



# Crater Lake National Park Habitat Assessment

## Overview

Students will learn about mixed conifer habitat and conduct a forest assessment.

## California Science Standards

Grade 3: 3.b.c.d.-L.S.

Grade 4: 3.b.-L.S.

Grade 7: 7.c.-I&E

## Oregon Science Standards

Grade 4: 2L.1

Grade 6: 2L.2

## National Standards

Content Standard A:  
Scientific Inquiry

## Materials Include

\* Student Journal

## Activity Time

Preparation: 20 min.  
Activity Time: 35 min.

## Best Season

All Season

## Vocabulary

\* Habitat  
\* Biodiversity  
\* Snags  
\* Bioregion

**Grade Level:** 3rd-8th (O.S.S 4th & 6th) (C.S.S: 3rd-7th)

## Learner Objectives

Students will:

- Learn about mixed conifer/whitebark pine forest habitat
- Learn about management issues associated with this habitat
- Conduct a mixed conifer forest habitat assessment

## Background Information

The high elevation forests of the Cascade Mountains and those found at Crater Lake National Park attracted early naturalists like John Muir and Gifford Pinchot because of the rich diversity of plant and animals found in these habitats. Crater Lake National Park was established in 1902, then expanded, to protect the species diversity and unique high elevation old growth pine forests.

Within the 249 square miles of Crater Lake National Park there are four major forest types named for the conifer tree (cone bearing trees with needle like leaves) that is most prevalent in each zone: ponderosa pine, lodgepole pine, mountain hemlock and whitebark pine. Separated by elevation, these high elevation conifer forests support over 700 hundred different plant taxa and a rich diversity of animals from apex predators (an animal on top of the food web), such as mountain lion, to small mammals, like pikas. These forests are home to over 150 species of birds. Many of the birds seen at Crater Lake depend on the conifer forests for food and shelter, and are quick to respond to any changes occurring in their habitats. Monitoring bird populations at Crater Lake National Park provides scientists and Park Rangers with a tool for measuring the health of the park.

Management at Crater Lake National Park has varied a great deal since the parks founding. For over 90 years it was the practice to suppress any and all fires and insect outbreaks in the park. Forest managers now have a greater understanding of the importance that fire and insects play in forest ecology. Such disturbances return nutrients to soils and help to remove older, weaker trees. Now the management of Crater Lake National Park actually includes lighting controlled burns.

There are several habitat aspects, that when found during a habitat

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assessment, can give scientists and citizens an idea of habitat health. Factors that are focused on include: snags (dead trees), fallen logs, tall pines, native shrubs, forest edges, and small diameter trees (less than eight inches), as well as larger old growth trees.

Snags and fallen logs are present along the rim and have great value. Birds and many other animals rely on both of these habitat components. Snags provide food and shelter for birds, black bears and insect larvae. Cavity nesting birds like the Red-breasted Nuthatch will use snags for nesting. Vaux's swifts and bats will also roost in hollowed out snags. Both Hairy Woodpeckers and black bear feed on the insect larvae that are found in snags. Fallen logs provide habitat for amphibians, reptiles, small mammals, slugs, mosses, lichen, fungi, and bacteria. Small diameter trees are important part of the forest succession process as they grow to replace the mature trees.

Monitoring and citizen science projects that are based on focal species and specific habitat components helps researchers identify and protect unique habitat characteristics at Crater Lake National Park.

## Getting Ready!

1. Read the background information.
2. Determine the site you plan to visit to conduct an habitat assessment.
3. Make copies of the *Student Journal: Crater Lake Habitat Assessment*.

## Discuss!

1. Ask the students if they know what a habitat is.  
*Answer: Habitat is the arrangement of food, water, shelter and space suitable to an animal or plant's needs.*
2. Review some of the vocabulary associated with this lesson.
3. Give the students some background information on mixed conifer forest habitat.
4. Go over with students the seven different conifer forest habitat aspects (*large diameter trees, small diameter trees, snags, fallen logs, native shrub layer, forest edge, and animal sightings*) and why they think that these are important. (You might receive answers like "Small diameter trees are important because they will grow to be the large trees" or "Large diameter trees are important because they produce lots of seeds, which is an important food source for birds.")
5. Ask them why they think habitat management is important and what could happen to a habitat if it is mismanaged.

## Focal species at Crater Lake National Park

Focal species refer to species that are highly associated with important attributes or conditions within a habitat type. Focal species include both rare, hard to find species and abundant species that can be easily monitored. By managing for a group of species representative of important habitat components, many species benefit.

At Crater Lake National Park there are many different focal bird species. Western Tanagers and Fox Sparrows, are focal species for edge habitats and high elevation montane brush fields. Clark's Nutcracker and Black-backed Woodpeckers are the focal species associated with old growth whitebark and lodgepole pine forests - two habitats of special concern at Crater Lake National Park. The occurrence of these species in their respective habitats is an indicator of habitat health.



Photo by NPS

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6. Share with students the history of management at Crater Lake National Park (see following page). Also, share the tree profiles and discuss why monitoring whitebark pine and management for whitebark pine is important.

## Go Outside!

1. Pick a location along the rim of the caldera at Crater Lake National Park where students can walk around and observe the habitat to make an assessment.
2. Pass out copies of the *Student Journal: Crater Lake Habitat Assessment*.
3. Tell students to think of the assessment as a scavenger hunt. They must find as many habitat aspects in their area as they can.
4. Have the students walk around the habitat and make observations of any and all important habitat aspects and record them on their student journal.
5. When they have finished their assessments, gather the students together and go over their findings.

## Follow-up!

1. Ask students 2-3 questions to re-cap the lesson (see right panel).

## Species Profile

*Whitebark pine*: Found at the highest elevations in the Park on rocky crests. Whitebark pine can be identified by its five needle clusters, whitish gray bark and gnarled, twisted appearance. It is considered the most primitive of the native pine species because the cones do not open until they decay.

*Lodgepole pine*: Present throughout the Park, even at the Pumice Desert. It is the only conifer with two needle bundles instead of five (making it immune to white blister rust). Lodgepole pine can be identified by its slender trunks and light brown thin bark. Lodgepole pine is the only conifer native from Alaska and Mexico.



Photo by NPS

## Suggested Questions

*What is the definition of a habitat?*

*What are two dominant tree species found in a mixed conifer forest habitat?*

*Why are snags and fallen logs important in mixed conifer forest habitat?*

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## Crater Lake National Park Forest Monitoring

Forest assessment at Crater Lake National Park focuses on whitebark pine, mountain hemlock, and lodgepole pine. Whitebark pine trees thrive in the highest forest zone at Crater Lake. Their seeds are an important food source for Clark's Nutcracker, red squirrel and black bear. Whitebark pine provide shelter for elk and Dusky Grouse. Whitebark pine stabilizes the soil at the rim and regulate snow melt. There is a new threat to the high elevation conifers at the rim of the Park. White pine blister rust, an introduced fungus that spreads through shrubs living under the whitebark pine, has inflected 20% of the whitebark pine on the rim of the caldera.

Lodgepole pine is the only two needled pine at Crater Lake National Park. This makes it immune to infection by white blister rust. These trees can be seen growing in dense stands in the middle elevations of the park. Lodgepole pines are one of the most abundant pines at Crater Lake National Park. Management of lodgepole pine dates back to 1925 when an epidemic of mountain pine beetle infections decimated much of the lodgepole pine stands in the park. Currently the park is managing lodgepole pine to minimize impacts form mountain pine beetle and also dwarf mistletoe.

Mountain hemlocks are the dominant conifer at Crater Lake from 4,000 feet to the timberline. Mountain hemlocks are slow growing and often appear twisted and bent due to the short growing seasons and long winters of the subalpine environment. These conifers are well adapted to the conditions of the subalpine zone. Thin branches and delicate needles, prevent snow from pilling on branches and breaking them under the weight. Mountain hemlocks start producing cones after 20 years, and can live for more than 800 years, alternating between years of heavy and light cone crops. This strategy helps the mountain hemlocks take advantage of seed caching species for seed dispersal and germination. During years of large cone crops, animals have many cache sites are either forgotten or never harvested, promoting the dispersal of mountain hemlocks.

Whitebark Pine



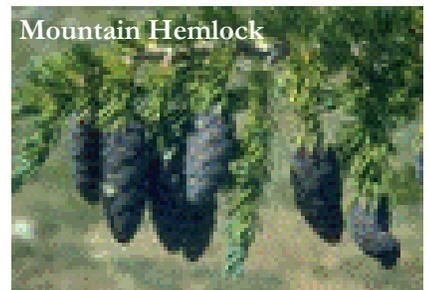
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Lodgepole Pine



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Mountain Hemlock



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