LOOKOUT CREEK OLD-GROWTH TRAIL

H.J. ANDREWS EXPERIMENTAL FOREST

USDA United States Department of Agriculture | Forest Service Pacific Northwest Region | OSU Oregon State University

Welcome to the H.J. Andrews Experimental Forest: Where ecosystems are revealed

You are about to embark on the Lookout Creek Old-Growth Trail. You will be travelling through a forest that is approximately 450 years old. Here in the H.J. Andrews Experimental Forest, the old-growth ecosystem is rich with species that depend on the unique habitat of a temperate rainforest. The diverse and complex system you see is created by many processes and cycles including those of nutrients, water, life, death, decay, and growth. Because some of these cycles operate on a vast time scale, research at the Andrews Forest focuses on long-term studies. Some projects last for 200 years! Andrews Forest research has enhanced our understanding of this ecosystem and has guided forest and stream management practices in the Pacific Northwest and around the world.

Along the trail, use your powers of observation to understand and appreciate this unique ecosystem. Because the trail was built as a narrow pathway with limited impact on the forest, it is rugged in nature. Please be respectful by staying on the trail and leaving organisms in their habitats. We hope you will leave with a better understanding of how the forest works—and why it is so extraordinary.

QUESTION TO PONDER: *As you head out on the trail, think about what causes change in the forest. What signs of change do you see?*

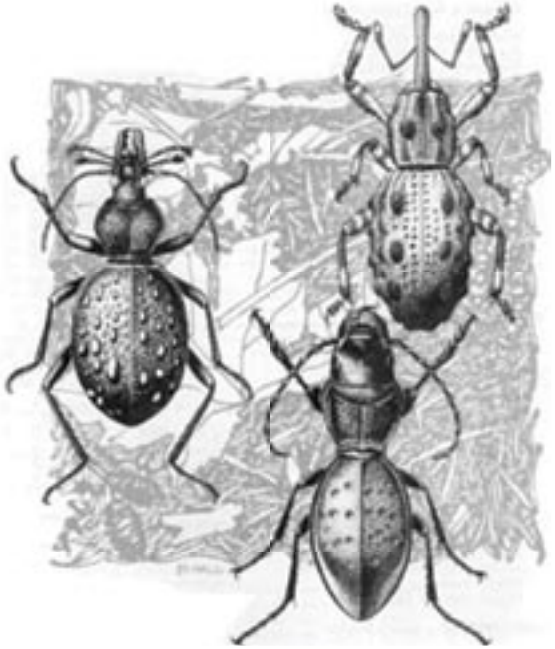
Succession for Success.

The forest around you may look like a stable place. But in fact, it is part of a cycle called succession. We call this an old-growth forest, but some patches are actually in the early stages of succession. When a large tree falls, it opens up space and light to new plants. Grasses, flowers, and shrubs come first, followed by sun-loving tree species like Douglas-firs. Along with the change in plant composition come animal species like small mammals that can survive only in young forest patches. Eventually, the trees grow tall enough to cover the ground in shade. Then new, shade-tolerant tree species grow beneath them. Large and small events create the mosaic of young and old trees, shrubs, animals, insects, and fungi that you see before you.

QUESTION TO PONDER: *What do you think happens to dead trees after they fall?*

FBI (Fungi, Bacteria, Insects).

If dead leaves, trees, branches, fungi, and other species are continuously falling to the forest floor, why isn't it covered in a deep layer of debris? Look closely at the ground or a downed log. You might see a beetle, a millipede, a slug, or a mushroom. We often think of these organisms as pests. Yet these decomposers in the soil actually benefit the forest by breaking down dead plant and animal debris into nutrients needed by plants for growth.



Young western hemlocks, for example, absorb nutrients and water from decomposing logs. You can find nutrient-rich "nurse logs" throughout the forest. Decomposers keep nutrients cycling; without them, life in the forest could not continue.

QUESTION TO PONDER: *Do you think events, like fire and strong winds, that cause trees to die are healthy for the forest?*

Mosaic of Change.

Look for a patch of forest that is in the first stages of succession. Can you see new shrubs and trees growing in the exposed sunlight? The first stages of succession begin after a disturbance, such as a flood, disease, landslide, insect outbreak, or wind, alters the physical environment. A disease like laminated root rot kills many Douglas-fir trees and may seem devastating. But the clusters of trees that die create canopy gaps that allow light to reach the forest floor; sun-loving plants can grow in these new spaces. Some disturbances leave many standing dead trees, called snags, which provide habitat for birds and other animals. Over time, disturbances create a mosaic of forest patches in different stages of succession, contributing to diversity in the forest. Look for downed logs in canopy gaps that are contributing nutrients to the soil and providing habitat for species such as salamanders, insects, and fungi.

QUESTION TO PONDER: *Do you think logs can be beneficial for streams?*

Jammed Up.

The numerous log jams in Lookout Creek may give the impression that streams are messy. At one time, forest management practices called for removing large logs from streams. As it turns out, management practices were harming the stream by removing logs. Through several long-term studies beginning in the 1970s and 80s, Andrews Forest researchers have found that logs provide habitat for species throughout the food chain. Logs shelter insects in the decaying wood and create splash pools where fish can rest from the current. Because of this new knowledge, policies have since changed to keep logs in the stream, where they can benefit the ecosystem for hundreds of years after their death.

QUESTION TO PONDER: *How do you think logs get into the stream?*

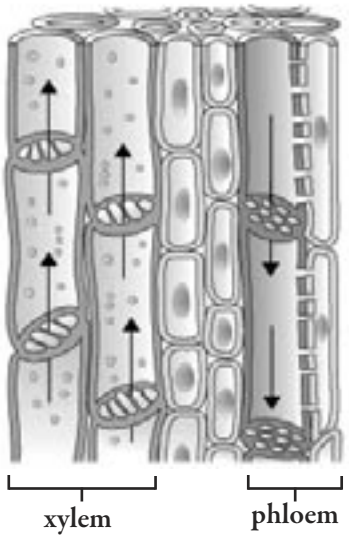
Chaos Into Order.

Floods can deposit logs into the stream and rearrange existing logs. When Lookout Creek flooded in the winter of 1996, it left the highest water mark since 1964. The flood presented a unique learning opportunity for the scientists of the Andrews Forest. Years of stream habitat research prior to the flood gave scientists a clear picture of how the flood affected the stream and forest habitat. They found that brief, large-scale events affect the overall structure of the stream more than years of steady erosion. In a video titled "Torrents of Change," scientist Gordon Grant says: "Decades of boredom punctuated by hours of chaos do much of the physical work of the landscape so that the features we see…owe their origin to that 12- or 24-hour window during which these channels are in full flood." While much of the rain that falls here feeds the stream, some of it is absorbed into the soil for plants to use.

QUESTION TO PONDER: *How do you think trees draw water from the roots all the way up to the leaves on the highest branches?*

Tree Mechanics.

To transport water, trees have special cells called xylem that line up in a ring of long tubes to link the roots to the leaves. Through evaporation, sunlight pulls water from the leaves, creating pressure on one end, like someone sucking through a straw. The xylem tissue uses this pressure to suck water up from the roots. But the leaves are not just consuming water. They are busy using sunlight, water, and carbon dioxide to make sugar in a process known as photosynthesis. Other transport cells, called phloem, carry this carbohydrate-rich food to the growing parts of the tree. Just like in the rest of the forest, the different parts of the tree interact to keep it alive.



QUESTION TO PONDER: *How do you think different layers of the forest, from the plants on the ground to the trees in the canopy, interact?*

A Story of Layers.

Remember how sunlight influences the succession of a forest? While some plants need it, others can grow with very little. The tallest trees in the forest, which compose the canopy, catch up to 75 percent of the light that comes from the sun. In this forest, the canopy contains Douglas-fir, which need full sun to grow, and western hemlock, which can grow in shade or sun. Below them, slower growing, shade-tolerant species make up the understory. These trees catch most of the remaining light, leaving little for the shrub layer of smaller plants beneath them. On the forest floor you will see many varieties of mosses, fungi, low-growing plants and decomposing dead matter. These complex layers interact to form a diverse old-growth forest. Look high and low to see if you can define all of these layers.

QUESTION TO PONDER: *Do you think anything lives below in the soil?*

Fungus Among Us.

You may have noticed some of the colorful mushrooms and other fungi that inhabit the forest. The fungi you see above the ground are just the fruits of a much larger root-like underground web. Many fungi decompose dead forest material to extract the nutrients they need because, unlike plants, they cannot make their own food. The underground fungal web often shares nutrients obtained through decomposition with the roots of plants in exchange for the sugar the plants produce through photosynthesis. Mutually beneficial relationships like this one are called symbiotic relationships and can be found throughout the forest. Lichen is an example of an important symbiotic relationship that exists between a fungus and algae. Lichen plays an important role by converting nitrogen from the air into a form that plants can use. One species of lichen resembles an old man's beard. Another looks like a shriveled lettuce leaf. See how many different types of fungi and lichens you can find on your walk today.

QUESTION TO PONDER: *Plants and fungi interact in the forest, but how do you react to it?*

Woods Into Words.

How do you feel while hiking? Relaxed, energized, awestruck? Every year, as part of the Long Term Ecological Reflections project, several professional writers live at the Andrews Forest for a week to write about their experiences in the forest. The project aims to combine creative writing with scientific research to give greater depth and understanding to long-term ecological change and our relationship with the forest. Among the poets, essayists and philosophers who have been here are Robert Michael Pyle (author of Wintergreen), Alison Hawthorne Deming (author of Writing the Sacred Into the Real), and Robin Wall Kimmerer (author of Gathering Moss).

> *"The rhythm of my breathing had, for the moment, joined the other rhythms of this forest—the rhythms of water and air, of movement and stillness, of living and dying."*
>
> Scott Slovic, "Out of Time"

QUESTION TO PONDER: There are many interactions in the forest. How do we fit in?

Thoughts To Take Away.

The Andrews Forest ***"...is the most studied primal forest ecosystem on this continent, and perhaps the planet. That does not mean that scientists here have found every cog and wheel, much less every relationship between them. But here they have discovered a host of species previously unknown to science, and interactions in the forest ecosystem that no one previously imagined. Here, in the shadows of this woods, in its rivulets and streams, under its soil, and high overhead, they have discovered a hidden forest."***

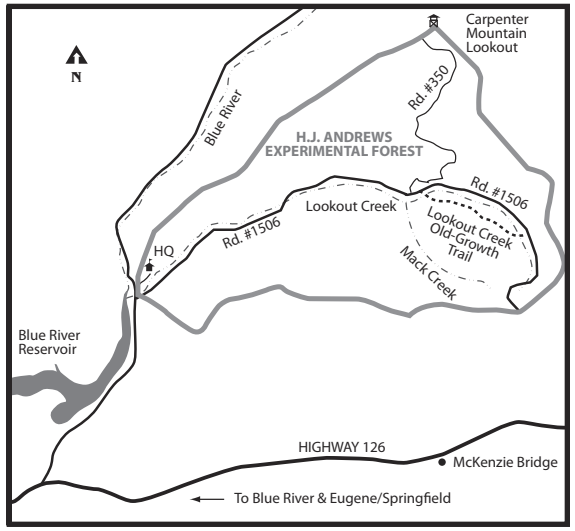
from The Hidden Forest by Jon Luoma

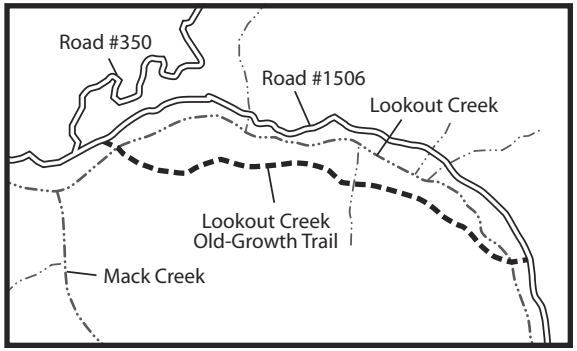
How To Get To H.J. Andrews And The Lookout Creek Old-growth Trail:

Blue River is located about 40 miles east of Eugene, Oregon on Highway 126.

From Blue River continue driving east on Highway 126 for another 3 miles to Forest Road #15. Turn left and continue driving 3½ more miles, past Blue River Reservoir, to Forest Road #1506. Turn right and proceed about 7 miles to the lower marked trailhead or 10 miles to the upper trailhead.

The trail is 2.6 miles long. Because of the rugged nature of the trail, you should expect at least a two hour hike one way.





About the H.J. Andrews Experimental Forest:

The Andrews Forest Program is dedicated to long-term study of complex forest and stream ecosystems of the Pacific Northwest, development of innovative and collaborative approaches to management of forests and watersheds, and communication of findings to land managers, researchers, policymakers, teachers, students, and the public.

For More Information Contact:

Willamette National Forest
McKenzie River Ranger District
McKenzie Bridge, OR 97413
541-822-3381

Pacific NW Research Station
3200 S.W. Jefferson Way
Corvallis, OR 97331
541-750-7250

Dept. of Forest Science
Oregon State University
Corvallis, OR 97331
541-737-2244