Welcome to the *Natural Inquirer* Monographs—CARBON SERIES!

USDA Forest Service photo.

Glossary words are in **bold** and are defined on page 30.

Welcome to the *Natural Inquirer* Monographs—Carbon Series! A monograph is a single research article organized into a booklet. This monograph series will focus on carbon. Carbon is an important part of our world. Carbon is an element that can be found in water, soil, plants, animals, and the atmosphere. In fact, about 18 percent of the human body is carbon!

Humans and other animals get carbon from eating plants and from eating animals that eat plants. A plant contains carbon as long as it lives and until it completely decays or is burned. Plants get carbon by taking in carbon dioxide (CO_2). When the plant takes in CO_2, it keeps the carbon and releases the oxygen. Another place that carbon is held is in the water. For example, carbon that is held in ocean water and coastal forests is known as blue carbon. This blue carbon is held in areas such as salt marshes, sea grasses, and mangroves (figure 1).

To learn more about monographs, read "About *Natural Inquirer* Monographs!" on page 5.

All places that hold carbon on Earth are known as carbon sinks. Carbon sinks are important to understand because too much carbon in the atmosphere contributes to climate change. Therefore, understanding how carbon sinks work and where they are located can help with **adaptation** and **mitigation** strategies for a changing climate.

With all this discussion about where and how carbon is stored, you may be wondering how carbon gets released back into the atmosphere. A natural release of carbon into the atmosphere comes from wildland fires (figure 2). Another way carbon is released back to the atmosphere is through the burning of fossil fuels. Fossil fuels are oil, coal, and natural gas. Fossil fuels are made from the chemical remains of dead plants and animals. When fossil fuels are burned, they release mainly heat, water, and carbon dioxide. This process of carbon cycling through different locations on Earth and in the atmosphere is called the carbon cycle (figure 3).

Because carbon is so **pervasive** and important in the environment, many scientific studies are conducted to help understand the role that carbon plays in our world. For example, some studies have been done on carbon

Figure 1. Sea grasses store blue carbon. Photo by Babs McDonald, used with permission.

sequestration (sē kwə **strā** shən). Carbon sequestration refers to the ability of some areas to keep carbon in a solid or liquid form instead of releasing the carbon back into the atmosphere. As noted earlier, these areas that hold carbon are called carbon sinks.

In this first monograph of the Carbon Series, you will learn about research that examines how landforms beside rivers affect how much carbon is stored. You will learn how beavers play a role in the carbon cycle. You will also learn what natural processes affect the location and the amount of carbon in these ecosystems.

Figure 2. Carbon is naturally released into the atmosphere when wildland fires occur.
USDA Forest Service photo.

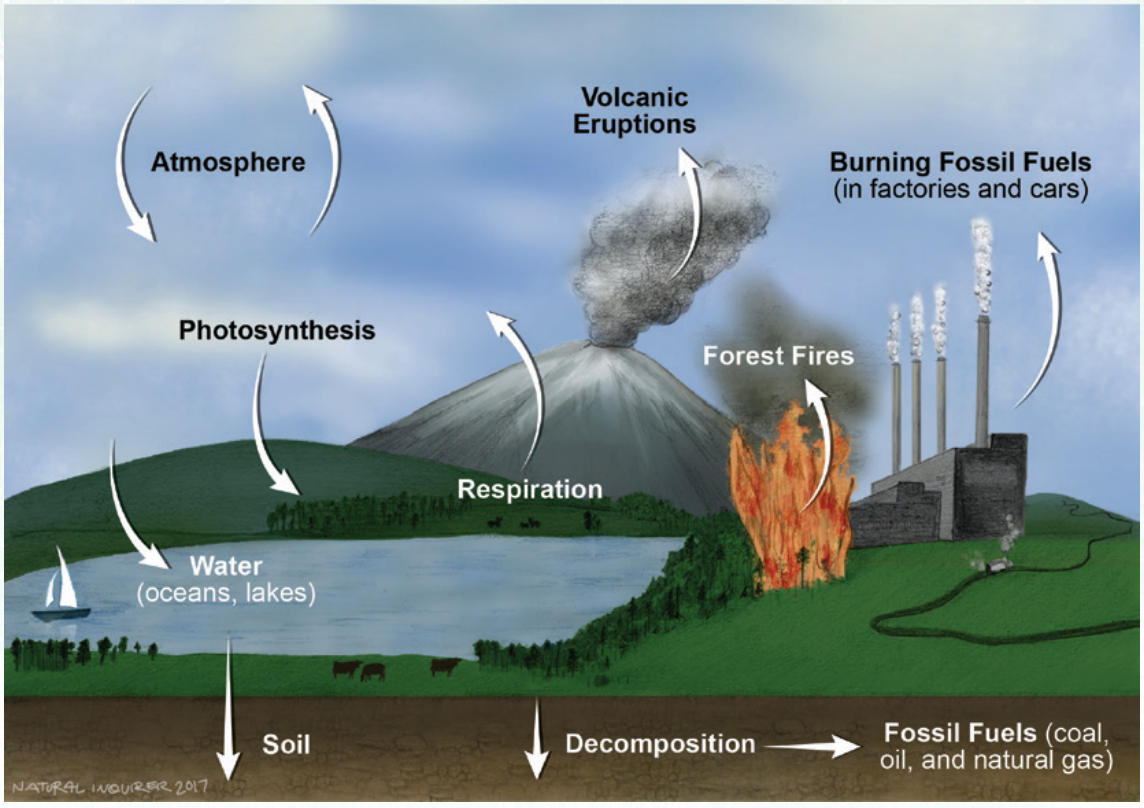

Figure 3. The carbon cycle.
Illustration by Stephanie Pfeiffer.