Researching Alongside Fire

The H.J. Andrews Experimental Forest

RESEARCH NOTE

by William G. Robbins

THE LOOKOUT FIRE of August 2023 burned 70 percent of the H.J. Andrews Experimental Forest near the community of Blue River, Oregon, in the upper McKenzie River Basin. The U.S. Forest Service established "the Andrews" — its affectionate nickname — in 1948 to develop strategies for efficiently harvesting old-growth trees and reforesting cutover areas "in the most orderly manner with the least delay."[1] Horace J. Andrews, the forester in charge of the Forest Service's Region 6, lobbied successfully to establish the forest (then named Blue River Experimental Forest), which embraced the entire Lookout Creek drainage of 15,800 acres. In its early years, forest personnel began studying watersheds, gauging stream flows, and building roads with attention to protecting streams from landslides. When Andrews was killed while traveling for the agency in 1951, the Forest Service renamed the forest in his honor and continued research there into snowpack, stream flows, and "experimental cuttings."[2]

Research on the Andrews has evolved from building roads and establishing gauges on small watersheds to participating in the multidisciplinary International Biological Program (IBP) from 1969 to 1974 — which studies "whole systems, such as drainage basins and landscapes through team effort." The IBP revolutionized the Andrews' research programs into a diverse set of studies of streams and forests that transformed it into one of the preeminent experimental forests in the world. Following the IBP, the National Science Foundation (NSF) selected the Andrews as one of its Long-Term Ecological Research (LTER) sites. Beginning in 1980, the Andrews' scientists participated in LTER grants for five-year intervals; in 1990, NSF changed to six-year grants. The number of LTER sites had also grown to twenty-eight.[3]

Under the LTER awards, the Andrews' research broadened and became more complex, its investigations shifting to analyses of tree growth, fish populations, climate, stream data, and much more. Cooperation across scientific disciplines became the watchword for its ecosystem inquiries. Fundamental to

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05_Robbins_HJ Andrews_OHQ 126_4_Winter 2025_2 copy.indd 436 12/2/25 10:20 AM

Rob Mutch / Carpenter Mountain Fire Lookout

FROM THE FIRE LOOKOUT on Carpenter Mountain near Blue River, Oregon, the Lookout Fire burns on August 13, 2023. The lightning-caused fire burned through about 70 percent of the 15,800-acre H.J. Andrews Experimental Forest, where researchers have studied forest health since 1948.

research there were natural and human environmental disturbances — studies of wildfire, flooding, landslides, and windstorms. As climate change advanced, wildfires increased in size and severity in the western Cascades. The Horse Creek Complex and Rebel Fire in the upper McKenzie Valley burned 42,914 acres in 2017. The next year, a fire on the South Fork of the McKenzie River ignited near hot springs at the head of Cougar Reservoir on August 19. Enroute to the Andrews that Sunday afternoon, I noticed a large column of smoke south of Highway 126 that proved to be the human-caused Terwilliger Fire that burned 11,555 acres. During those years, I researched and published an *Oregon Historical Quarterly* (*OHQ*) article and a book on the Andrews, followed by an *OHQ* essay on "The Age of Megafires in the American West" in 2021.[4] This research note updates those publications to include the effects of the Lookout Fire.

When lightning struck the north slope of Lookout Mountain on August 5, 2023, Rob Mutch was stationed as a lookout on nearby Carpenter Mountain and was the first to report the wisps of smoke. With a bird's-eye view

05_Robbins_HJ Andrews_OHQ 126_4_Winter 2025_2 copy.indd 437 12/2/25 10:20 AM

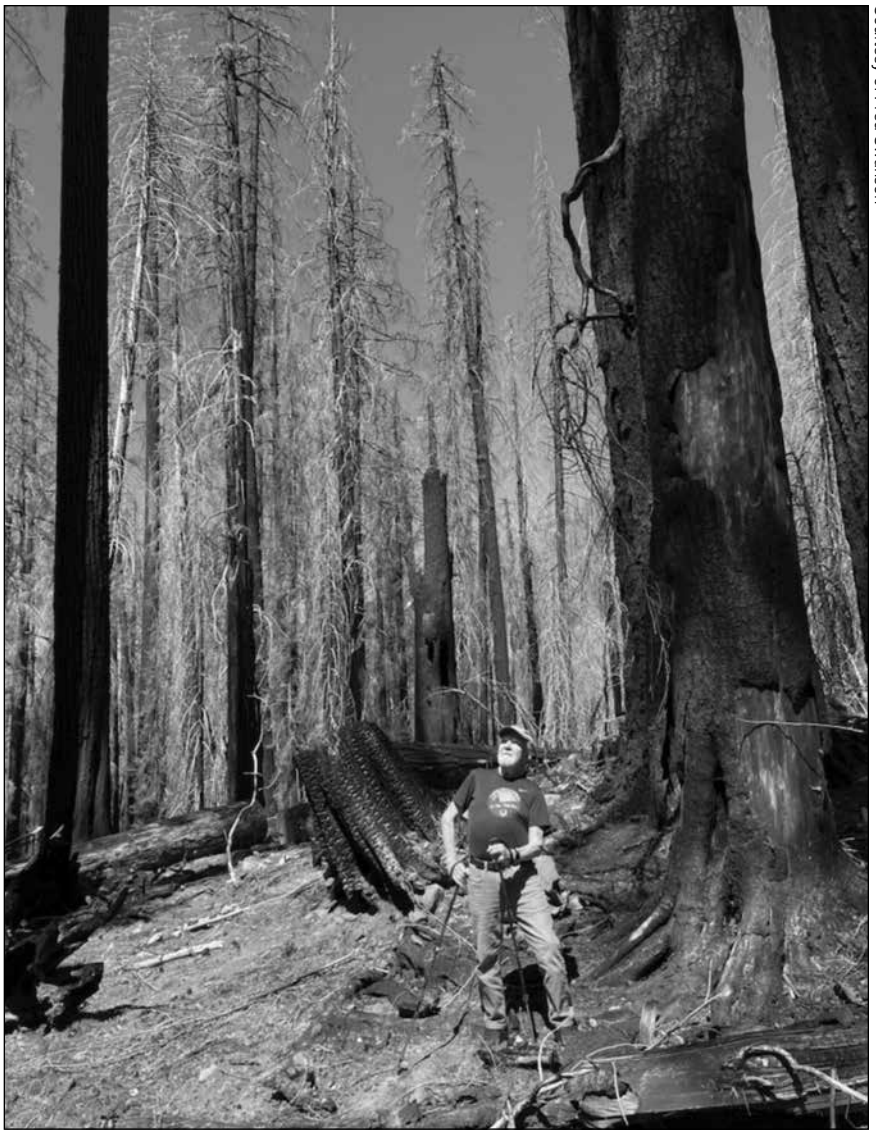
and excellent photographic skills, Mutch tracked and provided commentary and images until he was forced to evacuate on August 18. The incredibly steep terrain and dense vegetation growing under old-growth trees made it unsafe for ground crews to fight the conflagration. The fire spread rapidly, despite the efforts of crews on the ground and in water-dousing aircraft. The place where scientists studied disturbances now confronted the mother of all disturbances, a wildfire that would affect every facet of research and pause the collection of data in some areas. The fire burned over some gauging stations wrapped in protective cover. As *Seattle Times* reporter Lynda Mapes wrote on September 29, the fire marked a "turning point for the H.J. Andrews Experimental Forest, one of the most closely studied forests in the world."[5]

When fall rains slowed the fire in late September, scientists with decades of research in the forest were anxious to return. According to Mapes, the scientists experienced a range of emotions, including "guilt for feeling excited" about what the burned forest had to offer. Matt Betts, the principal investigator (PI) for the current Andrews LTER grant, told Mapes that the Andrews had more "long-term data" than any other forest. The fire left "unprecedented" destruction, although with burns more damaging in some places than others. Mark Schulze, the forest director, cited the work ahead, including identifying old research plots, replacing cables and instruments, and clearing trees and other debris from roads. Schulze also referred to human issues: "There is inherently a lot of suffering. The firefighters breathing incredibly toxic smoke. Selfishly, I worry about my favorite trees."[6]

The Lookout Fire did not burn the Andrews to a crisp, as some believe. The Lookout drainage today reveals a mosaic — large green patches across the forest, areas of reddish-brown with moderate damage, and the severely burned north-facing and south-facing slopes on Lookout Mountain. Speaking over radio station KLCC in Eugene, Betts shared his belief that the Andrews' vast stores of data collected before the fire underscored the need to "collect data afterwards." The hard work would be reestablishing plots and sensors, once it was determined how to fund replacing damaged equipment. Brooke Penaluna, lead Forest Service scientist on the Andrews, believed the fire had the greatest impact on those doing short-term research, especially graduate students with deadlines to meet.[7]

Two years after the fire, Mapes returned in July 2025, observing that the Andrews' research had the potential to "inform the future of other forests burned as wildfire becomes fiercer and more frequent with climate change." The fire, she noted, "ignited a whole new research agenda." Penaluna noticed a greater appreciation for fire, "a balance of fearing and respecting it." She had assisted with the removal of valuable materials in the headquarters library — books, articles, and stuffed spotted owls. Now she was returning everything from storage, but for how long? "I think our new normal is living alongside fire

05_Robbins_HJ Andrews_OHQ 126_4_Winter 2025_2 copy.indd 438 12/2/25 10:20 AM



Courtesy of Fred Swanson

THE AUTHOR surveys the severely burned north side of Lookout Mountain in 2025 at about 4,400 feet in elevation, where the average annual precipitation is about 110 inches a year. The severity of the Lookout Fire in this location, which historically seldom burns, indicates how climate change is influencing fire behavior.

and researching alongside fire." Mark Harmon, former principal investigator and emeritus professor at Oregon State University (OSU), argues that the forest was never destroyed; "it's not lost. It's changed." Although his research plots burned, investigations following the fire may "be more exciting than ever."

05_Robbins_HJ Andrews_OHQ 126_4_Winter 2025_2 copy.indd 439 12/2/25 10:20 AM

There was much to learn, "as long as you throw out everything you think you knew about fire."[8]

Although the Lookout Fire was within the normal range of historical fires over the past several centuries, Betts argues that "climate change loaded the dice; it made it more likely, and more severe."[9] Forest scientists Peter Morrison and Frederick Swanson reconstructed fire histories for the central-western Cascades from 1150 to 1985, gathering records for two areas with different fire regimes. One area, with steep slopes and lower elevation, experienced frequent fires. Another area, with cool and moist conditions and gentle slopes, had less-frequent, once-a-century fires that resulted in stand replacement. The authors indicate that fire regimes differ climatically with slope and aspect. Most of the fires during the nineteenth century in both study sectors were small, however, and since 1900, both of the study areas have rarely burned. The absence of fire for most of the twentieth century may be attributed to the Forest Service's long and active suppression of all fires.[10]

Fires in the western Cascades have increased in size and severity since the mid-1980s. The U.S. Forest Service declared in 2021 that climate change in the Pacific Northwest was causing "increased variability and severity of weather events," creating environments where large fires are common. Wildfires on the wet, western side of the Cascades are now part of "A 'New Normal'." Climate models indicate that conditions for large wildfires will become more frequent. Rising temperatures since the 1980s have contributed to reduced snow levels in the mountains and the likelihood that summers will be longer, warmer, and drier. Because of the changing fire dynamics west of the Cascades in Oregon and Washington, the Pacific Northwest Research Station has launched an extensive effort to promote scientific information about the warming climate and wildfires in the western districts of the two states. The Andrews, and what scientists have learned from its long-term studies, may provide guideposts to help navigate that new normal ahead of us.[11]

The most intriguing document to emerge from the Lookout Fire originated when embers in the Andrews Forest were still smoldering. Some fifty or more scientific researchers, graduate students, and postdoctoral students began meeting monthly, and occasionally in more focused discussions, to pool their thoughts about the long history of research on the Andrews and its vast data sets, and to prophesize about the future. The contributors to what became the "Ecosystem Resilience" paper were continuing the Andrews' long-standing tradition of working across disciplines, and with people from different stages of their careers, to present their collective thinking about a problematic future. Participating in this post-fire exercise represents the spirit of questions from an *OHQ* reader that prompted my writing this research note: "What goes on there now? What flora and fauna live there?"[12]

05_Robbins_HJ Andrews_OHQ 126_4_Winter 2025_2 copy.indd 440 12/2/25 10:20 AM

The "Ecosystem Resilience" consensus expects the Andrews to be "generally resilient to fire since species have evolved with mixed and high severity fire over millennia." Their reasoning contends that "more frequent mixed-severity fires" should increase the biodiversity of the landscape, fitting within the Andrews Forest's "historical range of variation." My belief, however, is that consistently reoccurring, high-severity fires will contribute to a decrease in Douglas fir and western hemlock and a transition to more drought-hardened and fire-resistant trees and shrubs. The fire regimes currently emerging in the western Cascades will be more severe than the "historical range of variation" in previous fires.[13]

NOTES

1. William G. Robbins, *A Place for Inquiry, A Place for Wonder: The Andrews Forest* (Corvallis: Oregon State University Press, 2020), 16.

2. Ibid., 1–20.

3. Robbins, "The H.J. Andrews Experimental Forest: Seventy Years of Pathbreaking Forest Research," *Oregon Historical Quarterly,* 119:4 (Winter 2018): 476, 480–481.

4. *Ibid.,* 35, 39, and 100; Robbins, *A Place for Inquiry, A Place for Wonder,* 39, 43–44, and 71–72, 81–82, 113–114, and 132–135; Robbins, "Oregon and Climate Change: The Age of Megafires in the American West," *Oregon Historical Quarterly,* 122:3 (Fall 2021): 272.

5. Lookout Fire Update August 7 2023, H.J. Andrews Experimental Forest, https://andrewsforest.oregonstate.edu/news/lookout-fire-update-august-7-2023 (accessed November 10, 2025); Lynda Mapes, "Decades of research burned in this Oregon forest. Now it could hold clues to wildfire mysteries," *Seattle Times,* September 29, 2023.

6. Mapes, "Decades of research."

7. Karen Richards, "What is lost and what's to be gained at the H.J. Andrews Forest after the Lookout Fire," *KLCC*, October 16, 2023.

8. Lynda Mapes, "It's not lost. It's changed," Climate Change, *Seattle Times*, July 10, 2025.

9. *Ibid.*

10. Peter H. Morrison and Frederick J. Swanson, *Fire History and Pattern in a Cascade Range Landscape* (U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, PNW-GTR-254, May 1990), 3, 67–68, and 70–72.

11. U.S Forest Service Pacific Northwest Research Station, "A 'New Normal' for West-Side Fire," (2021), https://research.fs.usda.gov/pnw/centers/wsfcari (accessed November 16, 2025).

12. Matt Betts, "Ecosystem Resiliency to Fire in Temperate Rainforest: a priori hypotheses from long-term data," https://d197for5662m48.cloudfront.net/documents/publicationstatus/265753/preprint_pdf/f5af32c1d4c5cbe63693b3d263e1bc6f.pdf (accessed October 21, 2025). This paragraph is gleaned from the Abstract, p. 1. Editor Eliza Canty-Jones forwarded the reader's question to me.

13. Ibid., 10 and 40–43.

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