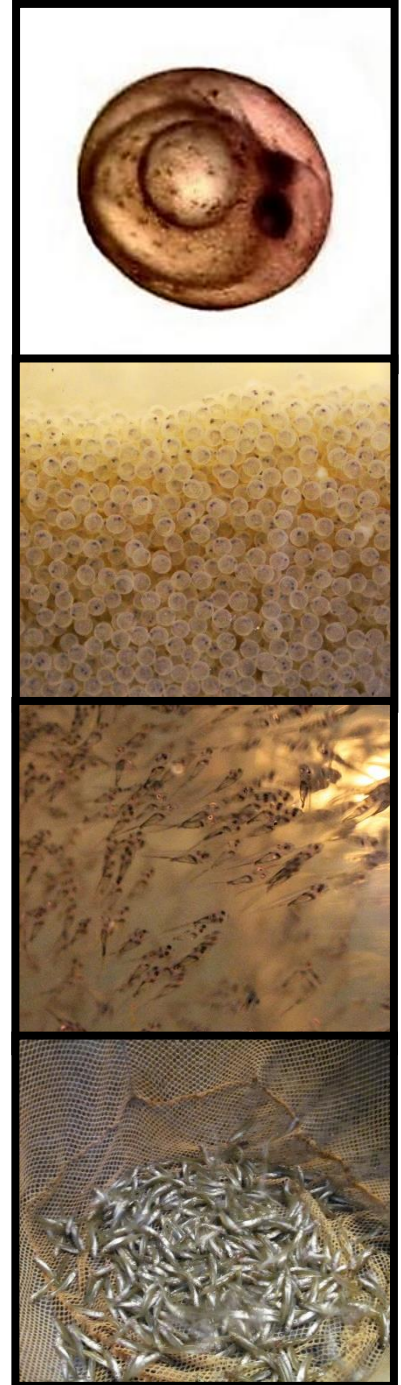
Annually, fingerlings will be stocked into the Tennessee-Tombigbee Waterways and its tributaries.



Exercise: Stocking Request

You are the hatchery manager at the North Mississippi Fish Hatchery. You have been assigned to stock at least **125,000 fingerlings into the Tennessee-Tombigbee Waterway**. It is early March and water temperatures are about 51°F. You collect brood fish and have 12 males and 4 females. The females weigh **2 pounds, 5 pounds, 4 pounds, and 3 pounds**.

- Female walleye usually produce at least **20,000 eggs per pound of body weight**. How many eggs will these females potentially produce?
_____ (total lbs.) x 20,000 = _____ (eggs)
- During the second collection, you catch **four more females weighing 4 pounds each**. How many eggs will **these four females** produce?
_____ (total lbs.) x 20,000 = _____ (eggs)
- Add the eggs together: _____ (eggs from first group) + _____ (eggs from second group) = _____ (total eggs)
- How many fry will hatch from the eggs? **Remember**, the hatching success rate is 50%. That means that half of these eggs will hatch.
_____ (total eggs) x 50% = _____ (fry)
- How many fry will survive in the pond and harvested as fingerlings? **Remember**, 50% - 80% of these fry will grow to be fingerlings and harvested from the ponds. As a hatchery manager, it is better to plan for the lowest percentage. _____ (fry) x _____ % = _____ (fingerlings)
- Will you have enough fingerlings to fill your stocking request?





Reflection:

Why do **hatcheries help** fish populations? What events cause fish populations to decrease?

What do you think would be the hardest part of spawning walleye? What would be the most interesting part? What other thoughts do you have?

Resources:

- ✓ Fish ID Guide (Learn more about walleye and other Mississippi Freshwater fish species!):
https://www.mdwfp.com/media/1638/fish_id_compressed.pdf
- ✓ A look inside the North MS Fish Hatchery: <https://www.youtube.com/watch?v=k3KXC754MMQ>