Glossary

aromatic (**a** rə **ma** tik): Having a strong smell.

bole (bōl): Tree trunk.

coarse root (kȯrs rūt): The thicker root structure of a plant when compared with the finer roots.

crown (kraun): The leaves of a tree.

fine root (fīn rūt): The small, hair-like roots growing out of a plant's coarse roots.

forest cover (**fȯr** əst **kə** vər): The area of land covered by forest crowns.

iconic (ī **kän** ik): Of or pertaining to an icon. An icon is a picture representation, a symbol.

maladapted (ma lə **dap** təd): Poorly suited or unsuited.

novel (**nä** vəl): New and not resembling anything used or known before.

pristine (pris **tēn**): Not spoiled or polluted.

seedling (**sēd** liŋ): A young plant grown from seed.

simulate (**sim** yə lāt): To give the appearance or effect of.

spatial (**spā** shəl): Relating to, occupying, or having the character of space or area.

species (**spē** sēs): Groups of organisms that resemble one another in appearance, behavior, chemical processes, and genetic structure.

surrogate (**sər** ə gāt): Substitute.

totem pole (**tō** təm pōl): A pole carved and painted with totems and set up by native Alaskan peoples. A totem is an honored symbol.

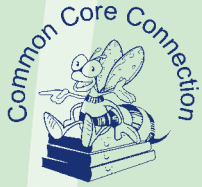
wilderness area (**wil** dər ness **er** ē ə): An area in the United States designated by law for preservation and protection in its natural condition. A wilderness area also refers to a large unspoiled natural area.

Accented syllables are in **bold.** Marks and definitions are from http://www.merriam-webster.com.

FACTivity

Time Needed

One class period



Materials (for each small group)

- Blank sheets of paper
- Pencils
- *Natural Inquirer* Wilderness Benefits edition (order for free or download at http://www.naturalinquirer.org)
- *Natural Inquirer* Invasive Species edition (order for free or download at http://www.naturalinquirer.org)
- USA Today article on yellow-cedar decline: http://www.usatoday.com/weather/climate/2006-03-27-yellow-cedar_x.htm
- Wikipedia article on assisted tree migration: http://en.wikipedia.org/wiki/Assisted_migration
- This article

In this FACTivity, you will consider the recommendation made by the scientists in this study. You will also discuss the advantages and disadvantages of following the scientists' recommendation. You will then consider a bigger question: When, if ever, should natural resource managers make changes to large areas of wildland?

Background

When managers practice adaptive management, they anticipate and prepare for the future. They take actions now that they believe will bring about desired results in the future. Managers continually evaluate what they are doing and make changes as needed. In this research, the scientists recommended planting yellow-cedar trees in areas where they have not been found before. In Alaska, these areas are large areas of undeveloped forest land where other tree species currently grow.

Methods

Consider a section of a newspaper article written by Barry Saxifrage. This newspaper article was published on February 9, 2012, in the Vancouver (British Columbia, Canada) *Observer*. This newspaper article was written about the yellow-cedar research you just read. The first sentence that follows refers to the scientists' suggestion that yellow-cedar seedlings be planted in areas where they do not now live.

> In other words, we may be forcing ourselves and future generations to become permanent gardeners of the "wilderness." And not just for yellow-cedars. Already serious discussions are underway for other **iconic** long-lived trees like the giant sequoias of California. They too are becoming "**maladapted**" to their ancient habitat as a result of fossil fuel pollution reducing snowfall and overall precipitation. Surveys show the number of giant trees dying each year has doubled. Concern is growing over the inability of seedlings to thrive in the drying climate. Scientists and forest managers talk about the need to water, raise, and even possibly transplant these trees to new regions. For trees that can live thousands of years, the rapid climate shift underway now is going to be a struggle.

Note that Mr. Saxifrage also mentioned another tree species humans may need to rescue from a warming climate. Many tree species may need help being located to a new habitat. Mr. Saxifrage asked the question:

> How long will humans choose to garden increasingly large swaths of the wild to try to prevent a collapse of species richness and biodiversity? How much can we really do even if we decide we want to?

Your teacher will divide the class into small groups. Each group will do research and decide which of the following two positions to take: (1) We must modify large areas of forest now by planting yellow-cedar tree seedlings or (2) We should not modify native forests by planting yellow-cedar tree seedlings where yellow-cedar has not grown before. You may use the resources given to you by your teacher, or you may access the Internet, use the media center, and simply reflect on and discuss the question.

Take a blank sheet of paper and write either "Plant yellow-cedar" or "Do not plant yellow-cedar" at the top. Draw a line down the middle of the page and across the page, half way down. Label the top section "Advantages" and the bottom "Disadvantages." As a group, research and discuss your topic.

As a group, take 20 minutes to discuss and list the advantages and disadvantages of planting or not planting yellow-cedar. Then, present your findings and hold a class discussion about planting yellow-cedar. Share your group's position and reasons for taking that position. Finally, consider and discuss the related larger question, "When, if ever, should natural resource managers make purposeful changes to large areas of wildland?"

FACTivity Extension

You will write a short newspaper editorial or a blog that responds to Mr. Saxifrage's questions.

Common Core Connection

Additional FACTivity Extension

In small groups, create an adaptive management experiment to figure out where yellow-cedar seedlings grow best. Write up your experiment to include a research question, management action, and what and how you will monitor the effects of the management action. Use your knowledge of adaptive management to place this experiment into an adaptive management process.

Common Core Connection

Note to Educator: If you are a Project Learning Tree (PLT) educator, you may use "Trees in Trouble" as an additional activity.

PLT

Web Resources

How trees might move in a changing climate
http://www.naturalinquirer.org and read, "Moving On Up" in the Climate Change edition

"Freezing to Death in a Warming Climate: Yellow-Cedars in Trouble"
http://www.vancouverobserver.com/blogs/climatesnapshot/2012/02/09/freezing-death-warming-climate-yellow-cedars-trouble?page=0,0

USA Today article on yellow-cedar decline
http://www.usatoday.com/weather/climate/2006-03-27-yellow-cedar_x.htm

Assisted tree migration
http://en.wikipedia.org/wiki/Assisted_migration

Totem poles
http://www.native-languages.org/totem.htm

For a *Natural Inquirer* article about the roots of trees
http://www.naturalinquirer.org, "FACE Look"