

Boom and Bust in the Ozark Forests

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In this lesson students will learn about a human activity that had a major affect on the natural landscape in the Ozark Plateau Natural Division—the removal of the deciduous forests that occurred by the end of the nineteenth century. They will compare the Ozark deforestation with the removal of Truffula trees and associated ecological events in the story of *The Lorax*, by Dr. Seuss. Students will also analyze the timber “boom and bust” of the early 1900’s and learn about federal and state agencies that exist to prevent such environmental catastrophes from occurring again.

Grades: 6-8

Arkansas Curriculum Frameworks:

Arkansas History 1.1.6, 1.1.7, 1.1.9, 1.1.12, 1.1.14, 2.1.4, 2.1.7, 4.1.5, 4.1.9, 4.1.11, 4.1.13, 6.1.5, 6.1.11, and 6.1.13

Science LS.2.12, ES.2.4, ES.2.5, ES.3.6, and ES.3.8

Key Terms:

plateau	hollow	karst typography	glade	virgin forests	subsistence lifestyle
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Key Terms Defined:

plateau: An elevated, comparatively level expanse of land.

hollow: A word used in the Ozarks to describe a small valley between erosional hills; pronounced “holler” by many people.

karst topography: An area in which the bedrock has been chemically weathered by the groundwater and features caves, sinkholes, and springs.

glade: An open area in a forest with shallow soil, often populated with plants that can tolerate drought. Eastern redcedars are commonly found on glades, along with a variety of plants typically associated with prairies.

virgin forests: Forests that have never been logged for timber production.

subsistence lifestyle: A way of life in which people plant gardens and/or gather wild plants and hunt animals to get the things they need to live.

Materials:

- A copy of the The Ozark Timber Boom... and Bust! for each student (included below)
- *The Lorax* by Dr. Suess—either the book or the video

Background Information:

Arkansas is divided into six natural divisions based on certain environmental components, including geology, plants, animals, climate and soil types. One of the more scenic of Arkansas' natural divisions is the area referred to as the Ozark Plateau, located in the northwest corner of the state.

The Ozark Plateau was formed millions of years ago when large plateaus were uplifted and subsequently eroded by rivers and streams. Because of the processes involved in the formation of these uplands, some people refer to the Ozark Plateau as "erosional hills." The tops of the Ozarks are generally flat and fairly uniform in height. The Ozarks are not true mountains. There are large valleys carved out by the rivers, but some the hills are separated by narrow valleys or "hollows" with steep rocky sides. Cooler and moister conditions are found on the north- and east-facing slopes. South- and west-facing slopes receive more sunlight throughout the year and are warmer and drier. The flat tops, often referred to as ridge tops, drain quickly and tend to be dry and rocky with thin soil. The valleys between the peaks are not as easily drained and have richer soil formed when organic material that washes off of the upper slopes accumulates and decays in these hollows.

One of the more common rocks in the Ozarks is limestone, a rock that can be slowly dissolved by the slightly acidic normal rainfall. As it dissolves, caverns, sinkholes, underground streams and other features of karst topography are formed. Another common rock is sandstone, which sparkles as sunlight is reflected off of the sand particles that form the rock. A third rock is chert, a very hard rock that was used by Native Americans to form the points for their spears and arrows.

Swift-flowing rivers, like the well-known Buffalo River, are found in the larger valleys of the Ozarks. Because these rivers flow downhill from high to low elevations, they often form scenic rapids and waterfalls. Large bluffs bordering these streams provide evidence of the erosional action of these rivers over a long period of time. Smaller spring-fed streams and springs are common.

The Ozark Plateau is forested by a variety of trees, but the dominant species are oaks and hickories. Dry ridge tops may include shortleaf pine, and eastern redcedars grow in the harsh environment of the bluff tops and in the shallow soil of glades. Prairies are also found in the Ozarks.

There were no long-term Native American communities in the Ozarks, but the bluffs along the slopes provided shelter for nomadic groups that hunted and gathered in the area. When European settlers arrived in the Ozarks, they found vast virgin forests, some with massive trees and a wide, clear understory. These early settlers cut trees to build their homes and to provide fuel for cooking and heating, but a profitable timber business was impossible at the time. There were no railroads, and hauling cut trees up the steep, rocky hillsides was very difficult.

The early European settlers, like their Native American predecessors, lived a subsistence lifestyle. They planted gardens, gathered native plants, and hunted animals like black bears, white-tailed deer, wild turkey, and the then-abundant passenger pigeon. Many settlers brought hogs with them when they came to the Ozarks. They released the hogs in the forests, where the animals foraged for food. Although the settlers periodically harvested the hogs, some of them became feral (wild) and reproduced in the wild. One name given these wild hogs was "razorback!" Their offspring continue to live in some of the more remote areas of the Ozarks. Life in the Ozarks changed greatly following the Civil War, when railroad construction began to move into the area.

Activities:

1. After presenting a summary of the background information above, hand out a copy of The Ozark Timber Boom... and Bust! (included below) to each student to read.

2. Explain to the students that you will be reading (or showing a video of) a children's book that is related to the lesson—*The Lorax* by Dr. Seuss. Either read the story to the class, or show the video version of the story to the students.

Note to teachers: Many environmental educators use The Lorax successfully with high school students and adults. Although the story was intended for children and your students might initially consider the story childish, the message is meaningful to older students and adults.

3. Assign students to cooperative learning groups. Ask half of the groups to list the similarities between *The Lorax* and the story of the timber boom in the Ozarks. Ask the other half to list differences. Each student should contribute to the cooperative learning group's list.

4. After sufficient time, come together as a class to compare findings. Ask two students to list all of the ideas on the board as the groups report them. Focus the discussion by helping students group similar ideas together.

5. Discuss the two accounts, using the following questions as a guide:

A. What was the cause of the rapid deforestation of the Ozarks? Were all of the trees cut down in the Ozarks? Why or why not? Were all of the trees cut down in *The Lorax*? Why or why not?

B. Could the forests be removed from the Ozarks (or any other region of Arkansas) as rapidly today as they were in the early 1900's? What agency regulates the use of national forests? Are private lands regulated by any agency?

C. What agency regulates hunting in the state of Arkansas? What federal agency oversees the protection of endangered species? What state agency works with both public and private landowners to protect rare species of plants and animals?

D. The human population in the Ozarks is growing rapidly and requiring more highways, more houses, bigger towns, and other developments. Forests must be cleared to make room for people and infrastructure. Also, more and more chickens, cattle, and pigs are being raised in the area. That means that more animal waste is being washed into the area's clear, free-flowing streams and rivers. Much of the area's water is underground, and all of these activities on the surface can cause pollution of the groundwater. Could water pollution eventually affect the area's successful growth? Why or why not?

E. What state agency is required to monitor water quality problems in the state? How may students help this agency do its work?

F. Thousands of red oak trees are dying in the Ozarks as the result of an infestation of red oak borer beetles. Scientists think the large number of dead and dying trees is due to many factors, including the fact that the trees are weakened from summer droughts. The beetles attack old red and black oak trees. Why are so many of the trees approximately the same age?

Answers:

A. The people in the Ozarks were living a subsistence life and lacked the money to buy the things that other Americans had. The timber boom offered a way to make money.

Trees were left on the Ozark hills after the timber bust, but the most desirable timber was removed. The remaining trees would not generate enough revenue to make their removal worthwhile. No trees were left in *The Lorax*. No doubt the author wished to make a point in the story, and the felling of the last tree is dramatic.

B. The United States Department of Agriculture's Forest Service manages publicly owned forests in the United States. There are many experts within that federal agency, and the U.S. Congress is also actively involved in its operation. Citizens may affect the Forest Service's decisions by contacting the agency directly or by contacting a senator or representative. The cutting of timber of private land is not regulated by any public agency.

C. The Arkansas Game and Fish Commission regulates hunting of game species, while a federal agency, U.S. Fish and Wildlife, lists species as endangered. A state agency known as the Arkansas Natural Heritage Commission sets aside land to protect endangered, threatened, or special plant and animal species in the state of Arkansas. This agency also works with private landowners to protect certain species.

D. Answers will vary, but there is concern in the Ozarks regarding both surface water and groundwater pollution.

E. The Arkansas Department of Environmental Quality (DEQ) oversees water pollution concerns. Students may assist DEQ by participating in water quality monitoring groups known as "Arkansas WET" or the "Stream Team."

F. The old trees are the ones that grew after the removal of timber in the 1900's; it is possible that the even ages of the trees has made the beetle's impact worse.

Sources:

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*Arkansas History lesson plans are available online at the Butler Center for Arkansas Studies website:
http://www.cals.lib.ar.us/butlercenter/lesson_plans**

* To access links, copy and paste into your browser.

The Ozark Timber Boom... and Bust!

When Arkansas became a state in 1836, 32 million of its approximately 34 million acres were forested. Described by early botanist Thomas Nuttall as a “vast trackless wilderness of trees,” Arkansas was a natural candidate for timber production. Because transportation was limited, however, the industry did not become important in the Ozarks until after the end of the Civil War.

Vast trees grew in the forests of the Ozarks, but it was difficult to get the timber to market. Loggers had no heavy machinery to help them pull the giant logs out of the rough, rocky hills, so they relied on mules. Once the timber was felled and dragged out of the forest, there was no easy way to get it to market. But all of that changed in 1882 when the Frisco Railroad completed a link between Fayetteville and Fort Smith, opening up important economic opportunities for the people of the Ozarks. By 1886 railroads were constructed into some of the more remote areas and the timber boom began in earnest.

Waves of people came on trains, in wagons, on horseback, and even on foot, eager to make money in the mills and other businesses spawned by the timber boom. New towns sprang up along the railroad lines, with names like St. Paul, Dutton, Combs, and Brashears. Much of the timber was shipped out of Arkansas, but soon companies in the Ozarks began manufacturing wood products for wagons, plow parts, handles for farming equipment, and barrel staves. Because of the demand for lumber, some of the sawmills operated 24 hours a day.

The timber in greatest demand was white oak, in part because that wood was used to make the railroad ties that were rapidly connecting the eastern and western United States. Red oak was also valuable, as well as hickory and even Eastern redcedar. Between 1903 and 1909 a virgin forest of redcedars in Newton County was logged to produce pencils. Normally only about 22 inches in diameter, one of the redcedars cut during that time measured 42 inches in diameter!

While the boom lasted, it seemed that the forests of the Ozarks were limitless. Life was good in Northwest Arkansas: towns were growing, people made higher wages, and there was plenty of work. The same thing was occurring in other parts of Arkansas. In fact, by 1869, 79 million board feet of timber were cut in the state. Almost two billion board feet were cut in 1909, the peak year of timber production.

Because of the rapid cutting of the timber in Arkansas, by 1900 only 22 million acres of forest remained from the original 32 million. By 1912, only 2 million acres of the original forest remained in the entire state! So the forests were not limitless after all. Soon there were no trees of high enough quality to harvest in the Ozarks and the sawmills began to close. With the mills went the other businesses in the towns, and soon the people began to leave.

People weren't alone in their suffering. The rapid deforestation of the Ozarks wiped out the habitats of many of the native animals. Some of the early settlers had killed more animals than they needed for food, so numbers were already low by the time the forests were removed. By 1900 both the Carolina parakeet and passenger pigeon were extinct in Arkansas. Worse yet, overhunting had seriously depleted the populations of black bear, wild turkeys, and even white-tailed deer. Many people in the Ozarks had lost their only means of support when the timber boom went bust; now even the wildlife they needed for food was scarce.

The final insult occurred when the timber companies attempted to assist the Ozark people by selling them small parcels of the timberland for agricultural use. Row cropping failed in the relatively poor soils of this rocky, mountainous region, and the shallow soil washed off in sheets, clogging the clear streams and stripping the land of nutrients for plant growth. By the 1920's life in the Ozarks was bleak indeed.

Many other parts of the eastern United States had also been extensively logged, and the National Forests were created to make certain that some forests would remain for the future. On March 6, 1908, the Ozark National Forest was created. Much of the acreage in this forest is located in the area of the virgin oak forests of Madison, Newton, and Franklin Counties.

After many years of economic struggle, the Ozarks are again the site of prosperity. The U.S. Department of Agriculture Forest Service manages almost one million acres of forest in this natural division. Over half of the area is now reforested in second growth forests. When reservoirs were created on the White River in the middle part of the 20th century, the area began to attract tourists and retirees. Businesses like Wal-Mart, Tyson Foods, and J.B. Hunt have headquarters in the region, providing employment for a large number of people. The poultry industry offers local residents a way to make money, and poultry waste spread on the poor soil has begun to replace the nutrients lost during the sheet erosion of the early 1900's. Now many residents also raise cattle, clearing the rocky slopes for pasture.

Adults sometimes make the statement, "There is no such thing in life as a free lunch." That statement applies to the abundance enjoyed by Ozark residents today. In the midst of prosperity, people are becoming more and more concerned that pollutants from the developing cities, towns, and highways, as well as runoff from animal wastes, are polluting the clear, cold streams and groundwater systems of the Ozarks.