H.J. Andrews Experimental Forest

United States Department of Agriculture

Forest Service

Welcome to the H.J. Andrews Experimental Forest

The H.J. Andrews Experimental Forest covers the entire 15,800-ac (6400-ha) watershed of Lookout Creek, which flows into Blue River Reservoir and then to the McKenzie River. Elevation of the Andrews Forest ranges from 1,350 to 5,340 ft (410 to 1630 m). Broadly representative of the rugged, mountainous landscape of the Pacific Northwest, the Andrews Forest contains excellent examples of the region's conifer forests and associated wildlife and stream ecosystems.

When it was established in 1948, the Andrews Forest was covered by a mix of old-growth conifer forest (~450 yrs old) and mature forest (100 to 150 yrs old). Forest harvest, beginning in the 1950s, created young plantation forests over about 30 percent of the Andrews Forest. Old-growth forest stands still cover about 40 percent of the total area.

Forests in this area are among the tallest and most productive in the world. Tree heights of large conifers are commonly greater than 250 ft (75 m). Lower elevation forests are dominated by Douglas-fir, western hemlock, and western redcedar trees. Higher elevation forests contain noble fir, Pacific silver fir, Douglas-fir, and western hemlock.

Streams throughout the forest are steep, cold, and clear with large boulders and wood providing habitat for nine species of fish, eight amphibian species, and hundreds of species of aquatic invertebrates.

Photos by Al Levno, Theresa Valentine, Lina DiGregorio, Mike Furniss, and Rita Claremont.

Research and Experiments

Forests

Long-term research at the Andrews Forest examines how forest overstory and understory plants differ in communities composition and structure over the course of succession and what processes control these changes. Researchers also study how changes in vegetation influence other ecosystem processes such as vegetation water use, carbon storage, nitrogen cycling, and disturbance regimes. Because these trees live for centuries, long-term studies are essential. A network of permanent study plots throughout the Andrews and the Pacific Northwest provides sites for repeated long observations of the relatively slow dynamics of these forests. These forests accumulate large amounts of carbon, both above- and belowground.

Streams

Decades-long stream research has tracked fish populations and aquatic insects and examined stream ecosystem responses to forest harvest, floods, and debris flows. Other stream research focuses on wood input, movement, and decay; stream temperature; nutrient dynamics; channel geomorphology; and sediment transport. Long-term studies indicate that these streams resist disturbances and recover quickly. Research showing the importance of riparian zones in contributing wood and leaves, shading the streams, and filtering nutrients has quickly been incorporated into forest management strategies.

Small Watersheds

Andrews Forest has eight small experimental watersheds, five where forest harvest has occurred and three that serve to show reference conditions. Streamflow, water chemistry, sediment and vegetation have been sampled and studied in many of these watersheds since before treatments, which occurred mid-1960s to the mid-1980s. Additional research in these watersheds includes study of soil respiration, forest succesion, hillslope hydrology, ecophysiology, and carbon dynamics. Key findings include (1) peak flows increase after logging and roads with patchcuts; (2) nitrogen export is surprisingly limited following disturbance; and (3) sediment yield is quite episodic from some watersheds.

Log Decomp Study

The 200-yr log decomposition experiment is the emblematic long-term experiment at Andrews Forest. In 1985, more than 500 logs were placed at six sites across environmental conditions. The four species of tree represent a range of decay rates—Pacific silver fir, western hemlock, Douglas-fir, and western redcedar (fast to slow). Many associated studies have addressed issues such as carbon sequestration, forest respiration, and microbial and insect ecology. Results of this work have influenced the science of carbon dynamics at local to global scales and management of dead wood as an ecosystem component.

Forest Management

The Andrews Forest hosts several long-term forest management experiments at the forest stand and landscape scales. The Young Stand Thinning and Diversity project is examining how thinning and creation of small gaps in 35- to 50-yr-old Douglas-fir plantations affect vegetation, wildlife (including small mammals, birds, and amphibians), edible fungi, and other ecosystem components. Initial findings indicate that thinning, especially with gap creation, provides opportunities for early seral vegetation to survive and thrive in mature forest stands.

Education

As the home of an iconic old-growth forest, headwaters of municipal water supplies, and a principal source of knowledge about Pacific Northwest forests and watersheds, the Andrews Forest attracts the public interest and serves as a stage for lifelong learning. Education efforts involve undergraduate and graduate training, professional development programs for elementary through college instructors, and inspirational experiences for K-12 students.

Recreation Opportunities

As part of the Willamette National Forest, the Andrews offers a wealth of nearby recreational opportunities, including the Lookout Creek Old-Growth Trail, the Carpenter Mountain Lookout Trail, Blue River Reservoir, the McKenzie River, and two scenic byways—Aufderheide Drive and McKenzie Pass/Santiam Pass.

Lookout Creek Old Growth Trail

The 3.5 mi (4.8 km) (one way) trail provides an excellent opportunity to hike through a classic old-growth stand along Lookout Creek.

Both the lower and upper trailheads are located on road 1506, with the lower trailhead less than ¼ mi (0.4 km) east of the junction with spur road 350 (see trailhead symbol on map.)

Carpenter Mountain Lookout Trail

A short 1 mi (1.6 km) walk rewards the hiker with stunning views of the Cascade Mountains and Wolf Rock. Here you can see the clear transition from the highly dissected western Cascades to the much younger high Cascades.

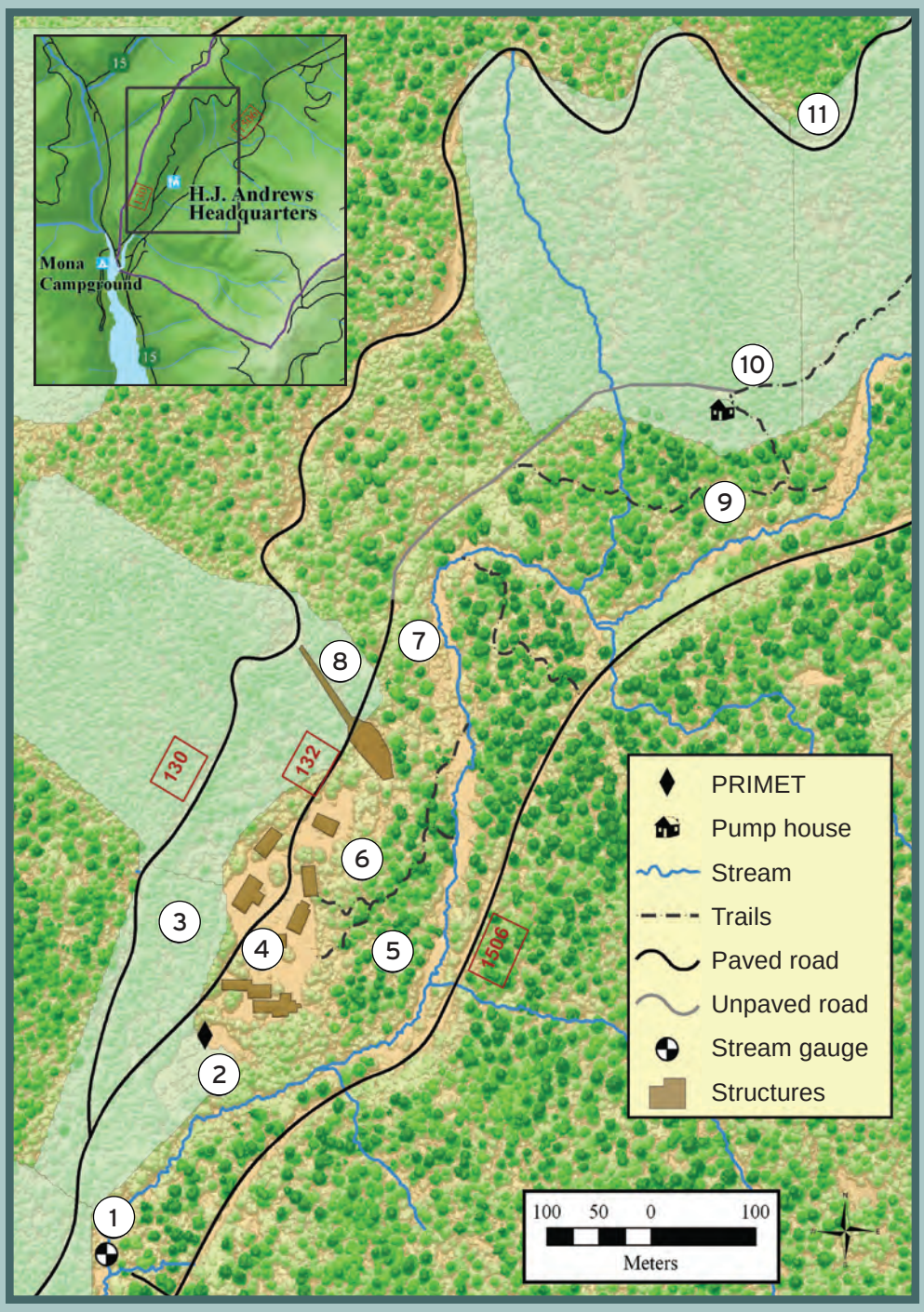
The trailhead is located at the Carpenter Mountain saddle on spur road 350 (see trailhead symbol on map.)

Humanities/Writers

Since the early 2000s, the Andrews Forest research program has collaborated with the 'Spring Creek Project for Ideas, Nature, and the Written Word," Oregon State University, to bring the humanities to the forest. With funding from the Forest Service and several other sources, the Long-Term Ecological Reflections program has engaged dozens of creative writers, philosophers, and religion scholars into the forest to reflect on long-term ecological and human change in settings that include the 200-yr log decomposition experiment, a meandering stream, and a recent clearcut.

Visit the Web site at:
http://andrewsforest.oregonstate.edu/research/related/writers.cfm?topnav=167

H.J. Andrews Headquarters



1 U.S. Geological Survey stream gauging station operating since 1949.

3 Douglas-fir plantation (clearcut in 1963).

4 Headquarters site.

2 The Primary Meteorological Station (PRIMET) was established in May 1972 to measure air and dew point temperature. Solar radiation, wind, precipitation, relative humidity, soil temperature, and snow and soil moisture measurements added in 1998 make PRIMET one of the Andrews' four benchmark weather stations. The site has been part of the National Atmospheric Deposition Program since 1980.

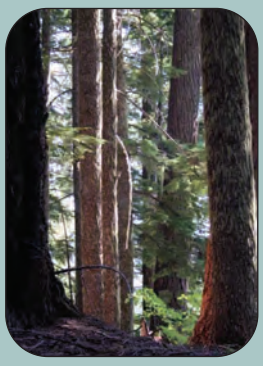
5 Trail to Lookout Creek through old-growth forest with 500-yr-old Douglas-fir in addition to shade-tolerant western hemlock, Pacific yew, dogwood, vine maple, western redcedar, and broadleaf maple.

6 Trees rigged for taking middle and high school students into the canopy for nature and writing instruction and experience through the Canopy Connections program.

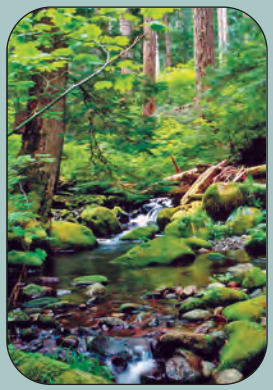
7 Lookout Creek, site of the River Continuum Concept project, where channel change has been tracked since the late 1970s. The gravel bars, vegetation, and big wood in the channel date from the February 1996 flood. This is a Reflection Plot in the Long-Term Ecological Reflections program.

8 U.S. Geological Survey debris flow flume, established in 1991, where the generation and runout of experimental debris flows are studied.

9 The Interpretive Trail passes through old-growth forest windfall gap (winter 2010) and through a 1960 clearcut plantation, which has recently undergone some self-thinning. A short spur trail takes the hiker to the bank of Lookout Creek.



10 Lookout Creek trailhead takes off from next to the pump house and traverses the north side of Lookout Creek.

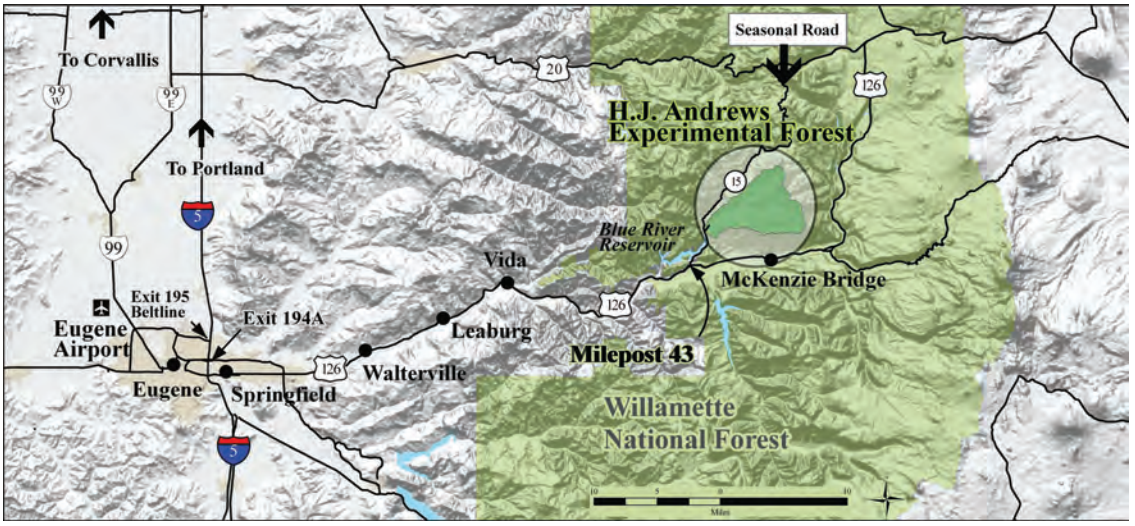


11 View from a cleared area within a clearcut/plantation dating from 1964. The opening provides a fine vista to the south into Watershed 2, a control watershed with a mix of 500-yr-old trees and mature forest of 150 yrs (dating from a moderate-severity fire.)

Here, the ruling trees are Douglas firs, western hemlocks, western redcedars, and Pacific yews, the oldest of them ranging in age from five hundred to eight hundred years, veterans of countless fires, windstorms, landslides, insect infestations, and floods.

—Scott Russell Sanders, Andrews writer-in-residence 2008, *Orion Magazine*, November–December 2009

The Andrews Forest is administered cooperatively by the USDA Forest Service's Pacific Northwest Research Station (PNW), Oregon State University, and the Willamette National Forest. Funding for the research program comes from the National Science Foundation, PNW, Oregon State University, and other sources. The Andrews Forest is one of 81 Forest Service Experimental Forest and Range sites and one of 26 Long-Term Ecological Research (LTER) sites.



Directions to the H.J. Andrews Experimental Forest from Interstate 5 (I-5):

From I-5, take exit 194A (Springfield, McKenzie Highway). Travel east on Highway 126 through the outskirts of Springfield. Turn left at traffic light at junction of 126 and business 126 to continue east along the McKenzie River, and past turnoff to the town of Blue River. Continue 0.75 mi (1.2 km) past milepost 43. Turn left (north) onto Forest Road 15 by the Blue River Reservoir sign. Travel 3.8 mi (6.12 km) along Blue River Reservoir, past Forest Road 1506 and the Lookout Creek Boating Area, and across Lookout Creek Bridge. Turn right on Forest Road 130 at the Andrews Forest Headquarters sign. Travel 0.5 mi (0.8 km) and bear right into the H.J. Andrews Headquarters site.

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For more information: http://andrewsforest.oregonstate.edu/ 541-822-6300