INQUIRY 2: BIODIVERSITY AND THE WORLD'S FORESTS

THE SITUATION: In Inquiry 1, you learned about the types of forests found across the planet. You also learned how much of Earth's land area is covered in forests, and where forest area is growing and shrinking. You also learned about primary forests.

Primary forests are those with native tree species and little evidence of human activities. Primary forests are usually rich in **biodiversity** (Figure 22). Biodiversity is the variety of life and life processes. When a natural ecosystem is diverse, it has a variety of living **organisms**.

Figure 22. Tropical rain forests contain a wide variety of plants and animals, such as this iiw'i. Photo by David Flaspohler.

FAO wanted to know how much biodiversity the world's forests contained in 2010. This can be complicated, because there are many ways to measure biodiversity. Biodiversity can be measured within an ecosystem, a plant or animal community, a species, a **population**, among individuals, and among genes. FAO decided to collect three pieces of information as an indication of a country's forest biodiversity. These 3 pieces of information included:

1. The number of hectares in primary forests.
2. The number of hectares of forests set aside to conserve the forest's biodiversity.
3. The number of hectares of forests in **protected areas**. Protected areas are areas set aside by law to conserve biodiversity and other natural and cultural resources.

FAO and the National Correspondents also planned to identify the number of hectares of forests affected by natural or human-caused disturbances.

REFLECTION SECTION:

Why do you think biodiversity is important to the world's forests?

How could knowing the number of hectares in each of the 3 categories help FAO to understand biodiversity in the world's forests?

WHAT FAO DISCOVERED: Worldwide, more than one-third of the world's forests are primary forests (Figures 16 and 23). This includes tropical rain forests, which are Earth's most diverse forests. FAO found that the percentage of primary forests has decreased yearly by 0.4 percent since 2000. This is about 40 million hectares, or the size of 12 football fields lost every minute. The decline was caused mostly by logging and other human disturbances. This does not mean that the forests had disappeared, however. It could mean that the primary forest had been

WHY IS GENETIC DIVERSITY IMPORTANT TO THE WORLD'S FORESTS?

Natural environments are always changing in some way. When something in the environment changes, plants and animals must adapt to the change if they are to survive. Some individuals can adapt and some cannot. This is because of slight differences in their genetic structure. If all individuals of a species had exactly the same genetic structure, the species may not be able to survive in a changing environment.

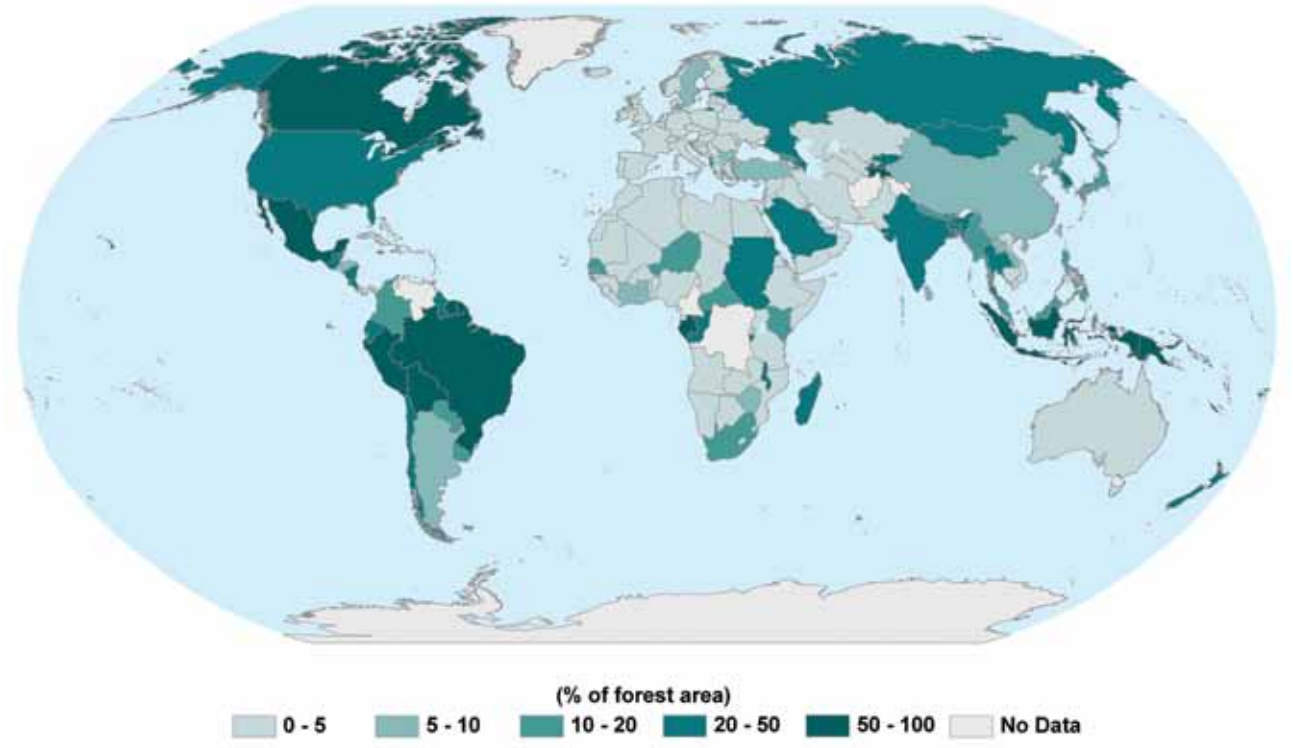

Figure 23. The percentage of forest land in each country classified as primary forest in 2010.

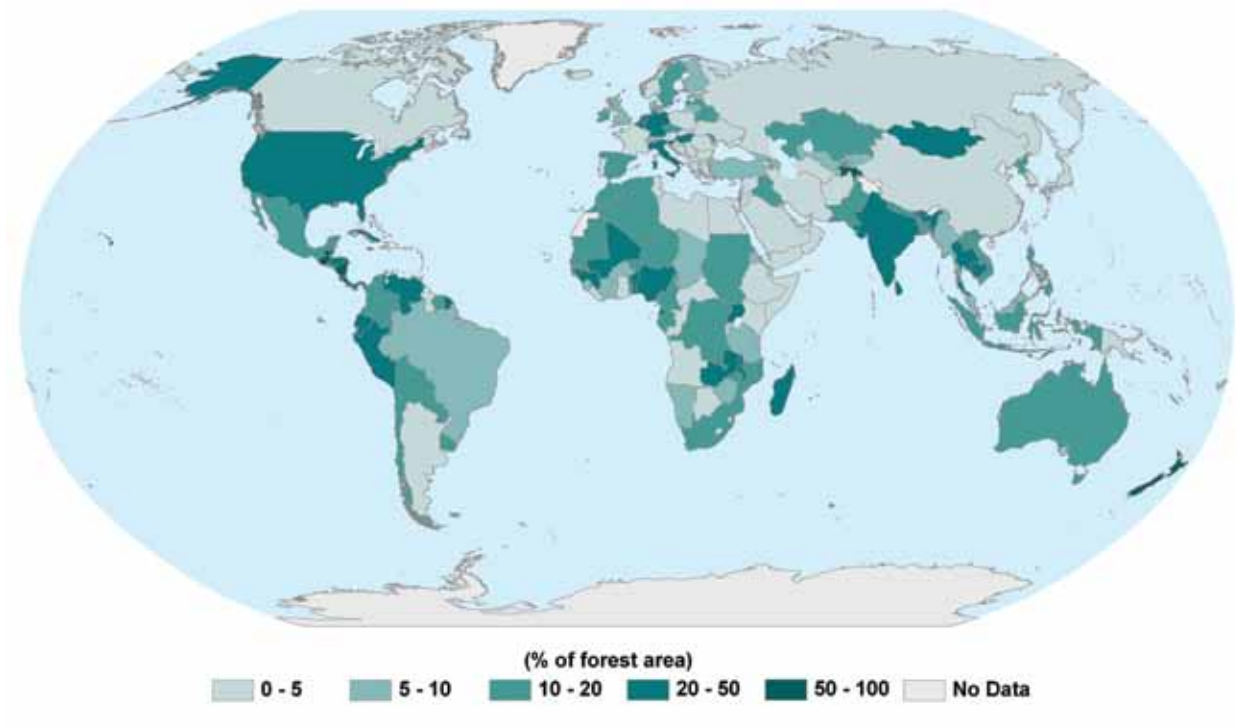

Figure 24. The percentage of forest land in each country set aside to conserve biodiversity, 2010.

modified by human activity so that it could no longer be classified as primary forest.

Almost twelve percent of the world's forests are set aside for the conservation of biodiversity (Figures 24 and 25 and Table 2). The area of these forests increased by 63 million hectares between 2000 and 2010.

Worldwide, 13 percent of the world's forests are located within protected areas (Figure 26). Since 1990, 94 million hectares of protected areas have been added globally. Two-thirds of these protected areas were added since 2000.

YOU DO THE MATH:

How many hectares of forests in protected areas were added between 2000 and 2010?

FAO found that over the past 20 years, more of the world's forests are being set aside to conserve biodiversity. On the other hand, it found that the area of primary forests worldwide has declined over this same period.

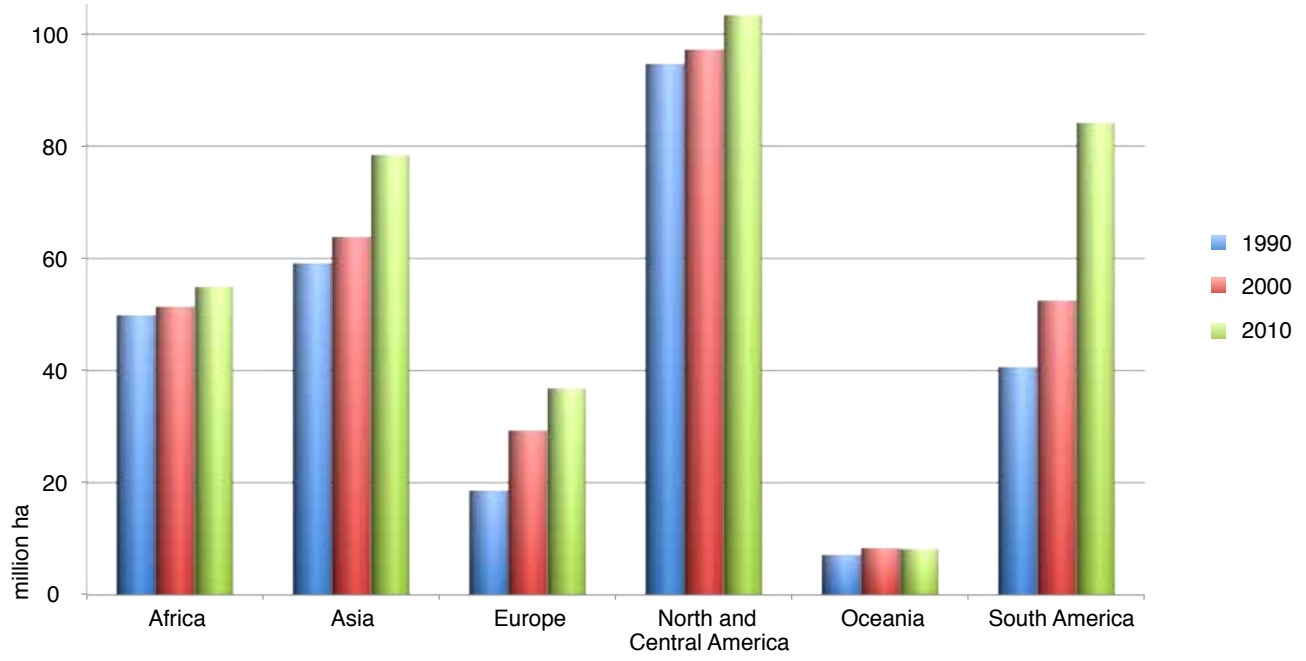

Figure 25. Number of hectares of forests set aside to conserve biodiversity by region, 1990-2010.

REGION	NUMBER OF HECTARES	% OF FOREST AREA
Africa	92 529 000	13.7
Asia	78 513 000	13.3
Europe	37 150 000	3.7
North and Central America	108 969 000	15.5
Oceania	30 640 000	16.0
South America	115 613 000	13.4
World	463 415 000	11.5

Table 2. Number of hectares and percent of forest area set aside to conserve biodiversity by region in 2010. Round off to the nearest whole percentage each of the percentages in the third column.

Biodiversity can be threatened by invasive insects and some kinds of forest fires. Nearly 35 million hectares of forest land were damaged by insects worldwide (Figure 27). In particular, the mountain pine beetle attacked over 11 million hectares of forest in Canada and the western United States (Figure 28).

Largely because of the increase in worldwide trade, insects are moving from country to country. The changing global climate has also made many areas more favorable for insects. This has caused an increase in damage from insects worldwide. Unfortunately, many countries did not collect information about damage from insects.

One percent of all forests were affected by forest fires in 2010 (Figures 29 and 30). This

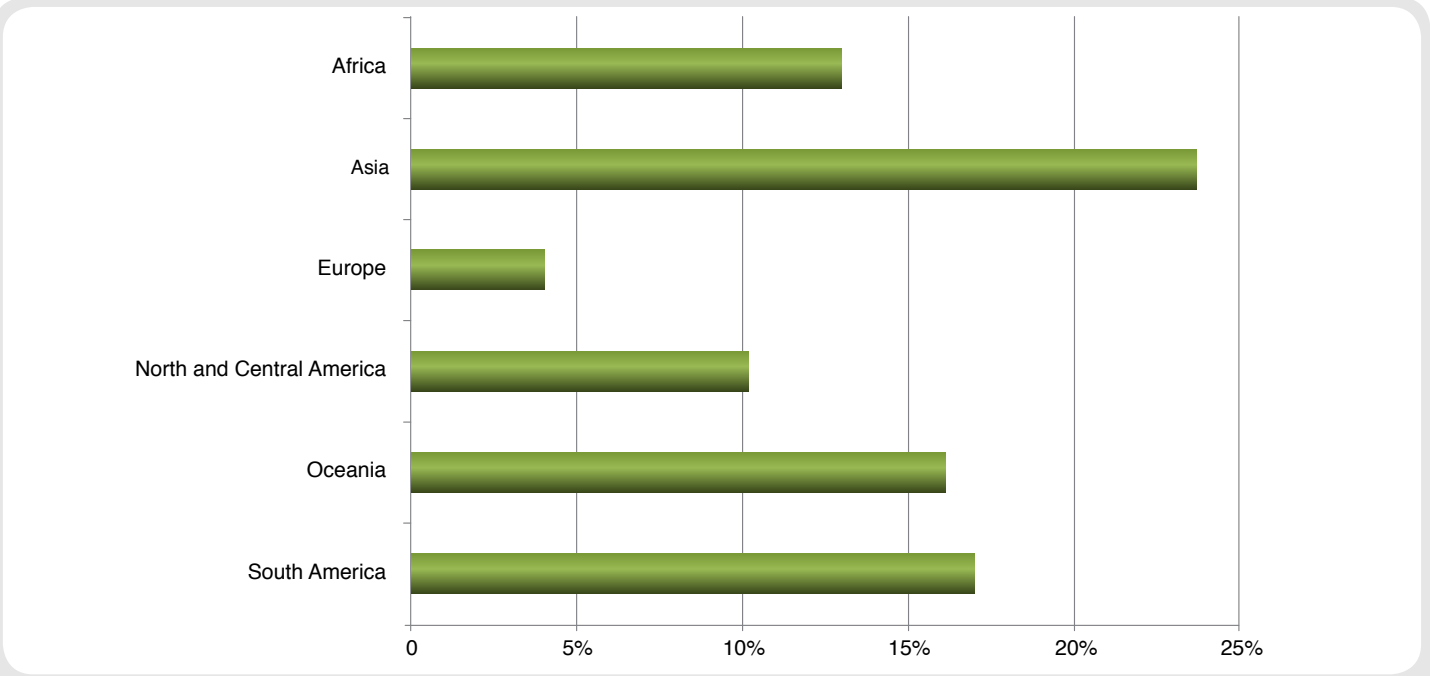

Figure 26. The percentage of forest area in protected areas by region, 2010.

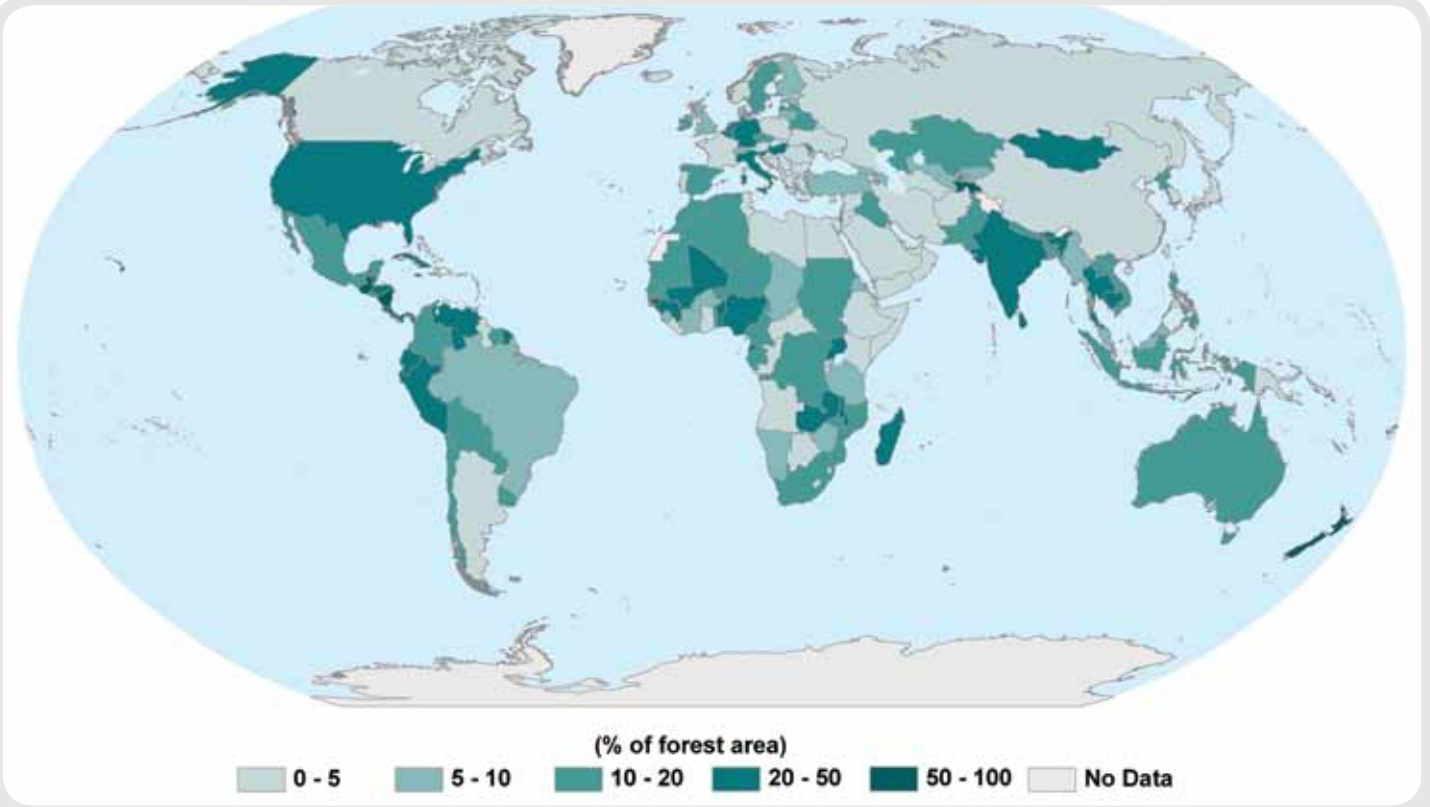

Figure 27. Average area of forest damaged by insects yearly by country, 2005

estimate may be low, however, as only 78 out of 233 countries reported information about forest fires. Events such as fire, drought, wind, snow, ice, and floods are usually considered natural disturbances. As the global climate changes, the number and strength of these disturbances have been increasing. This has resulted in a greater threat to forest biodiversity in these areas.

Figure 28. The mountain pine beetle is destroying large areas of forest in the North American West. Photo by Barbara Bentz.

REFLECTION SECTION:

Based on FAO's findings, would you say that the biodiversity of the world's forests is increasing or decreasing? Why?

Is it important to protect the biodiversity of forests? Why or why not?

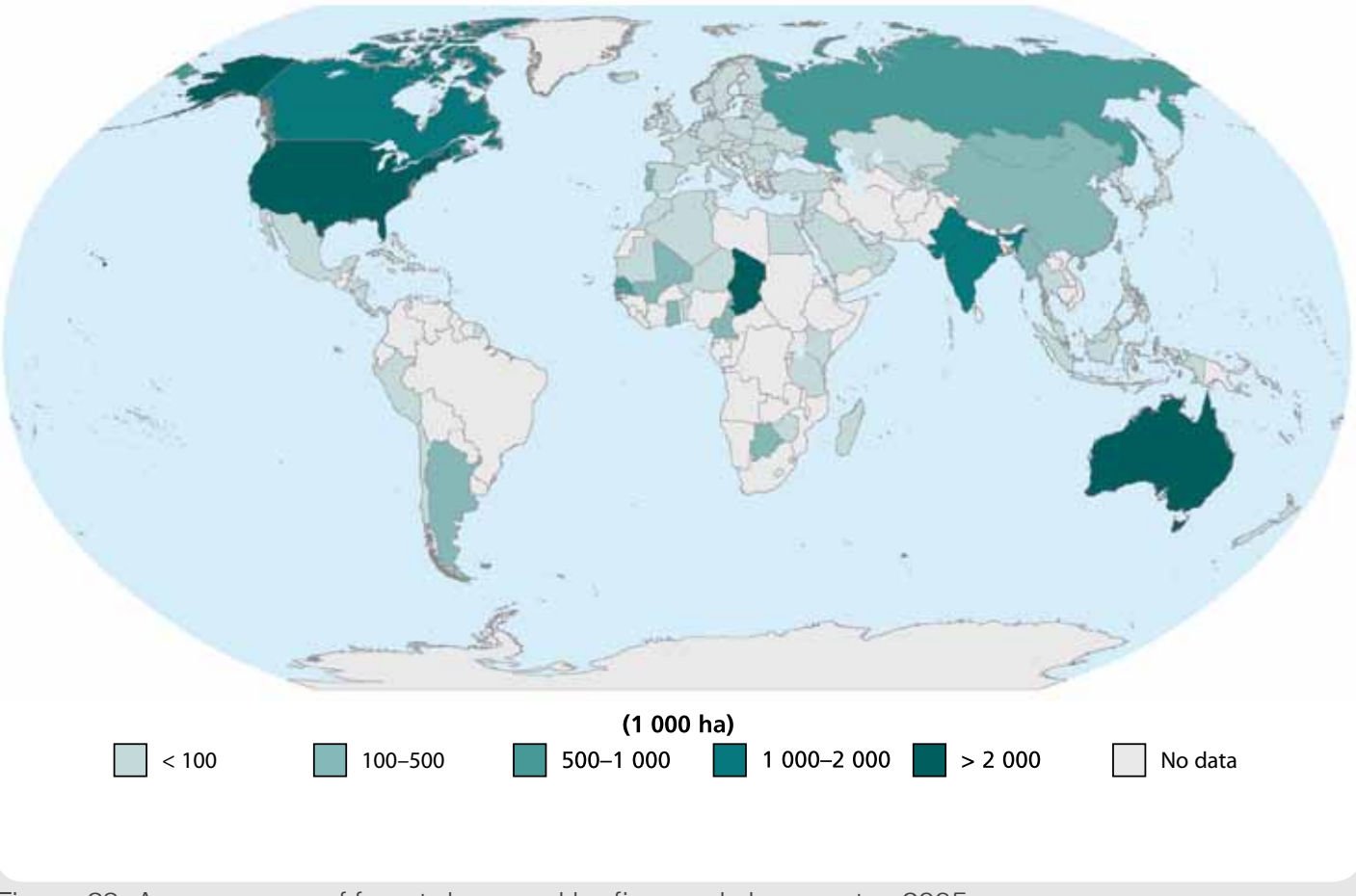

Figure 29. Average area of forest damaged by fire yearly by country, 2005.

Figure 30. A forest fire destroyed this forest in Chile. Photo by John Pye.

ARE FOREST FIRES ALWAYS A BAD THING FOR FORESTS?

FAO used the area of forest damaged or destroyed by fire to evaluate the health and vitality of the forests. For some forests, however, occasional fire is needed. In these forests, trees are adapted to withstand fires that burn across the ground. The trees are not killed. Some trees need fire to break open their seeds so they can germinate. Some trees depend on fire to keep other trees from growing in the area. So while many forest fires damage or destroy forests, it is important to remember that some types of forests need ground fires to conserve their biodiversity. When these fires occur, they typically do not destroy the forest.

FACTIVITY:

Forests are not the only places to find diversity. Diversity can be found everywhere! To prove this, take a look at either your classroom or your school. In a classroom discussion, identify the diversity that you observe. If you are examining your classroom, you might focus on diversity among students. If you are examining your school, you might also observe diversity among teachers and classroom appearance. All observations about diversity should be done respectfully. Now hold a class discussion about how diversity improves your classroom or your school. What are the advantages of having diversity in your community?

DID YOU KNOW?

The heaviest woods in the world come from flowering trees that are called “ironwoods”. This unusual wood sinks in water!
http://waynesword.palomar.edu

DID YOU KNOW?

One of the world’s softest and lightest woods is from the American balsawood tree.
http://waynesword.palomar.edu