Discovering Alabama

Teacher's Guide

Longleaf Pine & Longleaf Ecosystem

Suggested Curriculum Areas

- Science
- Geography
- Social Studies
- Ecology

Suggested Grade Levels

4–12

Key Concepts

- Symbiosis
- Commensalism
- Longleaf Pine Ecosystem
- Forestry & Fire
- Keystone Species

Key Skills

- Research & Reference
- Classification
- Communication

Synopsis

The longleaf pine forest was once dominant across much of the South, including most of the southern half of Alabama. Today, there exists only a small remnant of this native forest ecosystem. The two video programs Longleaf Pine Forest and Longleaf Ecosystem present the story of this remarkable part of Alabama's natural heritage and explore prospects for the recovery of this beautiful and valuable forest.

Longleaf Pine Forest describes the unique aspects of the tree, particularly its tolerance for fire, which has helped establish this species as dominant in the lower south. The program also looks at the history of the longleaf forest, its popularity, decline, and recent conservation efforts to restore the forest to the southern landscape.

Longleaf Ecosystem highlights the interdependent relationships among various plants and animals associated with this ecosystem. Featured, for example, is the gopher tortoise whose burrows provide shelter for several other longleaf forest inhabitants. This video also follows a special field trip with teachers who join scientists to locate rare species that still survive in the longleaf pine ecosystem.

Both Longleaf Pine Forest and Longleaf Ecosystem include footage from Alabama's Escambia Experimental Longleaf Forest, a nationally significant research project. Likewise, both videos underscore the role of conservation efforts such as the Longleaf Alliance, an organization of landowners, foresters, and environmentalists working for the restoration of the longleaf forest.

Discovering Alabama is a production of the Alabama Museum of Natural History in cooperation with Alabama Public Television. For a complete list of titles in the *Discovering Alabama* series, as well as for information about ordering videos and accompanying Teacher's Guides, contact us at either: *Discovering Alabama*, Box 870340, Tuscaloosa AL 35487–0340; phone: 205–348–2036; fax: 205–348–4219; or email: orders@discoveringalabama.org. Also visit our website: www.discoveringalabama.org.

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Before Viewing

1. Obviously, Alabama has lots of pine trees, and for many people, the different species of pine look similar. However, of the four or five common species of pine in Alabama, the longleaf is distinctive in a number of ways, including having longer needles (up to 18 inches) and much larger cones (several times larger than other cones). Bring to class a sampling of needles and cones from longleaf and other pines. Without identifying the types of pines, have the students compare and discuss the differing needles and cones. Ask if anyone can recall where they might have seen any of these types of pines and how the landscape appeared in the general vicinity.

2. Conduct a brief brainstorming session to generate a list of students' thoughts and concerns about the effects of fire in the forest. Again, this should be done without any advance discussion. Our aim here is to obtain the students' spontaneous views. Explain that the video(s) is about one of the pines examined in class and how fire affects this particular pine.

While Viewing

Encourage the students to see if their earlier observations and thoughts are in agreement with the facts presented in the video(s). **Video Mystery Question**: When walking in a longleaf forest, you must look down rather than up to fully appreciate the longleaf ecosystem. Why? (Answer: The diversity of the longleaf forest can be best observed by noting the variety of plants and animals that thrive on or under the ground beneath the longleaf canopy.)

After Viewing

1. Compare the students' thoughts and concerns about fire before watching the video with their feelings after seeing the video. Discuss the similarities and the differences.

2. The videos explain that fire is beneficial to the longleaf. Does this mean that all wildfires are good? Under what circumstances can fire be bad even for longleaf pines?

3. Are there gopher frogs in your area? Ask the students what would it take to have gopher frogs in your area?

Extensions

1. Read Joel Chandler Harris's story about Brer Fox and the tar-baby in *Uncle Remus and His Friends* (1892). The tar-baby is made out of pine tar, a thick, black, sticky product made from longleaf pine sap. The story tells something mighty important about pine tar. Where is pine tar used today? (Hint: It has to do with baseball, see below.)

2. Why is the longleaf pine such a valuable species? Its use for lumber is obvious, but what are "naval stores?" What is turpentine? Pitch and tar? Resin and rosin? The uses for these materials have almost vanished from our daily lives, but we still use large amounts of similar materials. Who might still use turpentine, and for what? What longleaf pine product does a pitcher put on his hands to throw a baseball (and we don't mean spit!)? The black surface on roads and roofs is still called tar, but it is really asphalt. Where does asphalt come from?

3. Are gopher tortoises the same as box turtles? Using a dictionary or encyclopedia, look up "polyphemus," the last word in the gopher tortoise's scientific name, Gopherus polyphemus. Who was he? What was another name for him, and most importantly, where did he live?

Philosophical Reflections

Throughout much of our nation's history, there has been recurring debate between advocates of conservation versus advocates of preservation. In this debate, "conservation" is often seen as the practice of managing natural resources to include active use, harvest, and commercial profit in meeting the material needs of society. On the other hand, "preservation" is often seen as restricting human and material uses of special natural features so as to protect nature for the sake of nature. What are some things that you feel need strict preservation? Are there things that would still flourish if simply conserved instead?

With regard to Alabama's forests, can we have our cake and eat it, too? Can we have plentiful timber products and also save endangered species? What is the proper balance between our increasing demand for material goods and our responsibility to nature? Is this balance realistic? If the scale tilts either in one direction or the other, what might the consequences be?

Nature in Art

So useful was the longleaf pine and so pervasive in the South were its products that it continually appears in southern song and story, as well as in arts and crafts.

Pine Needle Baskets: An unusual use of longleaf pine is in the making of baskets. The long, cinnamon-colored needles are coiled and woven into extremely attractive, small baskets. Excellent examples can be seen at Alabama craft shows and festivals.

Heart Pine & Lighter Wood: Considering how resistant the longleaf pine is to fire, it is amazing how flammable the rosin-saturated inner wood is. Slivers of the inner wood, called heart pine, burn like a match, sometimes sputtering flaming droplets of burning pitch.

Heart pine "lighter wood" has long been used in the south for starting fires, even in wet weather. The builders of log cabins in the deep South often used longleaf heart pine logs for the lower tiers. Not only is heart pine resistant to decay, it is also termite proof.

Pine Knots: When longleaf pines (and to a lesser extent other pine species) die, the knots where the limbs join the tree are so saturated with rosin that they won't rot. As the rest of the tree decays, numerous pine knots are scattered over the forest floor. These are often very attractive in shape and are collected by people to decorate their homes and patios. Many pine knots are so dense, they do not float.

Community Connections

1. Conduct a field trip around the school grounds or local community to observe, measure, identify, and photograph local pine trees. Make a collection of needles and cones for classroom display.

2. Contact several of your local forestry and conservation agencies. Invite them to come and speak to your class and to recommend an interesting pine forest to visit.

3. What kinds of pine trees are naturally predominant in your area? Work with local forestry agencies to get seedlings and learn how to help them grow. Plant a selection of Alabama pine species on school or community property.

Complementary Aids and Activities

To acquire an "Adopt-a-Forest Curriculum Guide" or information about the program, contact the Ranger Station, Conecuh National Forest, Route 5, Box 157, Andalusia AL 36420; 334-222-2555.

Explore forest change using the US Geological Survey topographic maps along with "Map Adventures" or "What Do Maps Show?" Write the Geological Survey of Alabama, Publication Sales Office, P.O. Box O, Tuscaloosa AL 35486; 205-349-2852.

To receive information on the *Plan•It3* interactive CD-ROM, the curriculum for forestry education (grades 6-9), or the video "Southern Forest . . . Southern Heritage," write P.O. Box 70424, Montgomery AL 36107; 800-566-4645.

Additional References and Resources

Longleaf Pine—A History of Man and a Forest, US Forest Service, Forestry Report R8-FR7 (1987).

Treasures of the Longleaf Pines—Naval Stores by Carroll Butler. Tarkel Publishing, P.O. Box 45, Shalimar FL 32579. A detailed reference on turpentining.

In the telephone book: Alabama Forestry Commission: look under "Alabama, State of, Forestry Commission, County Forester's Office; United States Forest Service: look under "US Government," then USDA or USFS, or call Montgomery at 334-241-8125; for your County Agent: look under the county listings and see Alabama Cooperative Extension System.

Parting Thoughts

Today's Alabamians will never encounter vast stretches of longleaf pine forest such as existed at the time of Alabama's settlement. However, many worthy efforts—the Longleaf Alliance among them—are seeking the restoration of longleaf forests in our state.

Meanwhile, perhaps the overarching issue for Alabama forestlands is a different question altogether. Modern society continues to rapidly expand and urbanize, and the momentum of such growth will change our region and our state. What problems does this pose for the long-term future of Alabama forestlands? Will our forestlands remain abundant, or will they become like those in other states—fragmented, isolated, and diminished in size by "growth," "corridors," and "infrastructure?" If we lose our abundant forestlands, we will have lost more than the opportunity to restore the longleaf. We will have lost the heart of our natural heritage and a key aspect that helps set us apart from other states.

Oh yeah, I almost forgot. Conversion of forestlands to longleaf can also present issues of public concern, not the least of which is the fact that such conversions often begin with extensive clear-cutting of existing forest stands. If you wish to be involved in decisions about National Forest management, contact the US Forest Service office in your area or the state headquarters in Montgomery (see Additional References & Resources).

Happy outings,

Discovering
Alabama

Activity/Information Sheet

Longleaf Pine & Longleaf Ecosystem

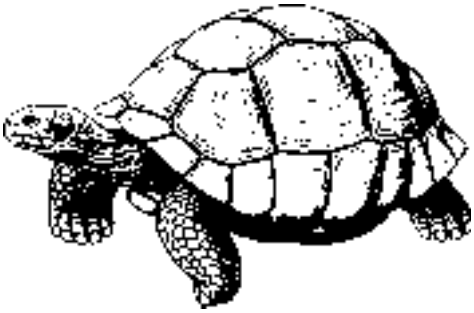
The longleaf pine ecosystem is not complicated, but there are several aspects about it which must be understood. For example, in the sandy soils of the Southeast, regular forest fires will kill all trees except the longleaf pine. Any plants or animals that live there must be specially adapted to quickly recover from these fires. Over time, a special community of plants and animals adapted to these conditions so well that, at one time, around 90 million acres of the Southeast were covered with the longleaf pine ecosystem. After many years of cutting and abuse, this beautiful and useful landscape is now less than 3 million acres and many of the unique plants and animals are endangered. But thoughtful conservationists realize that if preserved, longleaf pine ecosystems will produce economically valuable sources of timber, will protect rare species, and will add greatly to the quality of life in the South.

Fire: The key to understanding the longleaf pine ecosystem involves understanding the effects of fire on the landscape. The southeastern United States receives more than 60 inches of rain a year. A great deal of this rain is produced by lightning-producing thunderstorms. In some areas, notably those with sandy soils, the combination of dry soils and lightning have produced frequent fires for millions of years. These low-temperature brush fires are sufficient to kill all the young trees and brush except the longleaf pines. After several years as a very green, surprisingly fireproof seedling, the longleaf pine grows rapidly into a tall slender tree that is above the reach of most brush fires. However, if an area isn't regularly burned, and large amounts of trees and brush are allowed to grow between fires, this additional growth fuels very hot fires and everything, including the longleaf pine, is killed. Regular burning with relatively low-temperature fires is the key to preserving the longleaf pine ecosystem.

Keystone Species: A keystone species is one that allows the survival of many other species. In this case, the longleaf pine is the main keystone species. Its shade allows the growth of many plants that cannot grow in full sun, and its needles mulch and fertilize the soil after fires. Animals, like the endangered red-cockaded woodpecker, live in longleaf pines.

An even more dramatic keystone species is the gopher tortoise. The gopher tortoise is a soccer-ball sized tortoise that digs large burrows into the sandy soil. These burrows—yards deep and as much as 30 feet long—are cool and damp, and they provide daily shelter for the tortoise and literally dozens of other species. When wildfires occur, the burrows become crowded as animals take shelter. The fire quickly passes, and within weeks, rain has aided in the recovery of plant life. Life slowly returns to normal.

Symbiotic and Commensal Species: Symbiotic species are those that live closely together. Those symbiotic species that live together with others but neither prey on nor parasitize them are called commensal species. The most dramatic gopher tortoise commensal is the eastern diamondback rattlesnake, the largest pit viper in North America and a regular inhabitant of the tortoise's burrow.



One species, the gopher frog, lives only in the burrows of gopher tortoises, coming out to breed in the temporary spring pools of the pine forest.

The Gopher Tortoise

Gopher tortoises (*Gopherus polyphemus*) were once abundant in the Alabama coastal plain. Its heavy, shovel-like feet are especially adapted for burrowing. These large—up to 18-inches long—tortoises, should not to be confused with box turtles. The gopher tortoises are vegetarians and forage for food in the open areas under the longleaf pine canopy. Natural wildfires, mostly caused by lightning, keep the longleaf ecosystem open and healthy by periodically killing the heavy underbrush. Gopher tortoises love the open shade of the longleaf pine forests and share their cool, protective hiding places with a whole community of specially adapted species, including dusky gopher frogs, indigo snakes, diamondback rattlesnakes, and bobwhite quail. More than thirty species of vertebrate animals are known to occasionally share gopher tortoise burrows.

Yet many of these species are in trouble today. Farming and timbering have greatly reduced the number of acres of longleaf forest. Also, traditional timber practices have concentrated on preventing the very fires that keep longleaf stands healthy. Gopher tortoises have greatly reduced in numbers, and hence the animals that rely on their burrows have also declined.