Natural History along the Natchez Trace Parkway

On-Site lesson: Beavers on the Trace: code NATRBV

- **Grade Level:** 9th – 12th
- **Subject Areas:** Biology
- **Setting:** Scenic Trail on Natchez Trace Parkway and classroom (see resources)
- **Duration:** Two hours in the field and one class periods
- **Skills:** Observation, explanation, research and evaluation
- **Core Standards:** MS Biology I Competency/Obj. 3b
- **Vocabulary:** Keystone species,

Summary:
On a National Scenic Trail students will observe how a keystone species can create an ecosystem used by a variety of different species, leading to an overall increase in biodiversity.

Materials Needed: Each student will need a notebook, and a pen or pencil.

Instructional Information

Mississippi Objectives:
Biology I: Investigate and evaluate the interaction between living organisms and their environment. 3b. Provide examples to justify the interdependence among environmental elements.
Interrelationships among organisms

Teacher Set: The students will be visiting a National Scenic Trail and observing an ecosystem created by a keystone species (beavers).

Teacher Overview: A keystone species is one that modifies the natural environment in such a way that the overall ecosystem builds upon the change. The primary keystone species is the beaver (Castor canadensis). The ponds, wetlands, and meadows formed by beaver dams increases biodiversity and improves overall environmental quality. The beaver is classified as a mammal and is the largest aquatic rodent in North America weighing 25 to 75 pounds. The beaver's most distinctive feature is their large flat tail, which serves as a rudder when swimming, a prop when sitting or standing upright, and stores fats for the winter. Beavers will also slap their tail on the surface of the water as a danger warning signal to other beavers. Beaver are also known for their large front incisor teeth that never stop growing so they do not become too worn despite years of chewing on hardwoods. Beaver fur consists of short fine hairs for warmth and long hairs for waterproofing. They have castor glands on the underside of their abdomen from which they can excrete an oily substance (castor) that they use in the grooming process to waterproof their fur and to mark their territory. Beavers are pure vegetarians. They eat fresh leaves, twigs, stems, bark, and cambium (soft tissue under the bark), along with many aquatic plants. Beavers are monogamous and mate for life. Mating usually takes place in January and February and the young called kits are born in March to April. The young usually live with the family unit (colony) until 2 years of age. Then they move or are driven off by parents to establish their own home colony. These offspring travel an average distance of 4 miles from their natal colony.
Beavers build and maintain houses called lodges. There are two main types, the conical lodge and the bank lodge. The most recognized is the conical lodge that is surrounded by water and is made from sticks, rocks, and mud. The second type of lodge is the bank lodge. It is made from excavating

into the bank of a stream, river, or pond. Once the lodge is made beavers build dams to flood areas so they can get food and protection from predators. The dams, channels, and lodges beavers build have gained them the reputation as "Nature's Engineers". No other animal with the exception of man can significantly alter its habitat to suit its own needs and desires. Native Americans revered the beaver and referred to them as "Little People" for this reason.

Benefits of Beavers:
Reduces channel scouring and stream bank erosion
Development of new wetlands
Increases fish and waterfowl habitat
Wetlands serve as water filters that capture silt and pollutants
Helps buffer against flash floods
Recharges underground aquifers

Problems Caused by Beavers:
Build dams that can cause flooding that may damage timber, agricultural crops, homes, roadways, and garden plants.
Damage water retention structures
Gnaw bark around the base of a tree causing it to die
Stopping the water flow in culverts
Causes damage to pond dams by burrowing into them
United States Department of Agriculture estimates that beavers annually cause about $100 million in damage to public and private property in the Southeast.

Beaver Lodge at Rock Springs milepost 330.2

Student Instruction: Students will answer questions about the field trip in their notebooks.

Student Task: Students will use their textbook, Subject Area Testing Program workbook, internet, and knowledge gained from the field trip to complete the following activity.
Scenerio:
You are a Park Ranger who just received a job with the US National Park Service. You are unfamiliar with the terrain (slope of the land). Also, you do not understand how the organisms living within the park interact with each other. Tourists coming to the Natchez Trace Parkway Visitor Center are going to be asking you questions like: Why are beavers important to the Natchez Trace Parkway? In order to prepare you for your new job you will need to answer the following questions in your notebook.

- **How does dam building affect fish populations? Suggested answer. The dam creates a pond from free- flowing water, which allows a greater number and variety of fish to live and reproduce in the water.**
- **What effect does the increase in fish populations have on the pond? Suggested answer. Fish attract various wildlife species that feed on them.**
- **What effect does the pond have on waterfowl and other birds? Suggested answer. Most of the ducks that migrate in the winter use water impoundments as resting and feeding ground. Birds such as herons and kingfishers feed on the fish in the pond.**
- **What is the overall effect of damming? Suggested answer. There will be an increase in biodiversity.**
- **How would the removal of a keystone species affect an ecosystem's biodiversity? Suggested answer. The removal of a keystone species would decrease the ecosystem's biodiversity.**
- **Design a food web that shows all the feeding relationships that have been created due to a keystone species. Suggested answer. Connect all the feeding relationships beginning with the producers and ending with the consumers.**

Teacher Closure: Explain to the students that beavers play an important ecological role in our environment. They create wetland ecosystems that provides habitat for many species of plants and animals. Also, wetlands improve the environmental quality for human populations. However, in some situations beavers cause damage to public and private property. Beaver dams can cause flooding that may damage timberland, agricultural land, and urban areas. With the help of the general public and state and federal agencies, a harmony can be reached between humans and beavers for the overall benefit to the world in which we live.

Student Assessment: Students will be graded using a rubric in answering the questions about the field trip.

Suggestions for re-teaching: Refer to the beaver when teaching topics such as principles of ecology, interactions in ecosystems and the biosphere.

Resources

Natchez Trace Parkway
Jamie L. Whitten Bridge located @ mp 290
Rock Spring located @ mp 330
Cypress Swamp located @ mp 122
River Bend located @mp 122.6