

Welcome to the Southern United States Climate Change Edition of *Natural IQ!*

GLOSSARY WORDS ARE IN **BOLD**
AND DEFINED ON PAGE 8.

Over the past 100 years, the global climate has been changing. In the event of continued climate change, forests of the future likely will be different from the forests of today. Forest managers must manage forests even as the forests change.

The element carbon plays an important role in climate change. All living and once-living things contain carbon. About half of the weight of a tree, if all of its water is removed, is carbon. Living trees hold carbon. When trees

are planted and cared for, less carbon is released into the atmosphere. Wood products produced from trees also hold carbon.

One of the main causes of global climate change is an increase in **atmospheric** carbon dioxide. Carbon dioxide is a gaseous form of carbon. Carbon dioxide is released into the atmosphere from many sources (**FIG. 1**). Forest managers can help to reduce the amount of carbon dioxide released into the atmosphere. Forest managers reduce atmospheric carbon dioxide when they plant and care for trees.

Forests and other types of land provide benefits to people. Some of these benefits include clean air, clean water, wildlife **habitat**, food, scenery, and places to **recreate**. These kinds of benefits are called **ecosystem** benefits. Another ecosystem benefit is that forests help to slow the rate of climate change. As the climate changes and forests change, the ecosystem benefits may change as well. Forest managers want to preserve as many ecosystem benefits as possible as forests change.

The Forest Service, U.S. Department of Agriculture, has scientists who are helping forest managers preserve ecosystem benefits.

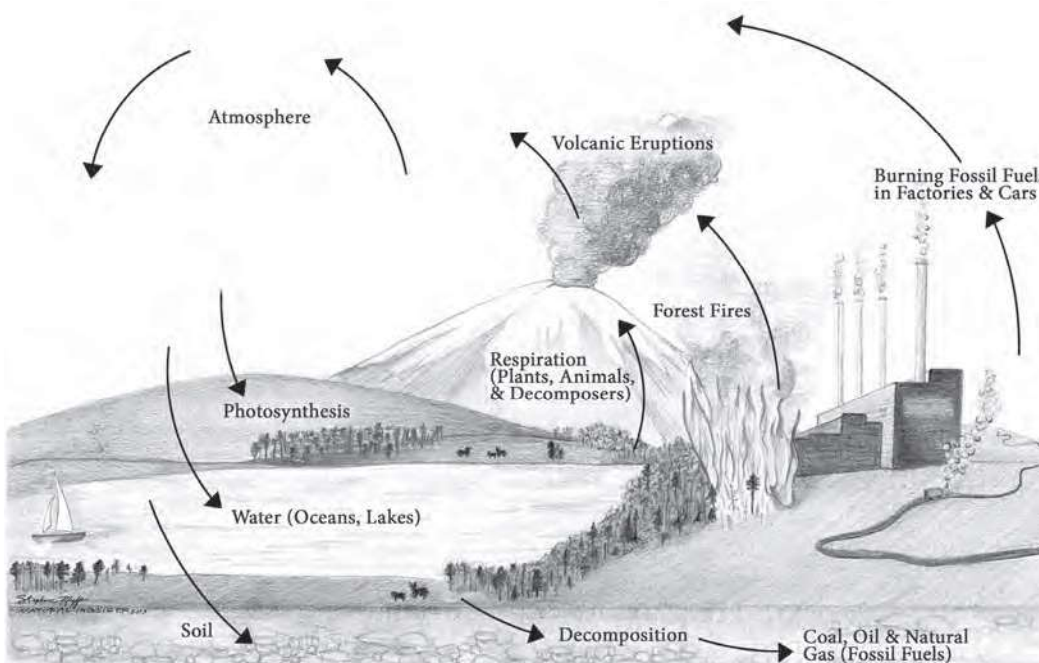


FIGURE 1. THE CARBON CYCLE. CARBON IS CYCLED FROM THE ATMOSPHERE TO EARTH AND THEN BACK AGAIN INTO THE ATMOSPHERE. ILLUSTRATION BY STEPHANIE PFEIFFER.

Some Forest Service scientists, whose research you will read about in this journal, study our changing climate and forests. These scientists focus their research on two areas. First, these Forest Service scientists explore ways to adapt to the changing climate and changing forests. Second, Forest Service scientists explore ways to better understand how trees hold carbon. This includes studying how to manage trees so that more carbon is held on Earth's surface. This second area of research is called **mitigation**.

Forests in the Southern United States

Almost 30 percent of forest land in the United States is found in 13 Southern States (FIG. 2). The future of forests in the South is affected by at least four things:

1. Population growth
2. Climate change
3. The demand for wood products
4. Invasive species

Another important factor in the future of southern forests is land development, or **urbanization**. Increasing urbanization will mean that more carbon will be released

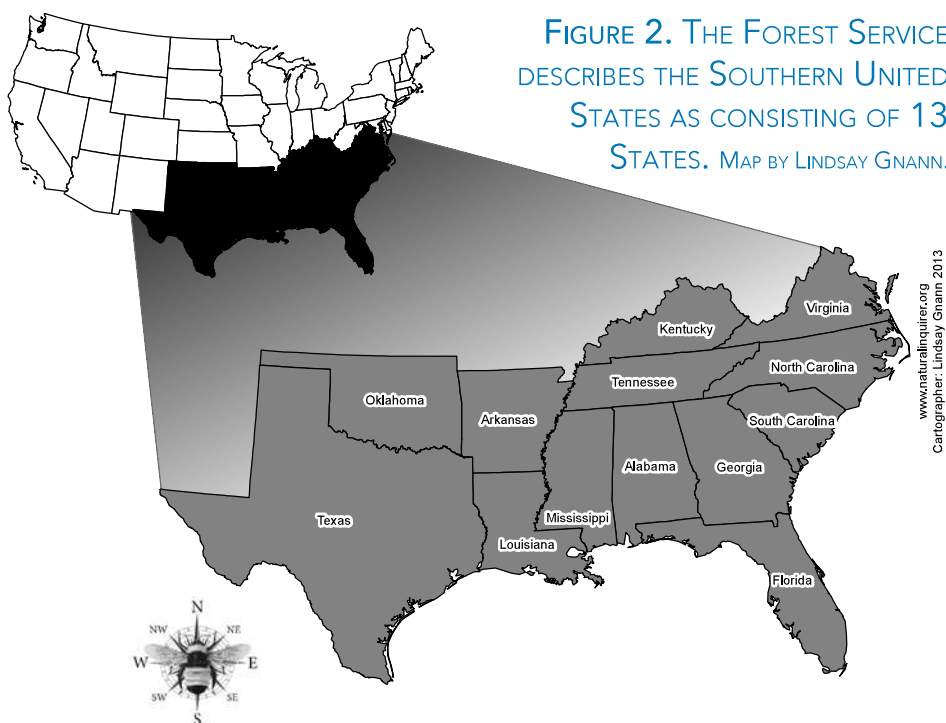


FIGURE 2. THE FOREST SERVICE DESCRIBES THE SOUTHERN UNITED STATES AS CONSISTING OF 13 STATES. MAP BY LINDSAY GANN.

into the atmosphere. More carbon will be released because forests will be removed to build roads and structures. Another reason for increased atmospheric carbon is that more people create more **fossil fuel emissions**. These emissions are one of the main causes of increasing atmospheric carbon dioxide levels.

In the Southern United States, climate change is expected to bring additional changes. Globally, average temperatures are predicted to rise between 2 and 6 degrees Celsius ($^{\circ}\text{C}$) by the year 2100. **Precipitation** patterns are expected to change also. The number and **duration** of dry periods are expected to increase. Rising temperatures and different precipitation patterns will change southern forests.

Forest Service scientists are interested in learning how southern forests will change as the climate changes. These

What Do the Abbreviations F and C Stand For?

F is the abbreviation that stands for Fahrenheit, a nonmetric temperature scale, and C is the abbreviation for Celsius, the metric temperature scale. The $^{\circ}$ symbol stands for "degrees." So, " 18°C " is read as "eighteen degrees Celsius." You will see temperatures written this way in *Natural IQ* articles as well as in articles that scientists publish in other journals. Most scientific publications use the metric scale.



scientists are interested in learning how we can adapt to our changing climate and forests. Scientists want to learn about how southern forests can help slow climate change by holding more carbon on Earth.

You will read about five scientific studies in this journal. All of the studies are concerned with climate change. In one article, you will learn whether the 13 Southern States have held or released more carbon into the atmosphere over the last 100 years. In another article, you will think about what will happen to streams when different **species** of trees are planted close to them. Another article will help you discover whether scientists are predicting more or fewer wildfires in the South's future. You will learn how southern **rural** areas are likely to be affected by the changing climate. Finally, you will discover what scientists are learning about where nonnative plant and animal species are likely to live in the future. Nonnative means that the plant or animal species does not naturally live in the area. As you read these articles, you will discover how climate change is affecting the South's land, wildlife, air, water, and wildland fires.

Glossary

atmospheric (at mə **sfēr** ik): Of, relating to, or occurring in the atmosphere. The atmosphere is the whole mass of air surrounding Earth.

duration (du **rā** shən): The time during which something exists or lasts.

ecosystem (ē kō **sis** təm): Community of plants and animal species interacting with one another and with the nonliving environment.

fossil fuel emission (fä səl **fyü(-ə)**l ē **mi** shən): The discharge or sending out of fossil fuels. Fossil fuels are fuels, such as coal, petroleum, or natural gas, formed from the fossilized remains of plants and animals.

habitat (ha bə tat): The place or environment where a plant or animal naturally or normally lives and grows.

invasive species (in **vā** siv **spē** shēz): Any plant, animal, or organism that is not native to the ecosystem it is in, and is likely to cause harm to the environment, the economy, or human health. All invasive species are nonnative species, but many nonnative species are not invasive species because they do not cause harm.

mitigation (mi tə **gā** shən): Action taken to cause something to be less harsh, hostile, or severe.

precipitation (pri **si** pə **tā** shən): Rain, hail, snow, mist, or sleet.

recreate (re krē āt): To take recreation; to enjoy leisure time.

rural (**rūr** əl): Outside of the city.

species (**spē** shēz): A class of individuals having common attributes and designated by a common name.

urbanization (ər bə nə **zā** shən): The process by which towns and cities are formed and become larger as more and more people begin living and working in central areas.

Accented syllables are in **bold**. Definitions and marks are from <http://www.merriam-webster.com>.