# Photography and Early Fire Ecology

## *The Life of Harold Weaver*

**BY JAMESON KARNS AND MICHELLE M. STEEN-ADAMS**

**BELOW: The view looking southeast across Quinault River from center of NE 1/4, Sec. 26, T. 23 N, R 10 W. Taken August 21, 1956 (left), and the same view taken May 12, 1972 (right), both by Harold Weaver.**

*Fire ecologist Harold Weaver was a pioneer in several ways. One of them was the practice of using his camera to document the ecological role of fire.*

Tucked into the first footnote of the 1943 *Journal of Forestry* article was an unusual statement. Normally, such a citation gives nothing more than the author's professional title—in this case, "Forest supervisor, Colville Indian Reservation, Nespelem, Wash." This note added a disclaimer apparently required by the author's employer: "The author writes from a background of 17 years' of varied experience on the national forests and Indian reservations of the Pacific [Northwest]. This article represents the author's views only and is not to be regarded in any way as an expression of the attitude of the Indian Service on the subject discussed."[1]

That his employer, the Indian Service's Branch of Forestry, wanted distance from Weaver was one thing. The journal's editors also sought to distance the publication from what he had to say. The editor's note at the beginning of the article made clear that what followed—the hypothesis that "the complete prevention of forest fires in the ponderosa-pine region of the Pacific Slope has certain undesirable ecological and silvicultural effects"[2]—would be unpopular, controversial, and bordering on taboo. Weaver used photographs of forest stand conditions in field surveys to demonstrate that fire (both natural and human caused) performed essential ecological and silvicultural functions, such as forest regeneration, stand density management, and hazard reduction. His controversial assertion and approach—which also included fire history based on tree-ring information dating back hundreds of years—ultimately contributed to the establishment of present-day principles of fire ecology.[3]

The article appeared during what recently has been characterized as federal land management agencies'

FOREST HISTORY SOCIETY PHOTOGRAPH COLLECTION, WEAVER_48 (LEFT), WEAVER_49 (RIGHT)

"systemization-centralization stage" (1924–1970s), when forest laws and policies were designed to achieve forest protection through a centralized organizational structure and systematic procedures of fire monitoring, recordkeeping, mapping, and research.[4] This was also the era of the U.S. Forest Service's full embrace of fire suppression—formalized in 1935 with the so-called 10 a.m. policy, which directed foresters to suppress every wildfire by midmorning after its initial report. Other agencies, including Weaver's employer, quickly adopted it.[5]

Not everyone, however, was convinced that suppression was the best policy. Reassessing the ecological role of fire in western dry conifer forests quietly began in the late 1920s. Although Weaver was not the first to question the suppression policy, he was in the vanguard. He began to probe the forestry profession's (and the U.S. Forest Service's) established practice of fire suppression shortly after being hired by the Branch of Forestry of the Indian Service in 1928. He experimented with prescribed fire on the reservation lands of several Native American tribes in the Pacific Northwest and conducted inquiries about prescribed fire throughout his forty-year career (1928–1967), most of which was spent in that region.[6] Weaver's reasoning was disarmingly simple: his observations indicated that fire could have beneficial effects on the region's forests. He observed that under certain ecological conditions in dry conifer forest types, the effects on tribal forest resources were not catastrophic; to the contrary, on certain sites, fire reduced fuels and initiated understory reproduction of shade-intolerant pines.[7] This was the argument in his 1943 article. Weaver's chief challenge was how to convey to foresters the ecological and management insights from his years of observation and documentation. How he overcame that obstacle is part of his legacy.

Influencing Weaver's development of pathbreaking ideas in fire ecology and forest management are biographical factors—specifically, the interplay of his experience, beliefs, and knowledge with the federal agency, tribal reservations, and forestry associations of his professional life.[8] We use this framework to examine how his understanding of the role of wildfire developed. We consider three main influences: experiences during the early stages of his life, organizational factors of the agency for which Weaver worked, and collegial relationships with forest scientists, particularly entomologist F. Paul Keen and fire ecologist Harold Biswell.

## CHILD OF THE BLUE MOUNTAINS

Harold Amos Weaver was born on March 18, 1903, and was raised in the small town of Sumpter, Oregon. Sumpter lies between the Wallowa-Whitman and the Umatilla national forests, in the Blue Mountains of northeastern Oregon.[9] In the late nineteenth century, the Weaver family had relocated from Indiana to this small mining community. Harold's parents, Amos and Edna, joined by Amos's brother Joseph, hoped to make their fortunes in the unexplored riches hidden in the Blue Mountains. Sumpter was a boom-or-bust mining town that experienced wide swings in economic and demographic conditions as gold deposits were discovered and exhausted. The Weaver brothers had purchased a small mining claim at the turn of the twentieth century in what is now the Buck Gulch Weaver Mine, just outside Sumpter.[10]

Harold Weaver attributed his love for forestry to his childhood in the Blue Mountains. He spent much of his youth exploring the forests around the town alone "with my dog and .22 rifle."[11] He was joined occasionally on these outings by one of his childhood friends, Brooks Hawley, who later became a historian of the area's gold mining industry.[12] The forest landscape Weaver explored was dominated by early- to mid-successional stands, which had developed after timber harvesting for construction of the railroad that connected gold deposits in the Sumpter Valley to Sumpter. As Weaver recalled,

> The foothills around Sumpter and lower elevations of the valley had been heavily cutover for yellow (ponderosa) pine, and large-scale logging by that time had migrated to Whitney and Bates, along the narrow gauge Sumpter Valley Railroad. Most of this cutover was restocking to pine . . . Later there came expeditions to the higher mountains. Most inspiring were views of the blue, seemingly endless forest covered ridges and isolated groups of higher, snow-flecked mountains. This background provided primary motivation for selection of forestry as a career.[13]

His explorations in the Blue Mountains came to an end early in his teenage years. His parents sent him to live with relatives in Goshen, Indiana, to attend high school.

At that time, the Weaver family faced a series of calamities that left them nearly destitute. The family's Buck Gulch mine yielded some promising deposits but not enough to support the family. Because the mine lacked a reliable water source, making large-scale operations impossible, the Weaver family invested a small fortune to construct a series of irrigation ditches that would connect their mine with Gray's Gulch, a local waterway.[14] The irrigation system was never completed to the satisfaction of Amos Weaver, and mining operations were limited by seasonal water flow. Harold Weaver recalled:

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**The Weaver family cabin next to Buck Gulch Weaver Mine in Sumpter, Oregon, ca. 1909. Harold, Edna, and Amos Weaver, at the far left, are joined by community members.**

My father was an active partner in ownership of a group of placer claims, and it was his responsibility to initiate mining at the earliest possible date in the spring after winter snow could be cleared from about five miles of water ditch and wooden flumes along steep mountain sides. Once water flowed the men worked day and night in hydraulic mining of a gold-bearing gravel deposit of an ancient river channel, high on a mountain slope. Usually, about July 4th, the water supply became inadequate for further mining.[15]

Seeking to diversify the family's livelihood, Amos began purchasing local farmland.[16] In 1917, however, Sumpter—already on hard times and declining along with the mining business—faced a disaster from which it never recovered.[17] A fire in a downtown hotel spread to most structures in the downtown district, destroying twelve blocks and leaving Sumpter "merely a city of chimneys and tottering brick and stone walls."[18] In the aftermath, Amos relocated his family to Riverside, California.

After completing high school, Weaver attended Oregon State College (now Oregon State University), where he earned a forestry degree. During the summers, he worked part-time as a forest surveyor in California and Oregon. Weaver was inducted into the college Forestry Honors Society.

After graduating in 1928, Weaver accepted a position as junior forester with the Klamath Division of the

Branch of Forestry of the Indian Service. He was stationed at a small forestry camp in the Beatty Precinct of Klamath County. As the only forester at the camp, Weaver supervised twenty forest laborers. The timing of the job offer was fortuitous: a year after he was hired, in October 1929, the stock market crashed, initiating the Great Depression and massive unemployment.

## THE WILDFIRE QUESTION

Weaver's understandings about fire ecology evolved in the context of the administrative history of his employer and the Native tribes whose forest resources it managed.[19] Established in 1910, the Branch of Forestry of the Indian Service was authorized to manage tribal timber.[20] Two main principles of federal Indian policy guided the agency's forestry: first, that the sale of timber products on lands held by Indian landowners could benefit tribes,[21] and second, the doctrine of trust responsibility—based in the unique, historical relationship between the U.S. and Indian tribes—which established the obligation of the federal government to ensure the protection of tribal lands, resources, and assets, and to provide services to federally recognized tribes. The scope of tribal trust responsibility included provision of technical forestry services to administer, manage, and protect tribal timber from loss due to wildfire and insect outbreak, and thereby sustain tribal employment and income. Weaver sought to identify practices that could promote a sustained yield and maximize economic and employment returns for tribes.

From the time of its establishment and for the next half-century, the Forestry Branch held to a policy of wildfire suppression to protect tribal forest resources. It focused on forest conservation and protection from fire—particularly fires sparked by logging operations. After World War II, forest planning promoted sustained yield, with fire protection remaining a central activity.[22] As a junior employee, Weaver was expected to adhere to the suppression policy. In addition, his forestry training reinforced the fire suppression paradigm. In his undergraduate thesis, "Slash Disposal in the Western Yellow Pine Forests in Oregon," he had synthesized the literature on the best practices both to get rid of slash and to protect slash from fire, thereby promoting the continued productivity of ponderosa pine lands in Oregon and Washington—at the time, a hundred thousand acres of harvest area per year. Years later, reflecting on his undergraduate forestry training, Weaver observed, "I graduated from Oregon State in 1928, thoroughly imbued, at that time, with the incompatibility of pine forestry and fire."[23] It was his experiences during the first five years of his career that gave shape and cause to his life's work. Weaver's willingness to learn from experienced field staff and woodsworkers and his open-mindedness led him to challenge the fire suppression paradigm. His rethinking, spelled out in subsequent publications and presentations, had ripple effects in the agency and the community of professional foresters.[24]

Harold Weaver's first duty station for the Forestry Branch was at the Klamath Indian Reservation, in south-central Oregon.[25] Conversations with woodsmen of the area—people who had accrued knowledge through years of first-hand experience—exposed Weaver to viewpoints that ran counter to the forestry principles of his undergraduate training and of the profession:

> As a forester on the Klamath Indian Reservation in southern Oregon, I met a number of older, nontechnical woodsmen, who considered the policy of attempted total fire exclusion a serious mistake. None of them, however, could explain to my satisfaction how the forest could be regenerated under a regime of frequent light burning. I do recall that a logging superintendent told me that earlier fires were usually of lighter intensity, that they crept slowly about through the needles and dry grass, and that they spared many of the young trees.[26]

The local woodsmen's viewpoints lacked the credibility of the scientific, technical basis of professional knowledge. By the time Weaver was hired, the Forest Service had been conducting research on light burning in California for nearly two decades, and the results nearly always criticized it or favored fire suppression. In the early 1920s, agency leaders were openly condemning the practice of "light burning"—derisively calling it "Paiute forestry" in print to associate it with Native American burning practices—as a management tool and would continue trying to stamp out the practice until the 1970s.[27]

A 1930 meeting with Frederick Paul Keen, a Forest Service entomologist and forester, was a turning point in Weaver's understanding about the ecological role of fire in dry conifer forests of the Pacific West. Keen, a graduate of the University of California–Berkeley, had earned recognition among foresters for his pioneering research on bark beetles in pine forests.

Keen and Weaver developed a close and mutually beneficial professional relationship. Taking an interest in the Keen's bark beetle studies, Weaver began studying the insect's effects on the Klamath Indian Reservation in 1932 and generating data that Keen used in subsequent work.[28] Keen supported Weaver's view that recurring fire events benefited the area's forest

U.S. FOREST SERVICE, PACIFIC NORTHWEST REGION, STATE AND PRIVATE FORESTRY, FOREST HEALTH PROTECTION, COLLECTION: BUREAU OF ENTOMOLOGY, PORTLAND STATION COLLECTION, LA GRANDE, OREGON. IMAGE: PS-57

**Meeting Paul Keen in 1930 proved a turning point in Harold Weaver's understanding of the ecological role of fire. In October 1930, Keen (standing) and Weaver visited the Klamath Indian Reservation, a place central to their work.**

stands by moderating hazardous fuel accumulation and promoting conditions that favored understory pines rather than shade-tolerant forest species—a perspective that contradicted the forest management policy of the U.S. Forest Service. When Weaver asked how Keen had reached this conclusion, Keen responded by picking up his ax and taking Weaver into the woods.

> To my stock query concerning how the forest could be regenerated he (Keen) invited me to examine with him a nearby stand of pole-size reproduction. Though these trees had originated about the beginning of the century, a number, widely scattered, showed fire scars near the ground surface. Sectioning of these with a sharp axe revealed that there had been several fires, the first occurring when the trees were quite small.[29]

Weaver did not have much time to investigate these theories of "light burning" in Oregon, however: he was transferred from Klamath to Nespelem, Washington, promoted to forest assistant, and assigned to a unit in the new Civilian Conservation Corps (CCC). Established by President Franklin D. Roosevelt in March 1933, the CCC employed thousands of men in forest management, infrastructure projects, and fire suppression efforts on public lands.[30] Weaver's CCC unit was based out of the then-Colville Indian Agency. Native Americans probably constituted most, if not all, of the workers on the Colville CCC unit. The primary task for Weaver's crew was to inspect and mitigate bark beetle damage at the Klamath, Colville-Spokane, Warm Springs, and Yakima reservations. Weaver was pleased to learn that the project would involve collaboration with Keen.[31]

Weaver and the crew were granted a unique authority in the "battle to conserve the Indian's forests" against the "insect enemy": they were allowed to burn infested trees to "destroy such a high percentage of the destructive beetles that the aggressive character of the outbreak will be broken."[32]

## WEAVER'S PHOTO DOCUMENTARY METHOD

To document the ecological role of fire, Weaver chose a surprisingly simple instrument: a 1930s Zeiss camera. His methods were simple and straightforward, yet effective. His goal was to document how fire affected forest regeneration and stand (and landscape) conditions over time. Rather than submit his work to journals of forestry or range management, he mostly chose to share his empirical insights with agency administrators.

Weaver identified regions in the Pacific Northwest that had been affected by "light burn," wildfires of low to medium severity. He would then hike to a nearby vista or clearing from which he could shoot the burned area. He used black-and-white Kodak film in his trusty Zeiss—he called it "the camera that never failed."[33] After taking images in varying apertures, Weaver recorded the location, time, date, camera settings, and personnel present—information he considered critical because he intended to photograph his study sites at least every ten years after their initial burn.[34]

With a series of photos in hand, he would develop and enlarge the negatives into large-print photographs that filled most of a standard 8.5-by-11-inch page. The images were then cropped with a small utility knife and mounted on sheets of cardstock, with captions giving the location and date. He then placed the sheets in a three-ring binder. The last page was reserved for a topographical map that he stenciled and colored. Reviewing these handmade field trip reports with minimal text, present-day readers can easily overlook that they are administrative documents. Indeed, the experience is akin to walking through a self-guided photo exhibit. To Weaver, the photos surveys were living documents that would never be completed: each site required continuing sequels.

Weaver's audience included both advocates and detractors of fire ecology. His goal was to present the effects of fire over time in a simple and approachable format. By providing a well-documented body of evidence to his supervisors and other forestry professionals, he won approval for the majority of his light burning projects.[35]

## KEEN, BISWELL, AND TALL TIMBERS

For some Forestry Branch administrators, Weaver's photo survey reports prompted reconsideration about the ecological role of fire; however, his fellow foresters were not easily swayed. In the early 1940s, he began drafting the manuscript "Fire as an Ecological and Silvicultural Factor in the Ponderosa-Pine Region of the Pacific Slope." He knew that publishing a paper on the favorable aspects of forest fires would be difficult, but he was emboldened by his friend Paul Keen, who advised him to use the techniques from his binders—demonstrate and convey first-hand experience. Despite Weaver's hesitations, the article would become his most influential publication—and it helped forge an enduring friendship.

In "Fire as an Ecological and Silvicultural Factor," he used data from published studies by Keen in Oregon and two other researchers in California to make the case that fire was needed in ponderosa forests.[36] The tree-ring evidence they provided showed that fires occurred cyclically, and that fire—whether caused by

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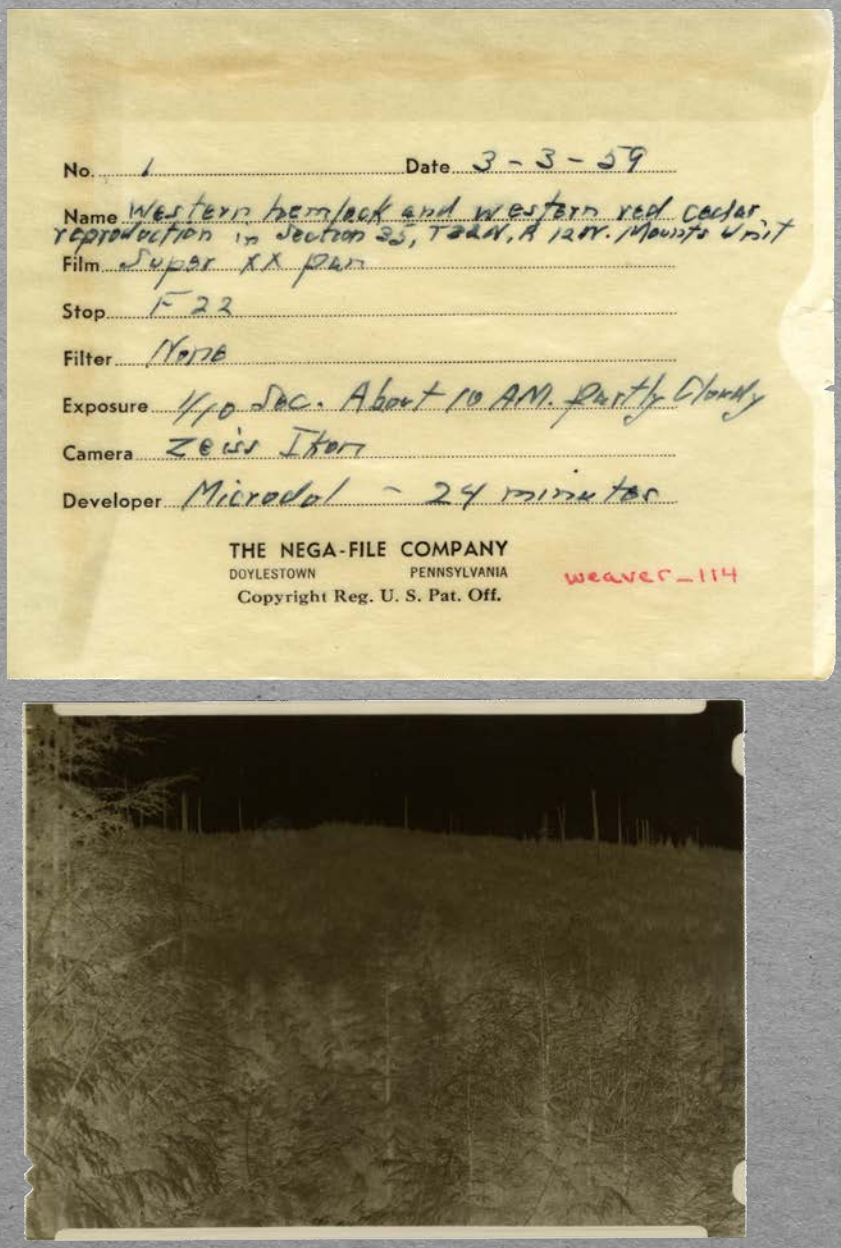
**Unnamed members of Weaver's CCC "spotting" and burning Native American crew. Klamath and Warm Springs Surveys, 1938.**




FOREST HISTORY SOCIETY; HAROLD WEAVER PHOTOGRAPH COLLECTION, WEAVER_114A

**An example of Harold Weaver's archival methods using Kodachrome negative slides. He recorded every detail, including time of day and weather conditions, when taking photographs so that he could easily take photos from the same spot years later.**

lightning or humans—had helped to maintain a healthy ponderosa pine forest. He then explained why and how excluding fire had made stands prone to destructive pine beetles and severe fire, before offering examples of how light fires had beneficially thinned the forest. "Everywhere are the groups of thrifty mature, mature, and overmature trees with their tree-ring record of fires of long ago," he declared. "The evidence is there for those who care to investigate."[37]

Next came the visual evidence: four comparative photos from Washington and Oregon that enabled readers to draw the obvious conclusion. But in case they did not reach the same conclusion, he spelled it out: "The present deplorable and increasingly critical conditions in vast areas of the region are proof that foresters have not solved the silviculture problems of ponderosa pine, and to continue present policies will further aggravate an already serious situation." Correcting these conditions, he warned, "constitutes a growing challenge to the professional forester and is a job worthy of the best minds in forest research."[38]

It was Harold Biswell, a Forest Service researcher, who fit that description. Born in Fayette, Missouri, Biswell had been working in Georgia since 1942, "where he became acquainted with controlled burning in pinelands as it was being introduced in the 1940s."[39] In 1947, he received a teaching and research position in the Department of Forestry and Conservation at the University of California–Berkeley and would go on to advocate for the use of light burning.[40] When he arrived, however, Biswell found that prescribed fire was not an accepted practice in California's forests. Foresters offered no resistance to his studies on grasslands and shrublands, but the response to his fire ecology investigations changed when he shifted the focus to ponderosa pine forests.[41] State and federal fire suppression authorities were so outraged that Biswell was introducing controlled burning to students, researchers, and ranchers that they demanded the university stop him. They failed.[42]

All of that was in the future, however. On reading Weaver's 1943 article, Biswell wrote to him. "The Harolds," as they would come to be known, began a professional collaboration in which they would review each other's manuscripts and projects and commiserate with each other's trials.[43] (And they also developed a close friendship. Their families frequently vacationed together.) Weaver's photos provided a critical and integral component of Biswell's publications.[44] The duo became particularly influential with the researchers who attended the

FOREST HISTORY SOCIETY, HAROLD WEAVER PHOTOGRAPH COLLECTION

**Three pioneers in fire ecology gather at the 1967 Tall Timbers Conference: Harold Weaver, Herbert Stoddard, and Harold Biswell. Stoddard worked in southern Georgia and northern Florida.**

Tall Timbers Research Station fire ecology conferences, held in Florida starting in 1962. The conferences served as a forum outside the control of the forestry profession and the Forest Service (and even the federal government) for foresters and others to discuss burning techniques around the world.[45]

## WEAVER'S LEGACY

By 1951, Harold Weaver had been promoted to a senior position in the Forestry Branch of the Bureau of Indian Affairs and had been reassigned to Arizona. However, his passion for the Pacific Northwest never dimmed. After three years in Arizona, Weaver took a position in the nation's capital as the assistant chief of the region. Weaver transferred once again in 1954 to serve as area forester of BIA's area in Portland, Oregon.[46] Unfortunately, the position kept him from the forests he loved. The position was primarily administrative, as he was tasked with "investigating economic aspects of planning for more intensive management of Indian reservation forests."[47] In this capacity, he wrote the "Weaver Reports," which are now widely recognized by the agency. The reports, a series of memoranda, called attention to the poor support for staffing of the BIA forestry division by comparing it with Forest Service districts of a similar size.[48] Additionally, during the 1960s, Weaver became more active with Tall Timbers publications and conference attendance. Though no longer on field duty, he also allocated time to update his forest survey photograph reports.

In 1967, after nearly four decades in forestry, Weaver retired. Reflecting on his career to colleagues, Weaver highlighted the importance of expanding forest fire research to include Native American and private landowner perspectives.[49] He understood that these landowners had varied and dynamic relationships with wildfire. As he summarized in a 1964 paper at a Tall Timbers conference, they had the ability to inform forestry "because we, as foresters, are still inexperienced" in the application of fire.[50]

As a pioneer in the field of fire ecology, how should foresters and historians engage with the legacy of Harold Weaver? His photo documentary and forest survey approach has been adopted by others with some success.[51] Over the years, Weaver's career-defining photo essays have migrated to three archives: the Forest History Society in Durham, North Carolina; the Bancroft Library in Berkeley; and the National Archives branch in Seattle. Weaver's rich archival record suggests that he hoped his work would serve as living documents that would be revisited and reassessed by each generation. As Weaver explained, "Before you begin to study the ecological role of fire in an area, be sure to gather information of fire history."[52] Perhaps this is the best way to honor the legacy of Harold Weaver—to continue reexamining and documenting changes in forests and sharing the findings, from which we can draw our own conclusions about the role of wildfire in forest management under current climatic and forest structural conditions.

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## NOTES

1. Harold Weaver, "Fire as an Ecological and Silvicultural Factor in the Ponderosa-Pine Region of the Pacific Slope," *Journal of Forestry* 41, no. 1 (1943): 7.
2. Weaver, "Fire as an Ecological and Silvicultural Factor," 7.
3. Jan W. van Wagtendonk, "Introduction to H. Weaver's Article," *Fire Ecology* 10, no. 1 (2014): 1–2; Stephen F. Arno, "Slow Awakening: Ecology's Role in Shaping Forest Fire Policy," *Forest History Today* Fall 2017: 17–18.
4. The systemization-centralization stage was preceded by the establishment stage (1905–1924 for the U.S. Forest Service, 1910–1924 for BIA) and followed by the reevaluation stage (1970s–1990s). Michelle M. Steen-Adams, Susan Charnley, and Mark D. Adams, "Historical Perspective on the Influence of Wildfire Policy, Law, and Informal Institutions on Management and Forest Resilience in a Multi-ownership, Frequent-fire, Coupled Human and Natural System in Oregon, USA," *Ecology and Society* 22, no. 3 (2017), https://doi.org/10.5751/ES-09399-220323.
5. Stephen J. Pyne, *America's Fires: A Historical Context for Policy and Practice* (Durham, NC: Forest History Society, 2009), 35.
6. Weaver's professional appointments were junior forester (1928–1933); manager of Civilian Conservation Corps projects, based in the regional office in Spokane (1933–1940); forester of the Colville Agency (1940–1948); area forester, based in Phoenix (1948–1951); assistant chief, Branch of Forest and Range Management, based in Washington, DC (1951–1954); and area forester, attached to the Washington office but based in Portland, Oregon (1954–1967). Forest History Society, online finding aid for Inventory of the Harold Weaver Notebooks, 1942–1967, Forest History Society Archives, Durham, NC, https://foresthistory.org/research-explore/archives-library/fhs-archival-collections/inventory-harold-weaver-notebooks-1942-1967.
7. Harold Weaver Notebooks, "Field Trip to Warm Springs Reservation, June 9–11, 1958." For a fuller discussion, see Steen-Adams et al., "Historical Perspective."
8. The methodology that we have used to develop this biographical sketch draws on the subgenre of environmental biography. Aldo Leopold biographer Curt Meine defined this as the "exploration of individual lives in the context of landscape and lives, seeking insight from the connections between personality and place." See Curt Meine, "Bio(graphical) Diversity," *Conservation Biology* 17, no. 4 (August 2003): 1180.
9. The Blue Mountains, which span about fifteen thousand square miles mainly in northeastern Oregon and extend into southwestern Washington, constitute about one-sixth of the land area of Oregon and is the state's largest ecoregion. "Blue Mountains," *Oregon Encyclopedia*, https://www.oregonencyclopedia.org/articles/blue_mountains/.
10. J. T. Pardee, "Some Placer Gravels of Eastern Oregon," *Northwest Mining News* 6 (1909).
11. Harold Weaver, "Fire and Its Relationship to Ponderosa Pine," *Proceedings of the Seventh Tall Timbers Fire Ecology Conference* (Tallahassee: Tall Timbers Research Station, 1968), 128.

12. Brooks Hawley and Melvin L. Kathan, *Gold in Sumpter Valley* (Portland, OR: Cascade Printing Services, 1967); Brooks Hawley, *Gold Dredging in Sumpter Valley* (Baker, OR: Baker Printing and Lithography, 1977); U.S. Forest Service, Wallowa-Whitman National Forest, *Final Environmental Statement, Burnt Powder Planning Unit: A Land Management Plan* (USDA Forest Service, Pacific Northwest Region, 1979), 229–30.
13. Weaver, "Fire and Its Relationship to Ponderosa Pine," 128.
14. "Oregon-Sumpter," *Mining and Engineering World* 43 (1915).
15. Weaver, "Fire and Its Relationship to Ponderosa Pine," 127.
16. "Small Tracts Are Sold," *Sunday Oregonian*, June 22, 1913.
17. Ralph Friedman, *Oregon for the Curious* (Caldwell, ID: Caxton, 1972), 202.
18. Addison Bennett, "Old Town Mass of Ruins," *Sunday Oregonian*, October 21, 1917.
19. The Bureau of Indian Affairs provides services to federally recognized tribes and is responsible for the administration of reserved tribal lands ("Indian reservations") held in trust by the United States on behalf of American Indian, Indian tribes, and Alaska Natives. Established in 1824 as the Office of Indian Affairs of the War Department, the agency was transferred in 1829 to the newly created Department of the Interior. The agency has had several names: Indian Service, Indian Office, Indian Agency, and as of 1947, Bureau of Indian Affairs. In 2021, there were 574 federally recognized tribes and 324 reserved Indian lands (reservations, villages). Many federally recognized tribes do not have reserved lands. BIA administers fifty-five million acres of surface lands and fifty-seven million acres of subsurface mineral estates held in trust on behalf of American Indian, Indian tribes, and Alaska Natives. In addition to federally recognized tribes, there are state-recognized tribes and many tribes that do not have federally recognized status.
20. In 1909, Congress authorized funds ($100,000) to the Commissioner of Indian Affairs for forestry activities on Indian reservations, including "to advise the Indians as to the proper care of forests, and . . . timber operations and sales of timber" [act of March 3, 1909 (35 Stat. 783)]. The paternalistic language is noted. An act of June 25, 1910 (25 USC § 406), authorized the owner(s) "with the consent of the Secretary of Interior" to sell timber on Indian lands, "and the proceeds . . . shall be paid to the owner . . . for their benefit under regulations prescribed by the Secretary of the Interior." Theodore Catton, *American Indians and National Forests* (Tucson: University of Arizona Press, 2016), 48. Steen-Adams et al., "Historical Perspective"; Alan Newell, Richmond Clow, and Richard Ellis, *A Forest in Trust: Three-Quarters of a Century of Indian Forestry, 1910–1986* (Washington, DC: Litigation Support Services for the Division of Forestry, Bureau of Indian Affairs, 1986), 2–22.
21. In practice, the sale of tribal timber under Indian Service forest management often did not return anticipated benefits to tribes; indeed, adverse outcomes often occurred. Michelle M. Steen-Adams, Nancy Langston, and D. J. Mladenoff, "Logging the Great Lakes Indian Reservations: The Case of the Bad River Band of the Ojibwe," *American Indian Culture and Research Journal* 34, no. 1 (January 2010): 41–66.
22. In broad terms, the branch's administrative history can be divided into four periods: (1) Depression-era forestry, when the agency was developing and forest conservation and fire protection were emphasized (1910–1945); (2) post–World War II forestry, when forest planning to promote sustained yield became prevalent (1945–1960); (3) intensive forest management, when replanting and intensive harvesting sought to maximize forest yields (1960s); and (4) tribal self-determination and transition (1970s–present). Weaver's career spanned the first through third periods.
23. Weaver, "Fire and Its Relationship to Ponderosa Pine," 128.
24. Steen-Adams et al., "Historical Perspective"; H. A. Weaver, "Potential for Intensive Timber Management on the Warm Springs Indian Reservation, Oregon, Forestry 326-65, Pt. 1-H, Bureau of Indian Affairs," Archives of the Resource Management Division, Confederated Tribes of Warm Springs, Warm Springs, Oregon.
25. The Treaty of 1864 merged the Klamath, Modoc, and Yahooskin tribes into a single "Klamath Tribe" and onto the Klamath Reservation. In 1954, Congress passed the Klamath Termination Act—despite tribal and BIA protestations—resulting in the termination of federal government services to the tribe and eventual conversion of reservation lands to the National Forest System of the U.S. Forest Service. Robert Donnelly, "Klamath Indian Reservation," *The Oregon History Project*, 2003, https://www.oregonhistoryproject.org/articles/historical-records/klamath-indian-reservation/#.YZWvip7MI2w.
26. Weaver, "Fire and Its Relationship to Ponderosa Pine," 128.
27. In 1920, Chief Henry Graves and his associate chief and immediate successor, William Greeley, published articles in the industry journal *The Timberman* two months apart using the term in the titles. Pyne, *America's Fires*, 24, 29–30; Stephen Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (Seattle: University of Washington Press, 1997), 103–10.
28. R. P. Keen, "Annual Report of the Forest Insect Conditions in Oregon and Washington," Bureau of Entomology, Portland, Oregon, 1934.
29. Weaver, "Fire and Its Relationship to Ponderosa Pine," 129.
30. David Carle, *Burning Questions: America's Fight with Nature's Fire* (Westport, CT: Praeger, 2002), 60.
31. "Annual Report of the Forest Insect Conditions."
32. "Indians Conserving and Rebuilding Their Resources through CCC-ID: Northwest Indians Attack Deadly Pine Beetle," *Indians at Work* 7, no. 9 (1940), 32–33.
33. Correspondence to H. Biswell, 1970, Harold H. Biswell Papers, Bancroft Library, University of California–Berkeley.
34. Harold H. Biswell, *Prescribed Burning in California Wildlands Vegetation Management* (Berkeley: University of California Press, 1989), 108.
35. Newell, Clow, and Ellis, *A Forest in Trust*, 279.
36. Weaver, "Fire as an Ecological and Silvicultural Factor," 7; Van Wagtendonk, "Introduction to H. Weaver's Article," 1.
37. Weaver, "Fire as an Ecological and Silvicultural Factor," 8–9.
38. Weaver, "Fire as an Ecological and Silvicultural Factor," 13–14.
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40. Carle, *Burning Questions*, 59.
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