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# Landscape and the Intermontane Northwest: An Environmental History

William G. Robbins and Donald W. Wolf



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# **Landscape and the Intermontane Northwest: An Environmental History**

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From Volume III: Assessment

Pail F. Hessburg, Science Team Leader and Technical Editor

## **Eastside Forest Ecosystem Health Assessment**

Richard L. Everett, Assessment Team Leader

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## ABSTRACT

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Traces the natural and cultural processes involved in shaping the environment in the intermontane northwest from the Indian period of domination to the present. Emphasizes the increasing influence of humans as modifiers of landscapes and ecosystems, especially with the coming of the market system to the region and the onset of the industrial era. Focuses on the unique aspects of ecological change in the intermontane region: the very recent extension of the market system to the area; and the very rapid expansion of human-induced environmental disturbance over very extensive areas in a very brief span of time.

**Keywords:** Environment, modification, market system, cultural stability, fire, horse, reconnaissance surveys, railroads, Euro-americans, Native Americans, timber, sawmills, grazing.

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# **Landscape and the Intermontane Northwest: An Environmental History<sup>1</sup>**

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**by**

**William G. Robbins and Donald W. Wolf**

<sup>1</sup>A report for the USDA Forest Service, Pacific Northwest Research Station, Supplemental Agreement PNW 93-0304, "Historical Perspectives on Human Use of Eastside Forest Ecosystems."



*The strong tendency to be concerned only with the present or near future carries with it the serious danger that . . . we shall fail to put enough weight on the long-term and secondary effects of our actions; that we shall do further damage to the very machinery of resource production that we seek to repair.*

E. I. Kotok<sup>2</sup>

From time immemorial, people have been great modifiers of the ecological niches they occupy. That observation is also a proper fit for the prehistoric period in North America, where archaeological evidence shows purposeful human manipulation of the environment to be an incontestable fact.<sup>3</sup> Indeed, the great weight of scientific evidence and hypotheses argues against the notion of the Americas as a pristine, Edenlike world where the human imprint was barely perceptible.<sup>4</sup> Scholarly research in the last two decades indicates the existence of sizable prehistoric populations in the Western Hemisphere and considerable human modification to forest, riverine, prairie, and basin landscapes. Amerindian people influenced the extent and composition of forests, established and expanded grassland areas, and altered landscapes through a myriad of human devices. According to geographer William Denevan, the important question is “the form and magnitude of environmental modification rather than ... Whether ... Indians lived in harmony with nature with sustainable systems of resource management.”<sup>5</sup>

Although it is generally acknowledged that human environmental influences in prehistoric North America were considerable, it is now widely understood that the Columbian encounter triggered vast biological and technological changes with worldwide repercussions. After the event of 1492, a developing global network of economic and biological exchanges emerged whose “international energy flows,” according to Karl Butzer, favored the emerging centers of the industrial revolution; as the industrializing sector expanded its technological reach, forces were set in motion that introduced immense social and environmental changes worldwide.<sup>6</sup> To point out the obvious, succeeding modes of production—hunting/ fishing/gathering, peasant agriculture, and the industrial/postindustrial mode—have increased the extent and scope of the human influence in the natural world.<sup>7</sup>

Both natural and cultural processes have been involved in shaping the environments about us. But culture became a factor in environmental change only with the emergence of modern humans during the midpoint of the last glacial period, say 40,000 B.P. (before the present), when they were in the process of colonizing most of the earth. For thousands of years, however, population numbers and technological practices limited the human imprint on global change. With the exception of a possible role in Pleistocene extinctions, therefore, human-induced environmental change on a broad scale was limited. But with warming conditions and the northward advance of forest ecosystems and plant life during the early

<sup>2</sup>E. I. Kotok, “The Ecological Approach to Conservation Programs,” in Renewable Natural Resources, Section IV (circa 1950), 472 (copy in library, Blue Mountain Natural Resources Institute, La Grande, Oregon).

<sup>3</sup>For a select number of scholars who argue this point, see Carl O. Sauer, “Man in the Ecology of Tropical America,” Proceedings of the Ninth Pacific Science Congress 20 (1957), 104-10; Sauer, “Man’s Dominance by Use of Fire,” Geoscience and Man 10 (1975), 1-13; William Cronon, Changes in the Land: Indians, Colonists, and the Ecology of New England (New York: Hill and Wang, 1983); and Richard White, Land Use, Environment, and Social Change: The Shaping of Island County, Washington (Seattle: University of Washington Press, 1980).

<sup>4</sup>For an excellent review, see Karl W. Butzer, “The Americas Before and After 1492: An Introduction to Current Geographical Research,” Annals of the Association of American Geographers 82, 3 (1992), 345-366.

<sup>5</sup>William M. Denevan, “The Pristine Myth: The Landscape of the Americas in 1492,” Annals of the Association of American Geographers 82, 3 (1992), 370.

<sup>6</sup>Butzer, “The Americas Before and After 1492,” 346.

<sup>7</sup>Neil Roberts, The Holocene: An Environmental History (New York: Basil Blackwell, 1989), 5.

Holocene (10,000 to 5,000 B.P.), the human impress on the natural world became much more noticeable. The more favorable climatic conditions expanded the range of ecological niches suitable to human habitation and allowed for people to manipulate plant and animal species to their advantage. But more than anything else, it was the advent of Neolithic agriculture that accelerated the human role in environmental change in many parts of the world.<sup>8</sup>

Several archaeological finds, including one at Oregon's Fort Rock Cave (13,000 B.P.) on the periphery of the Great Basin,<sup>9</sup> indicate that humans first entered the greater Pacific Northwest<sup>10</sup> during the late Pleistocene, when glaciers still covered much of the mountainous country of the interior. Before the dramatic warming of the climate between 11,000 and 9,000 B.P., now-extinct animals-the giant ground sloth, the giant bison, the camel, and the horse-were still present in North America. Those species intermingled with present-day animals-antelope, deer, mountain sheep, and a variety of bird life.<sup>11</sup> For reasons that are still subject to great controversy, several of those late Pleistocene mammals became extinct; whether the human presence in North America (and in the Pacific Northwest) is responsible for those extinctions remains an open question.<sup>12</sup>

As the great glaciers of the late Pleistocene receded, they unleashed a series of catastrophic floods through the upper-Columbia River drainage when Lake Missoula periodically burst through its dam of glacial ice. The scouring effects of that huge volume of water created the channeled scablands of eastern Washington, including the famous Grand Coulee. The most recent of those floods probably occurred some time after 13,000 B.P. With the recession of the glaciers, spruce, fir, and other conifers appeared over broad areas of the interior country, and when the climate began to warm after 11,000 B.P., the conifers themselves receded to higher elevations.<sup>13</sup>

With the onset of the modern era (about 500 B.P.), human-manipulated agricultural ecosystems had replaced natural ones in many parts of the world.<sup>14</sup> But economic, environmental, and ecological changes taking place elsewhere were delayed in the Pacific Northwest. Until the very recent past, the region was beyond the reach-or at best on the periphery-of the immense market-induced ecological exchanges that were taking place in the post-Columbian world. Euro-American penetration and conquest on this far edge of North America, therefore, has been of very recent duration, extending back little more than two centuries. Indeed, what is striking about the region is the very recent and very rapid pace of human-induced environmental disturbance over very extensive areas in a very brief span of time.<sup>15</sup>

<sup>8</sup>ibid., 57-113.

<sup>9</sup>For a brief account of the Fort Rock and other Northwest archaeology excavations, see L. S. Cressman, The Sandal and the Cave: The Indians of Oregon (1962; Corvallis: Oregon State University Press, 1981).

<sup>10</sup>This reference is to the physiographic region that embraces the present states of Washington, Oregon, and Idaho, northern California and Nevada, western Montana, and southern British Columbia. The greater Columbia River system also provides a definitive outline for the region.

<sup>11</sup>C. Melvin Aikens, Archaeology of Oregon (Portland: Oregon State Office, U. S. Department of the Interior, Bureau of Land Management, 1986), 9-10.

<sup>12</sup>Roberts, The Holocene, 67; Donald K. Grayson, "Pleistocene Avifaunas and the Overkill Hypothesis," Science 195 (1977), 691-93; and Paul S. Martin, "Pleistocene Overkill," Science 179 (1973), 969.

<sup>13</sup>Aikens, Archaeology of Oregon, 41-42; and Hunn, Nch'i-wan, 19-21.

<sup>14</sup>Roberts, The Holocene, 122.

<sup>15</sup>Carlos Schwantes argues that "geographical isolation fundamentally shaped the course of Pacific Northwest history." Geography conspired to keep the Northwest "beyond the reach of Europe and the rest of North America" and thereby "contributed to a pronounced time lag in its historical development." See Schwantes, The Pacific Northwest: An Interpretive History (Lincoln: University of Nebraska Press, 1989), 19.



For the interior Northwest, the hunting-gathering way of life remained dominant until Europeans began to impose a new set of cultural arrangements on the landscape. The Pacific Northwest was an anomaly in one other respect: Neolithic agricultural practices were absent during the Indian period of domination. “Therefore,” according to fisheries and wildlife scientist Dean Shinn, “we are still relatively close to the early history of the region, and to the events which caused environmental change there.”<sup>16</sup>

That historical configuration of events and circumstances provides exceptional opportunities for studying precontact landscapes, for learning about ecological conditions at the onset of large-scale Euro-American migration, and for placing the human-induced changes that have taken place in the industrial age in a broader perspective. In brief, the telescoping of the postcontact history of the region into such a brief span of time makes it possible to discern-through conventional historical records (journals, diaries, government surveys, and travel accounts)-much about ecological conditions at the time of the entry of Euro-Americans. That scholars are increasingly turning to pollen and soil records and traditional archaeological evidence further enriches the potential for building a realistic profile of landscapes and environments.

Once the postglacial regime established itself-with the exception of the cataclysmic explosion of Mount Mazama (about 6,000 B.P.)-environmental conditions in the intermontane Northwest remained *relatively*<sup>17</sup> stable for at least 10,000 years. For the Plateau culture area of the interior Northwest, the archaeological record indicates a consensus of sorts: cultural and social changes were modest until the historic period, with subsistence patterns centered largely on terrestrial and riverine environments. Only the northward spread of Spanish horses in the early 18th century, the entry of the market-oriented fur trade in the early 19th century, and ravages of the exotic epidemic diseases that followed disrupted that stability.<sup>18</sup>

But relative social and cultural stability does not imply the absence of native influence in the natural world. Indeed, extensive archaeological and other historical evidence suggests quite the opposite. Native Americans in the Pacific Northwest inhabited a humanized landscape-ecosystems that were purposefully modified to meet their subsistence needs. Richard White argues that native people on Puget Sound’s Whidbey Island used fire as a tool to enhance the growing of bracken and camas, staple vegetables in their diet. “Rather than being major Indian food sources because they dominated the prairies,” he concludes, “camas and bracken more likely dominated the prairies because they were major Indian food sources.”<sup>19</sup> There is abundant evidence to indicate equally human-influenced landscapes elsewhere in the Pacific Northwest.

<sup>16</sup>Dean A. Shinn, “Historical Perspectives on Range Burning in the Inland Pacific Northwest,” *Journal of Range Management* 33 (November 1980), 418-19. For the absence of Neolithic agriculture in the Pacific Northwest, see Butzer, “The Americas Before and After 1492,” 348; White, *Land Use, Environment, and Social Change*, 14-34; Philip Drucker, *Indians of the Northwest Coast* (Garden City, New York: Natural History Press, 1955), 35-55; and Cressman *Sandal and the Cave* 40-54. For a discussion of the food-gathering practices of the Palouse Indians, see Clifford E. Trafzer and Richard D. Scheuerman, *Renegade Tribe: The Palouse Indians and the Invasion of the Indian Pacific Northwest* (Pullman: Washington State University Press, 1986), 7-9.

<sup>17</sup>That is not to deny what the anthropologist Eugene Hunn calls “the biogeographical consequences of climatic change.” But, he points out, changes in climatic patterns required adjustments in hunting and gathering strategies rather than dramatic economic and social change. See Hunn, *Nch’i-Wana “The Big River:” Mid-Columbia Indians and Their Land* (Seattle: University of Washington Press, 1990), 19. Richard White makes the same argument for the native people of Puget Sound, who had been in a “relatively stable and productive environment” for centuries before the arrival of white settlers. See White, “The Altered Landscape: Social Change and the Land in the Pacific Northwest,” in *Regionalism and the Pacific Northwest*, William G. Robbins, Robert J. Frank, and Richard E. Ross, eds. (Corvallis: Oregon State University Press, 1983), 114-115.

<sup>18</sup>Hunn, *Nch’i-wana* 21; and Hunn, “The Plateau,” in *The First Oregonians*, Carolyn M. Buan and Richard Lewis, eds. (Portland: Oregon Council for the Humanities, 1991), 14.

<sup>19</sup>White, *Land Use, Environment, and Social Change*, 21; and White, “The Altered Landscape,” 111. William Cronon illustrates a similar case for southern New England where the Indian use of fire may have been even more frequent and pronounced. The area’s forests were park-like with intermittent openings, “not because the trees naturally grew thus, but because the Indians preferred them so.” See Cronon, *Changes in the Land: Indians, Colonists and the Ecology of New England* (New York: Hill and Wang, 1983), 49.

Native-modified landscapes through the use of fire extended well beyond the Puget and Willamette lowlands to the eastern slopes of the Cascade Range, where Indians used fire as an effective tool to enhance the production of a variety of foodstuffs, including nutritious herbs and shrubs, black mountain huckleberry, and its near relatives, blueberry and grouseberry. Those fire-created niches also attracted browsing animals like deer and elk, sources of protein for the Indian diet.<sup>20</sup> The widespread practice of burning created an artificial forest environment of open glades and park-like settings, a descriptive refrain that runs through virtually all of the 19th century travel and survey literature.

Except for the extremely arid regions of North America, the historian Stephen Pyne contends that grassland environments were also the result of the Indian's calculated and routine use of fire. From the coastal plain of Massachusetts southward to Florida and westward to Texas, from California's great Central Valley to Oregon's Willamette Valley, grasslands flourished as a consequence of Indian incendiary activity.<sup>21</sup> Native influences in modifying grassland environments in the "Great Columbia Plain"<sup>22</sup> region of eastern Washington and across the high-desert country of eastern Oregon is also too obvious to ignore

Some evidence indicates that early Pleistocene hunters in the Northwest used burning thousands of years ago, and references to fires and burned landscapes run everywhere through the early literature of the region. Although historical sources do not reveal with any precision the ratio between human and naturally caused fires in the interior Pacific Northwest before large-scale white settlement, evidence suggests that Indian incendiarism was a significant factor in the burning of both grassland and forest. For desert ecosystems, Lee Eddleman contends, "human caused fires were of greater consequence." Other writers agree: fire "was a natural component of the native ecosystem."<sup>23</sup> Early 19th century travel accounts mention fire with such regularity as to create a mental picture of a ravaged, charred, ruined land.

As with much of the early literature of the Pacific Northwest, the journals of Lewis and Clark revealed the complexities of Indian environmental influence, especially the important role of fire to the horsemounted hunter-gatherers of the interior country. On the return trip upriver in the spring of 1806, Meriwether Lewis reported the plains of the Columbia covered with a "rich verdure of grass and herbs from four to nine inches high." As the party drew closer to the Walla Walla River, the journal entries refer to a unique set of observations: the absence of firewood; the Indian use of shrubs for fuel; an abundance of roots for human consumption; and favorable assessments of grass for horses. Writing some distance up the Walla Walla River, William Clark remarked that "great portions of these bottoms has been latterly burnt which has entirely destroyed (sic) the timbered growth."<sup>24</sup>

The native people readily fired arid landscapes just as they did the Willamette and Puget lowlands to enhance hunting and the gathering of roots and berries. Hudson's Bay Company operative Peter Skene Ogden, leading a trapping party through the upper Crooked River and into the Harney Basin in 1826 and 1827, repeatedly referred to a country "overrun by fire," with the finger of guilt pointed to what he deemed were native culprits. But Ogden's greatest disappointment about those summer conflagrations centered on the widespread destruction of beaver habitat (and beaver):

<sup>20</sup>Hunn, "Nch'i-wana "The Big River," 130-131.

<sup>21</sup>Stephen J. Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (Princeton: Princeton University Press, 1982), 84-85. In Oregon's Willamette Valley native people used fire in a substantial way to dramatically alter the landscape for their own purposes. See Peter G. Boag, *Environment and Experience: Settlement Culture in Nineteenth-Century Oregon* (Berkeley: University of California Press, 1992), 12-15.

<sup>22</sup>This is the title of Donald Meinig's *The Great Columbia Plain: A Historical Geography, 1805-1910* (Seattle: University of Washington Press, 1968), still the best book of its kind for the Pacific Northwest.

<sup>23</sup>Shinn, "Historical Perspectives on Range Burning in the Inland Pacific Northwest," 415-417; Lee Eddleman, "Oregon's High Desert-Legacy for Today," in *Oregon's High Desert: The Last 100 Years*, Special Report 841 (June 1989) Agricultural Experiment Station, Oregon State University, Corvallis, Oregon, and USDA Agricultural Research Service, 2; and J. B. Kauffman and D.B. Sapsis, "The Natural Role of Fire in Oregon's High Desert," in *ibid.*, 15.

<sup>24</sup>Thwaites, *Original Journals of the Lewis and Clark Expedition*, vol. 3, P. 345-346.

*Many small streams have been discovered in the mountains and were not long since well supplied with beaver but unfortunately the Natives have destroyed them all and probably by the aid of fire which is certainly a most destructive mode of exterminating them for scarcely ever one escapes particularly when the streams are not wide, and from what I have seen in this my last years travels I will venture to assert without exaggeration the Natives have destroyed and principally by fire upwards of sixty thousand beavers and of this number not a Hundred have reached any establishment but all have been lost.<sup>25</sup>*

As the explorer/fur-trader extraordinaire, Ogden saw the regional landscape through a sharply different cultural lens from that of the Paiutes of eastern Oregon. The Indian habit of burning **for Indian purposes**, in his view, was irrational because it led to the destruction of beaver, an animal with a commodity value in distant markets.<sup>26</sup>

John Kirk Townsend, Philadelphia-based naturalist and traveler on the Oregon Trail, provides one of the most vivid accounts of Indian burning practices in the Columbia River country. When the party camped about 15 miles below the mouth of the Umatilla River on the evening of September 3, 1835, Townsend reported that Indians had “fired the prairie” on the opposite side of the river, thereby brilliantly lighting the night-sky:

*Here I am sitting cross legged on the ground, scribbling by the light of the vast conflagration with as much ease as if I had a ton of oil burning by my side; but my eyes are every moment involuntarily wandering from the paper before me, to contemplate and admire the grandure (sic) of the distant scene. The very heavens themselves appear ignited, and the fragments of ashes and burning grass-blades, ascending and careering about through the glowing firmament, look like brilliant and glorious birds let loose to roam and revel amidst this splendid scene.*

Standing on a hilltop at the mouth of the Walla Walla River the following spring, the Reverend Samuel Parker described a landscape “covered with the fresh green of spring vegetation.” Just a few miles to the north at the juncture of the Snake River he remarked again about “the fresh verdure, which is springing up, luxuriantly, at this early season.”<sup>27</sup>

Looking toward the Columbia River from the western slopes of the Blue Mountains in mid-October 1840, United States Army reconnaissance officer John C. Fremont reported that “smoky and unfavorable” weather conditions obstructed “far views with the glass.” But before descending to the Walla Walla River,

<sup>25</sup>M. A. Davies, ed., Peter Skene Ogden's Snake Country Journals, 1826-27 (London: Hudson's Bay Record Society, 1961), 7, 9, 19, 118, and 126-127.

<sup>26</sup>Explorer and discovery accounts of the Americas dating from the time of Columbus, according to Richard White, appraised objects in the physical environment in terms of their value as commodities. See White, “Discovering Nature in North America,” Journal of American History 79 (December 1992), 879-880.

<sup>27</sup>John Kirk Townsend, Narrative journey across the Rocky Mountains (1839; Lincoln: University of Nebraska Press, 1978), 246; and Samuel Parker, Journal of an Exploring Tour Beyond the Rocky Mountains (1838; Minneapolis: Ross and Haines, 1967), 272 and 274. Passing up the Columbia River on April 17, 1806, Meriwether Lewis reported “a rich verdure of grass and herbs from four to nine inches high and exhibits a beautiful seen (sic) particularly pleasing after having been so long imprisoned in the mountains and those impenetrably thick forests of the seacoast.” See Reuben Gold Thwaites, ed., Original Journals of the Lewis and Clark Expedition 1804-1806 (New York: Antiquarian Press Ltd., 1959), vol. 3, p. 286. In the same entry, Lewis noted that the Indians burned shrubs because of the absence of firewood, that grasses provided excellent grazing for horses, and that burned-over areas were superb grounds for gathering roots.

Fremont observed what he deemed to be the salutary aftereffects of burning: “the grass very green and good; the old grass having been burnt off early in the autumn.” Although both culture and nature were responsible for shaping the environment of the intermontane region, the preponderance of evidence suggests that culture was a major cause of incendiarism.<sup>28</sup>

Although the bulk of this discussion has focused on the Indian use of fire in arid landscapes, culture evidently played a major role in the ecology of the intermontane forests as well. For the greater Blue Mountains area, early travel accounts—many of them Oregon Trail narratives—provide copious testimony to the ecologically intrusive presence of Native Americans throughout the region. Stories of fire and ash are strewn along the section of the trail from the juncture of the Boise and Snake rivers to the Columbia. After leaving the Grande Ronde Valley in a northwesterly direction through the Blue Mountains in late August of 1834, John Kirk Townsend remarked about the stately pine trees with an undergrowth of “service bushes and other shrubs.” What most offended Townsend, however, was the burned grass and trees “blasted by the ravaging fires of the Indians. These fires are yet smoldering, and the smoke from them effectually prevents our viewing the surrounding country.”<sup>29</sup>

The ubiquitous and controversial Captain Benjamin Bonneville crisscrossed the Snake River/Blue Mountain country in 1834 and later made his notes available to Washington Irving, who wrote an account of Bonneville’s travels. According to Irving’s version, during the summer months the captain witnessed “the season of setting fires to the prairie,” with fire and smoke virtually everywhere. Bonneville’s troop subsequently spent two weeks camped in the Grande Ronde Valley because fires in the surrounding hills blocked egress from the area.<sup>30</sup>

Passing through the high country dividing the Powder River and Grande Ronde valleys in August 1835, the missionary Jason Lee described a landscape “covered with a heavy growth of pitch pine, very large, tall, and beautiful.” The only distracting feature to the Methodist was the evidence of fire that “had recently been making its destructive ravages over the whole mountain.” After ascending the Blue Mountains and traveling across the summit, Lee reported the party’s vision obscured “by smoke, which was [so] dense that we could discern objects only a few yards.” Four years later, Thomas Jefferson Farnham followed the west bank of the Snake River and then moved into the hills along a small stream where Indians had recently burned the countryside. The following day, Farnham described an atmosphere filled with smoke “as in Indian summer-time in the highlands of New England.”<sup>31</sup>

By the time the large emigrant train of 1843 was enroute to the Willamette Valley, newcomers traveling through the interior Northwest were becoming familiar with late-summer Indian fires. The trapper James Clyman, who accompanied an 1844 emigrant party to Fort Boise and then pressed on ahead to Oregon, observed “verry Smoky” weather in the Powder River Valley and even worse conditions in the Grande Ronde Valley where, “Indians as is their habit . . . set fire to the grass.” Passing northward from the

<sup>28</sup>Donald Jackson and Mary Lee Spence, eds., *The Expeditions of John Charles Fremont*, vol. 1 (Chicago: University of Chicago Press, 1970), 550-551; and Lee Eddleman, “Oregon’s High Desert—Legacy For Today, 2. Except for these early first-hand accounts, no body of solid “data” exists to prove the case one way or the other.

<sup>29</sup>Townsend, *Narrative Journey Across the Rocky Mountains*, 163.

<sup>30</sup>Washington Irving, *The Adventures of Captain Bonneville U.S.A. in the Rocky Mountains and the Far West: Digested from His Journal, and Illustrated from Various Other Sources* (1837; Norman: University of Oklahoma Press, 1961), 339-341.

<sup>31</sup>Archer Butler Hulbert and Dorothy Printup Hulbert, eds., *The Oregon Crusade: Across land & Sea to Oregon* (Denver: Colorado College, 1935), 178; and Farnham, *An 1839 Wagon Train Journal*, 73.

Powder River, Clyman's group "nearly suffocated with smoke & dust," and upon descending into the Grande Ronde Valley, they witnessed "the whole mountains which surround this vally (sic) completely enveloped in fire and Smoke."<sup>32</sup>

Much of the scientific and technical literature on the influence of fire in shaping ecosystems in the Pacific Northwest has an ironic twist. Virtually all writers recognize that Indians used fire as a tool to fashion grassland and forest environments for a variety of purposes. But once acknowledging that fact, those same writers move on to discussions of "fire and its role in the pristine environment" as if native people had no existence, except as part of nature itself. One authority on fire history, while conceding "significant Indian influence," refers to nineteenth-century forests as "unmanaged" and "natural" environments. In other words, before the advent of modern forest management, Northwest woodlands were neither humanized nor culturally proscribed places. As Richard White has observed: "perhaps the most important decision Europeans made about American nature. . . was that they were not part of it, but Indians were." Moreover, he argues, even when the newcomers encountered human-influenced ecosystems, they "tended to deny that Indians could have created them."<sup>33</sup>

By the early 19th century, native people in the interior Northwest had acquired sizable numbers of horses, with some tribes—the Yakima, Cayuse, and Nez Perce—possessing especially large herds. The diffusion of horses across western North America originated in the Spanish colonies in what is New Mexico. When the Pueblo Indians revolted in 1680 and drove the Spanish out of the Rio Grande country, they liberated the Spaniards' horses, which quickly spread northward along both sides of the Rocky Mountains. Horses were passed along the western slope from the Utes to the Shoshones on the upper Snake River, to the Flatheads by 1720, and most likely to the Nez Perce and Cayuse in the 1730s.<sup>34</sup> That the acquisition of horses dramatically increased Indian mobility (and thereby Indian economic and social life) is well known; what is more difficult to discern is the extent and magnitude of ecological change that should be attributed to the horse. Until the large-scale settler movement to the Northwest in the 1840s, the horse represented, along with fire, an Indian-mediated presence in the landscape.

The early and numerous journal references to the abundance of Indian horses indicates that the human influence in shaping intermontane ecosystems assumed forms other than fire. Struggling through the snow-clad Blue Mountains to the north of the Grande Ronde Valley in the winter of 1811-1812, the Astorian Wilson Price Hunt observed on every side of their route "horse-trails used by Indians." When party members reached the Umatilla River, they visited an Indian camp of 34 lodges with an estimated

<sup>32</sup>James Clyman, *Journal of a Mountain Man* (Missoula: Mountain Press Publishing Company, 1984). The expedition led by Captain John C. Fremont through the Snake River, Blue Mountains, and Columbia River area about two weeks behind the Great Migration of 1843 made reference to "recently burnt and blackened" surroundings, "smoky and unfavorable" weather, and grasslands "having been burnt off early in the autumn." See Jackson and Spence, eds., *The Expeditions of John Charles Fremont*, vol. 1, p. 542, 550-551.

<sup>33</sup>James A. Young and B. Abbott Sparks, *Cattle in the Cold Desert* (Logan: Utah State University Press, 1985), 27; James K. Agee, "The Historical Role of Fire in Pacific Northwest Forests," in *Natural and Proscribed Fire in Pacific Northwest Forests*, John D. Walstad, Steven R. Radosevich, and David V. Sandberg, eds. (Corvallis: Oregon State University Press, 1990), 26-27; and White, "Discovering Nature in North America," 882. One Forest Service employee recalled that in 1909 the Siskiyou forest "was largely as the Indians had left it. It had lots of game in the mountains and fish in the rivers," indications of a relatively pristine environment. But then the writer proceeded to tell of using old Indian trails through areas where "practically all the forest had been burned over." See Henry E. Haefner to Gifford Pinchot, Gifford Pinchot Papers, Series B, Container 986, Manuscript Division, Library of Congress.

<sup>34</sup>Francis Haines, "The Northward Spread of Horses Among the Plains Indians," *American Anthropologist* 40 (1938), 434-35; J. Orin Oliphant, "History of the Livestock Industry in the Pacific Northwest," *Oregon Historical Quarterly* 49 (1948), 13; and Hunn, Nch'i-wana "The Big River," 22-26. For many Indian people, according to Eugene Hunn, horses continue to symbolize the "old" way of life: "Several hundred run wild over the Yakima Reservation foothills. The tribe protects them against the urgings of stockmen who see wild horses as economic competitors" (p. 26).

2000 horses. Moreover, villagers with copper kettles and pots about their lodges and dressed in robes of bison and buckskin leggings indicated extensive travel by horseback or trade with distant peoples. Passing down the arid stretch of the Columbia River between the Umatilla and the Great Falls (Celilo Falls) in September of 1834, John Kirk Townsend reported seeing “large bands of Indian horses.” Those “beautiful animals . . . almost as wild as deer” and marked with “strange hieroglyphic looking characters” to indicate ownership.”<sup>35</sup>

Five years later, Thomas Jefferson Farnham met a Cayuse family in the Blue Mountains, returning from a buffalo hunt to the east. The man and woman and their two children had seventeen horses in tow, “splendid animals,” Farnham noted, “as large as the best horses of the States, well knit, deep and wide in the shoulders.” When he reached the south bank of the Columbia River, he noticed that “groups of Indian horses occasionally appeared.” And at the onset of the settler movement to the Willamette Valley in the early 1840s, the inveterate preacher-traveler Samuel Parker recorded in his journal that he saw several “bands of Indian horses” as well as deer and antelope.<sup>36</sup>

When his reconnaissance troop reached the Walla Walla River in October of 1843, John C. Fremont observed “several hundred horses grazing on the hills, . . . and as we advanced on the road we met other bands, which the Indians were driving out to pasture also on the hills.” A month later; journeying through the eastern slope of the Cascade Range, he reported a village of Nez Perce “who appeared to be coming from the mountains, and had with them fine bands of horses.” Fellow army officer Major Osborne Cross, on the Umatilla River in September 1849, witnessed everywhere “large droves of horses, . . . stout, well built, and very muscular.” And a decade later in the Grande Ronde Valley George Belshaw observed “quantities of Indians and Ponies” (sic) in “this butiful valet” (sic).<sup>37</sup>

That Parker and other observers lumped horses, deer, and antelope as part of the natural world points to another problem in distinguishing between the natural and unnatural. Horses, of course, were unlike deer and antelope: they were unnatural to the region; they were Indian cultural adaptations of the relatively recent past; they were large grazing ungulates; and, as an alien introduction, they unquestionably represented a new and intrusive agent in their adopted environments.<sup>38</sup> Because human agency was responsible for the introduction of horses, Indian use of the animals should be considered another culturally engendered force in shaping the landscape of the Indian Northwest.

<sup>35</sup>Wilson Price Hunt’s *Diary of his Overland Trip Westward to Astoria in 1811-12*, in *The Discovery of the Oregon Trail, Robert Stuart’s Narratives*, Philip Ashton Rollins, ed. (New York: Charles Scribner’s Sons, 1935), 301-302; and Townsend, *Narrative Journey Across the Rocky Mountains*, 283. Nearly every Oregon Trail travel account mentions the great number of Indian horses on both sides of the Blue Mountains. Writing from a camp on the Walla Walla river in 1843, James Nesmith mentioned great difficulty in the morning hunting down their cattle and horses, “the later (sic) having wandered off and the Indian horses being so numerous made it difficult for us to find our own.” See Nesmith Ankeny, *The West as I Knew It* (Lewiston: R. G. Bailey, 1953), 27. Early booster publications also mentioned that Indians raised “horses in vast numbers, and of a very superior quality,” perhaps as an enticement to spur further emigration. See Lansford W. Hastings, *The Emigrants’ Guide to Oregon and California* (1845; Princeton: Princeton University Press, 1932), 46.

<sup>36</sup>Farnham, *An 1839 Wagon Train Journal*, 74-75; and Parker, *Journal of an Exploring Tour Beyond the Rocky Mountains*, 281.

<sup>37</sup>Jackson and Spence, eds., *The Expeditions of John Charles Fremont*, vol. 1, p. 551 and 584; Raymond W. Settle, ed., *The March of the Mounted Riflemen as Recorded in the Journals of Major Osborne Cross and George Gibbs and the Official Report of Colonel Loring* (Glendale, CA: Arthur H. Clark Co, 1940), 229; George Belshaw, *Diary of the Oregon Trail, 1853* (Eugene: Lane County Historical Society, 1960), n.p. John W. Evans, who has compiled an excellent volume of the early travel accounts on this section of the Oregon Trail, contends that Indians fired the prairie in the late summer to ensure “an abundance of new grass for their horse herds.” See Evans, *Powerful Rocky*, 29n.

<sup>38</sup>Although the literature on Indian horse herds as agents of ecological change is not large, a growing body of evidence suggests that the ecological influence of the rapid spread of horses in western North America was considerable. See Richard White, *The Roots of Dependency: Subsistence Environment, and Social Change Among the Choctaws, Pawnees, and Navajo* (Lincoln: University of Nebraska Press, 1983), 100, and 247-248; and Dan Flores, “Bison Ecology and Bison Diplomacy: The Southern Plains from 1800 to 1850,” *Journal of American History* 78 (1991), 481.

After the United States established sovereignty over the country south of the 49th parallel in 1846, the government undertook a series of boundary, military road, and railroad surveys, with many of the investigations centering on the Cascades. Those inquiries provide further evidence of ecosystems heavily influenced by human activity. The reports of the Northwest Boundary Survey Commission offer an excellent cross-sectional description of the transition in forest types on the western and eastern slopes of the Cascade Range. On the western side, the timber was dense, “being a heavy growth of pine and fir that in many places stands over a fallen forest not yet decayed.” But east of the summit, the commission noted “the timber becomes more open, and survey operations less difficult.”<sup>39</sup>

At the far eastern extreme of Washington Territory, a reconnaissance group under the command of Captain John Mullan examined feasible routes for both military and railroad passage eastward through the Bitterroot Mountains. In the lower Snake River country, the command frequently traded with local Indian villages for salmon and other supplies and used the numerous Indian trails to traverse canyons and to gain access to the plateau above. The Indians lived in permanent villages, but the army officials noted that their lodges were covered with buffalo skins and mats, indications of trade and travel east of the mountains. On the slopes above the Palouse River, the Indians harvested service berries, wild currants, and gooseberries in great abundance; the “luxuriant bunch grass” that grew everywhere provided excellent feed for the surveyors’ horses. Above the scattered groves of trees along the river bottom was “a slightly undulating prairie, destitute of timber.” Standing atop Steptoe Butte close to the present border with Idaho in the summer of 1860, expedition topographer Theodore Kolecki described the vast area around the mountain as “rolling prairie, very much resembling a stormy sea” with pine timber commencing four or five miles to the east and stretching to the Bitterroot Mountains.<sup>40</sup>

Lieutenant Henry L. Abbott’s survey in the autumn of 1854 of a prospective railroad route from the Sacramento Valley to the Columbia River furnished detailed descriptions of fire-nurtured landscapes, firsthand observations of Indian burning practices, and frequent reference to sizable Indian horse herds. Through the entire route of their travel on the eastern flank of the Cascades from Klamath Lake northward, the Abbott survey found “excellent bunch grass, whortleberries, elder berries and service berries,” biotic specimens that thrive in the aftermath of fire. A decade later, officials of the Oregon Central Military Wagon Road surveyed a route from Eugene southeast through the Cascade Range to the headwaters of the Deschutes River. Although the party struggled through the dense forests on the western slope, east of the summit the country was flat, with the higher elevations “covered with black pine, clover grass in abundance, and great quantities of meadow grounds.” The surveyors observed places where the forest had been “killed by fire” but found little evidence of undergrowth, either in the black pine or in the yellow pine timber to the southeast. When the group came upon The Dalles-Fort Klamath trail, the surveyors saw signs where a large band of horses had camped the previous night “and from the character of the horse tracks and mockasin (sic) tracks accompanying think it is Indians.”<sup>41</sup>

<sup>39</sup>Archibald Campbell to William H. Seward, Secretary of State, February 3, 1869, Records Relating to the First Northwest Boundary Survey Commission, 1853-69, The National Archives, Washington, DC, Microcopy T-606, Roll 1, Image 0539.

<sup>40</sup>Captain John Mullan, Report on the Construction of a Military Road from Fort Walla Walla to Fort Benton (Washington: General Printing Office, 1863), 103-04.

<sup>41</sup>Reports of Explorations and Surveys. to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean 1854-55, Vol. vi, Report of Lieut. Henry L. Abbott, Explorations for a Railroad Route, from the Sacramento Valley to the Columbia River, 1855 (Washington: Beverly Tucker, Printer, 1857. 33 Cong., 2d Sess., Senate Ex. Doc. 78, reprinted in Bert and Margie Webber, Railroading in Southern Oregon and the Founding of Medford (Fairfield, WA: Ye Galleon Press, 1985), 194-200; and diary of B. J. Pengra, entries for July 1865, in Stephen Dow Beckham, The Oregon Central Military Wagon Road: A History and Reconnaissance, USDA, Forest Service, Pacific Northwest Region, Willamette National Forest, Heritage Research Associates, Report 6, Vol. 1 (1981), 28-34.

The descriptions of landscape in the official reports for the eastern slope of the Washington Cascades read much the same: dense underbrush and thickly spaced trees in the higher elevations, gradually giving way to open spaces and a clean understory in the ponderosa-dominated stands at lower elevations. The botanical section of the 1855 railroad surveys through the northern Cascades (known as the “Stevens Report”)<sup>42</sup> portrays a forested landscape similar to descriptions south of the Columbia River. The representation of the ponderosa-dominated areas is especially striking:

*There is [so] little underbrush in these forests that a wagon may be drawn through them without difficulty, forming a striking contrast to the dense thickets of the western slopes . . . the level terraces, covered everywhere with good grass and shaded by fine symmetrical trees of great size, through whose open foliage the sun’s rays penetrate with agreeable mildness, give to these forests the appearance of an immense ornamental park.*

The ponderosa zone, according to the Stevens report, extended eastward from Mount Adams about 12 miles and varied in elevation between 2500 and 5000 feet. At higher elevations in the month of August, the survey party encountered “a profusion of berries of several kinds, which the Indians were engaged in collecting.” The report also mentioned large forest fires at lower elevations.<sup>43</sup>

But what is most striking about the mid-century railroad survey narratives are their similarity to the turn-of-the-century forest reserve reports and the United States Geological Survey (USGS) investigations. With the exception of newly introduced grazing ungulates to the forests—sheep and cattle—and the continued influence of natural and human-caused fire, the forested landscape looked much the same. In brief, market influences in the forest environment of the interior Northwest were still very limited. On the lower slopes of the central Oregon Cascades, a USGS investigation headed by H. D. Langille observed forests “of pure growth . . . [which] are generally open, without much litter or undergrowth, and for those reasons are almost immune from fire.” In the yellow pine country, the report continued, “the forest floor is often as clean as if it had been cleared, and one may ride or even drive without hindrance. As the hills are approached the brush increases.” The investigators estimated that in the “yellow-pine region bordering the timberless area of eastern Oregon” 10 percent of the timbered area had burned recently, 90 percent of the forest “at some remote period.”<sup>44</sup>

John B. Leiberg’s survey of the southern Cascades at the turn of the century acknowledged both the influence of native burning practices and the effects of fire during the early period of white settlement. The composition of the forest in the area surveyed indicated “without any doubt the prevalence of wide-spread fires throughout the region long before the coming of the white man.” But the fires during the Indian period of occupancy “were not of such frequent occurrence nor of such magnitude as they have been since the advent of the white man.” Fires associated with the early settler period, however, were “more numerous and devastated much larger areas.” When settlers learned that burning the forest attracted game, Leiberg surmised, they set the woods on fire. The role of fire in the stands of yellow pine

<sup>42</sup>The survey through the northern Cascades is usually referred to as the Stevens Report because the Washington territorial governor and Indian agent, Isaac Stevens, was in charge of the survey.

<sup>43</sup>J. G. Cooper and G. Suckley, *The Natural History of Washington* (New York: Bailliere Brothers, 1859), 9-11. This privately published volume includes segments of the larger report.

<sup>44</sup>H. D. Langille, Fred G. Plummet, Arthur Dodwell Theodore F. Rixon, and John B. Leiberg, *Forest Conditions in the Cascade Range Forest Reserve, Oregon*, United States Geological Survey, Department of the Interior, Professional Paper 9, Series H., Forestry, 6 (Washington: Government Printing Office, 1903), 78 and 87.



on the eastern slope was clear because of the “noticeable and striking” absence of young growth and underbrush. “The yellow pine,” Leiberger concluded, “is by all odds the best fire-resisting tree in the sylvia of the North Pacific slope.”<sup>45</sup>

Finally, in a Division of Forestry inquiry into the influence of sheep grazing in the Cascade Mountains, Frederick V. Coville affords yet another turn-of-the-century examination of what must be recognized as a humanized landscape. Indian people were “the first manipulators of forest fires in this region,” according to Coville, both in the Willamette Valley, where they annually burned the savannah grasslands and in the Cascades where Indian burning practices created what he termed, “fire glades.” He thought it was an incontestable fact that “at certain seasons it was their custom to set fires in the mountains **intentionally and systematically** (author’s emphasis).” In traveling the length of the Cascades, Coville concluded, “evidences of fire, recent or remote,” had touched every township of forest land. He also reported two relatively new sources of fires—from road building and industrial activity. In the latter instance, he recounted the story of one fire that had burned 15,000 to 18,000 acres in the vicinity of the headwaters of Wood River in the Fort Klamath region. The conflagration began when a camp of men splitting shakes set several small fires to keep mosquitoes away.<sup>46</sup>

Coville’s example of the Wood River fire was only one instance of widespread settler-caused fires during the 19th century. “Fires during the early days of settlement,” one USGS survey reported, were “more numerous and devastated much larger areas .... [but] As time has passed, the frequency of forest fires in the region has diminished.” With the increasing commodity value attached to standing timber in the early 20th century, the effort to reduce and eliminate fire gained momentum, eventually assuming the form of the Smokey Bear grand crusade to prevent fire.<sup>47</sup>

With the arrival of ever-increasing numbers of Euro-Americans after 1800, the several millennia of relative<sup>48</sup> cultural and ecological stability in the Pacific Northwest began to erode. Possessed with unique cultural, social, and economic attributes, the newcomers initiated dramatic cultural and biological modifications that continue to the present day. The aging ex-president John Quincy Adams, speaking on the floor of the House of Representatives in 1846 in favor of settling the Oregon boundary question, may have expressed that newly emerging set of convictions best: “We claim that country—for what? To make the wilderness blossom as a rose, to establish laws, to increase, to multiply, and subdue the earth, which we are commanded to do by the first behest of God Almighty.”<sup>49</sup>

The intruders, slowly at first and then with gathering momentum, imposed on the indigenous people and the regional landscape a markedly different cultural vision, one that led to the gradual—and sometimes spectacular—modification of ecosystems both east and west of the Cascade Range. In the words of one scientist, the last 150 years have witnessed “an unprecedented acceleration” in the ever-changing ecosystems of the region. According to Richard White, as the factor most responsible for precipitating those changes, “white settlement destroyed the Indian Northwest.”<sup>50</sup>

<sup>45</sup>Twenty-First Annual Report of the United States Geological Survey to the Secretary of the Interior, 1899-1900, Part V, Forest Reserves, John B. Leiberger, “Cascade Range and Ashland Forest Reserves and Adjacent Regions,” 277-78 and 288.

<sup>46</sup>Frederick V. Coville, Forest Growth and Sheep Grazing in the Cascade Mountains of Oregon, USDA, Division of Forestry, Bulletin 15 (1898), 19-20, 29-30, and 33.

<sup>47</sup>Leiberger, “Cascade Range and Ashland Forest Reserves and Adjacent Regions,” 227; Eddleman, “Oregon’s High Desert—Legacy for Today,” 2; and Pyne, Fire in America, 161-67.

<sup>48</sup>Here I refer again to Eugene Hunn’s argument that no profound changes had occurred in plateau Indian life for at least 10,000 years. See Hunn, Nch’i-Wana “The Big River”, 19.

<sup>49</sup>Congressional Globe, 29 Cong., 1st sess. (February 9, 1846), 342.

<sup>50</sup>Buechner, “Some Biotic Changes in the State of Washington,” 154.

The worldwide expansion of market capitalism was the great driving force in transforming the human and natural world of the Pacific Northwest. First came the fur men in their quest for beaver pelts, deliberately creating “fur deserts” in one instance to drive competitors away from the region. The decimation of the beaver population occurred early in the Euro-American presence in the Northwest, with consequences to riparian ecosystems that scientists are only beginning to understand today. The fur traders also unknowingly trafficked in other items that brought ecological change, primarily the introduction of exotic plants to the interior country and human contagions that devastated native populations. To anthropologist Eugene Hunn, “the history of Indian-white relations in the Columbia Plateau has been first and foremost a history of the ravages of disease . . . which drastically reduced aboriginal populations.”<sup>51</sup> And, he might have added, opened the way for the re peopling of the region.

In both instances—the intentional and accidental introduction of exotic plant and animal species—agriculturalists were in the vanguard of ecological change in North America.<sup>52</sup> Farmers, whether their activities were subsistence or commercial, created their own artificial, human-imposed ecosystems on the lands they touched. Westering Euro-Americans brought with them cultural habits and practices and familiar plants and animals; the combined effects of that mix began the slow and then the accelerated transformation of their newly adopted environments. For the interior of the Pacific Northwest, where much of that transformation has taken place in the last century, the end result has been a decisively altered landscape.

It all began, of course, in very innocent and benign fashion. The short-lived Astorian fur trade venture at Spokane House planted what was purportedly a “thriving” garden in 1814; when the Northwest Company shortly took over the post, it raised wheat and potatoes and kept chickens and pigs. But the greatest expansion of agricultural activity during the fur-trade period was the Hudson’s Bay Company’s effort to become self-sufficient; that is, George Simpson’s directive that the company supply its own meat and dairy products and grow its own vegetable and grain crops. After the British government forced a merger with the Northwest Company in 1821, the Bay Company established Fort Colville above Kettle Falls on the Columbia River, an operation that cultivated 370 acres and raised thousands of bushels of wheat by the time the United States and England negotiated the boundary treaty in 1846. Other company posts—Fort Nez Percés or Walla Walla and Fort Okanogan—produced little in the way of food stuffs for export, although the former was a busy center for purchasing horses from the Indians.<sup>53</sup>

Where climate and soil permitted, the evidence shows clearly that native people readily adopted the agricultural practices of the newcomers. Indian villagers on Puget Sound were growing potatoes in several locations by the 1830s, and Samuel Parker reported in 1836 that the Spokane Indians were cultivating a small field with potatoes, peas, beans, and other vegetables.<sup>54</sup> Protestant and Catholic groups who began establishing missionary posts in the region during the 1830s expanded the tillable acreage in the next two decades. Although those early agricultural practices did little to disturb existing ecosystems, they were the opening wedge to great ecological change. Moreover, by the 1840s the Pacific Northwest was on the eve of tremendous change with the movement of white emigrants along the Oregon Trail but a portent of things to come. The great catalyst for the transformation of the interior Northwest was the California gold rush.

<sup>51</sup>To keep American fur traders away from the company’s valuable Columbia River country, Hudson’s Bay Company officer George Simpson ordered Peter Skene Ogden to create a “fur desert” in the huge drainage of the Snake River. See Schwantes, *The Pacific Northwest*, 60-62. As many as 50,000 native people may have occupied the 260,000 square miles of the Columbia River country. For these estimates and Indian population losses, see Hunn, *Nch’i-Wana “The Big River”*, 31-32.

<sup>52</sup>For an elaboration of this idea, see White, *Land Use, Environment, and Social Change*, 35-53.

<sup>53</sup>James R. Gibson, *Farming and the Frontier: The Agricultural Opening of the Oregon Country, 1786-1846* (Seattle: University of Washington Press, 1985), 15-18, and 45.

<sup>54</sup>White, *Land Use, Environment, and Social Change*, 32-33; Parker, *Journal of an Exploring Tour Beyond the Rocky Mountains*, 288.

The hundreds of thousands of people who flocked to California triggered an immediate demand for foodstuffs, lumber, and other materials. That instant market stimulated commercial agriculture and lumbering activity in the Willamette Valley and Puget Sound and led to subsequent gold rushes to southern Oregon in the early 1850s and eventually to the interior Northwest in the late 1850s and early 1860s. As part of its effort to “extinguish” Indian land title, United States officials negotiated a series of forced treaties that ceded huge areas of land in the interior Northwest to the Federal government. Just before the inrush of miners to eastern Oregon and the Snake River country, Federal troops conducted an intensive military campaign to subdue those same people and subsequently confine them to reservations.<sup>55</sup> The census of 1860 shows only two white “colonization clusters” east of the Cascade Range—one centering around The Dalles with a population of 1340 and another on the Walla Walla River of 1393 but the mining boom that followed quickly made those figures obsolete.<sup>56</sup>

On the eve of the boundary treaty with England, the Oregon City *Spectator* had prophesied that henceforward “the rich smiles of prosperity” would visit the area and “the resources of the country will be developed, and its high worth appreciated.” Appeals of that kind excited the imaginations of acquisitive and adventurous outsiders and Oregon’s growing Euro-American population, which stood at 13,294 in 1850, burgeoned to 52,456 in 1860, 90,923 in 1870, nearly doubled to 174,768 in 1880, and then reached 313,767 in 1890. As table 1 indicates, the same population cohort for Washington grew more slowly until the decade of the 1880s: 1201 in 1850, 11,594 in 1860, 75,116 in 1880, and then exploding to 357,232 in 1890.<sup>57</sup>

**Table 1—Oregon and Washington population, 1850-1990**

Year	Oregon	Washington	Total
1850	12,093	1,201	13,294
1860	52,465	11,594	64,059
1870	90,923	23,955	114,878
1880	174,768	75,116	249,884
1890	317,704	357,232	674,936
1900	413,536	518,103	931,639
1910	672,765	1,141,990	1,814,755
1920	783,389	1,356,621	2,140,010
1930	953,786	1,563,396	2,517,182
1940	1,089,684	2,736,191	3,825,875
1950	1,521,341	2,378,963	3,900,304
1960	1,768,687	2,853,214	4,621,901
1970	2,091,385	3,409,169	5,500,554
1980	2,633,156	4,132,353	6,765,509
1990	2,842,321	4,867,000	7,709,321

<sup>55</sup>For a discussion of this issue, see William G. Robbins, “The Indian Question in Western Oregon: The Making of a Colonial People,” in *Experiences in a Promised Land Essays in Pacific Northwest History*, G. Thomas Edwards and Carlos A. Schwantes, eds. (Seattle: University of Washington Press, 1986), 51-67.

<sup>56</sup>Schwantes, *The Pacific Northwest*, 92 and 166; and Meinig, *The Great Columbia Plain*, 201-04.

<sup>57</sup>*Oregon City Spectator*, November 12, 1846; William G. Robbins, “Diminishing Abundance and the Economic Culture of the Pacific Northwest,” in *Sweet Reason: Oregon Essay*, Issue 1 Carolyn M. Buan, ed. (Portland: Oregon Committee for the Humanities, 1982), 52; and James W. Scott and Roland L. De Lorme *Historical Atlas of Washington* (Norman: University of Oklahoma Press, 1988), 35. Until late in the 19th century census figures obviously did not reflect the Indian population.

For the interior region, gold findings were the immediate catalyst for the inrush of people in the early 1860s. The ubiquitous “dust” seemed to be everywhere—on several tributaries of the Snake River, along the streambanks in Oregon’s Blue Mountain country, and farther east in emerging mining districts like Montana’s Last Chance Gulch. The sudden increase in the flow of human traffic up the Columbia River spurred the organization of the Oregon Steam Navigation Company (which soon gained a monopoly on river transportation); boomed the city of Portland as a major entrepôt for the interior country; expanded the economic possibilities for The Dalles and Walla Walla, satellite towns to Portland; and led to the establishment of several fledgling communities—Lewiston, Boise City, and Baker City—as “jumping-off” places for the mines.<sup>58</sup>

That rush of activity in the 1860s to extract minerals from the streams and mountainous slopes of the interior Columbia system was the great opening wedge in the culturally induced transformation of intermontane ecosystems. Mining, especially the 19th century variety, was ecologically disruptive: entire hillsides sluiced away; watercourses silted; and riparian habitats destroyed. The demand for timber for a variety of construction purposes—including trusses for mine tunnels and wooden viaducts to carry water—brought the first large-scale cutting of inland forests. Within a year after gold was discovered in the John Day Valley (June 1862), a sawmill was supplying lumber to miners for flumes and sluices.<sup>59</sup>

Theodor Kirchoff, who passed through the mining country around Mormon Creek in 1868, offered a glimpse of the new ecological reckoning that was dawning in the eastern country: “elevated troughs, long sluices, uprooted ground, raw piles of sand and tailings, heaps of cleanly washed stone, and water for mining rushes in ditches and wooden conduits among boulders and trees.” In Rye Valley, Kirchoff saw evidence of shafts and tunnels with piles of tailings on the slopes and “miles of ditches, carrying water to wash gold.” What is interesting about those observations is the rapidity with which the larger, more heavily capitalized operators with more intrusive forms of technology—hydraulic pipe, reservoirs, and long canals—had replaced the shallow placer miners who relied primarily on the pan and sluice. And it should be noted, this transformation in the regional landscape was well underway before the coming of railroads and steam-powered dredges. The most notable of those early ditching efforts was the construction of a nearly 100-mile waterway from Burnt River to placer deposits near the Malheur River in 1870. During the most productive years of mining activity in the 1860s, the region sprouted a series of short-lived boom towns; among the many were Sparta, Cornucopia, Auburn, and Susanville.<sup>60</sup>

The great transportation arterial to the interior mining regions was, of course, the Columbia River. At the onset of the gold rush, boats moving upriver from Portland reported 15,000 passengers in 1861, 24,500 in 1862, and 22,000 the following year. Although gold-rush populations were notoriously fluid, the historian Dorothy Johansen estimates that, at the peak of the rush, the population of eastern Washington was 75,000. And for the first time since the heyday of the fur trade, traffic began to move downriver as well, this time in the form of the metal-turned-commodity extracted from the streambeds and hillsides of the interior. The Oregon Steam Navigation Company estimated that its monthly shipments of gold to Portland averaged \$400,000 during the 1860s. Other market items were beginning to travel the same route

<sup>58</sup>For general sources on the development of mining in the interior Northwest, see Schwantes, *The Pacific Northwest*, 106, and 172-74; Meinig, *The Great Columbia Plain*, 208-14; Oscar O. Winther, *The Great Northwest: A History* (1947; New York: Alfred A. Knopf, 1968), 220-226; and Dorothy Johansen, *Empire of the Columbia* (1957; New York: Harper and Row, 1967), 265-268.

<sup>59</sup>Jerry Mosgrove, *The Malheur National Forest: An Ethnographic History*, USDA, Forest Service, Pacific Northwest Region (1980), 35-41.

<sup>60</sup>Theodor Kirchoff, *Oregon East. Oregon West. 1863-1872*, ed., trans., and Introduction by Frederic Trautmann (Portland: Oregon Historical Society, 198, 85-86; Mosgrove, *The Malheur National Forest*, 173; and *An Illustrated History of Baker, Grant, Malheur, and Harvey Counties* (n.p., Western Historical Publishing Company, 1902), 137-166.

as well; in 1867, Walla Walla merchants experimented in shipping both flour and wheat to Portland. Aided by newly constructed portage railroads at the rapids and the great falls of the Columbia, those first shipments foreshadowed what would soon become a literal torrent of downriver grain.<sup>61</sup>

The external forces driving the ecological transformation of the interior Northwest, hence, were two-fold: the thousands of newly arrived immigrants who stayed on to make their homes in the small towns and surrounding countryside, and the external market demand for the commodities that attracted them to the region in the first place. The sharp increase in the flow of traffic through the region boosted the population of The Dalles from 252 people in 1856 to more than 2500 in 1864, with a much larger transient group staying for brief periods. Walla Walla, a small village on Mill Creek, was the transfer point for the movement of people and supplies to the Snake River mining country. The dusty settlement soon had the largest population in Washington, and for a time the community rivaled Olympia in its claims to serve as the territorial capital. Astride the best overland route to the interior, Walla Walla enjoyed the advantages of early settlement and provided, in Donald Meinig's words, "an ever expanding scale and variety of businesses and services."<sup>62</sup>

While miners, incipient wheat farmers, and town builders were reordering their immediate landscapes, the activities of stockmen were beginning the dramatic alteration of the grassland ecology in the interior Northwest. In a movement that paralleled the mining push east of the Cascades, entrepreneurs began moving large numbers of cattle and sheep onto the prairies and grasslands of eastern Oregon and eastern Washington. Soaring beef prices in the mining districts brought cattlemen and their herds to the creeks and grassy lowlands in the vicinity of The Dalles and several more eastern valleys linked to the Columbia: John Day, Umatilla, Walla Walla, and Yakima. Trailing not far behind were the sheep men, who came with flocks that eventually numbered in the thousands.<sup>63</sup> Cattle and sheep grazed throughout the intermontane Northwest by the 1870s, with perhaps Oregon's southeastern quadrant supporting the largest and most spectacular cattle herds.

In their excellent study of the influence of domestic livestock on arid environments, James A. Young and B. Abbott Sparks provide expert witness to the consequences for original plant communities:

*The vegetation of the pristine sagebrush/grasslands was rather simple and extraordinarily susceptible to disturbance. The potential of the environment to support plant and animal life was limited by lack of moisture and often by accumulations of salts in the soil. The native vegetation lacked the resilience, depth, and plasticity to cope with concentrations of large herbivores. The plant communities did not bend or adapt; they shattered.*

The large number of cattle and sheep consumed grasses that provided a major fuel source for the annual fires that swept the arid interior. The result was the eventual proliferation of big sagebrush and juniper, the virtual elimination of the perennial bunch grasses, and their replacement by exogenous annual grasses.<sup>64</sup> It would be accurate to say that before railroads penetrated the interior Northwest in the 1880s, extensive alterations to the regional ecology had already taken place on the grasslands.

<sup>61</sup>Johansen, *Empire of the Columbia*, 267 and 279; and W. D. Lyman, *An Illustrated History of Walla Walla County, Washington* (Walla Walla: W. H. Lever, 1901), 101.

<sup>62</sup>Lyman, *An Illustrated History of Walla Walla County*, 57; Schwantes, *The Pacific Northwest*, 106; and Meinig, *The Great Columbia Plain*, 215-217.

<sup>63</sup>Meinig, *The Great Columbia Plain*, 220-222.

<sup>64</sup>James A. Young and B. Abbott Sparks, *Cattle in the Cold Desert* (Logan: Utah State University Press, 1985), xxi, 27-28; and Stephen Whitney, *A Sierra Club Naturalist's Guide: The Pacific Northwest* (San Francisco: Sierra Club Books, 1989), 254-255.

But the problem of determining cause and effect between human-induced activity and its consequences is not always a simple exercise in observation. As a seasonal employee of the Bureau of Forestry in 1902, William T. Cox participated in a study “to ascertain the source and cause of the annual deposits of sand left by the Columbia, which blows out, forming dunes which bury railroads, orchards, vineyards, and fields of alfalfa.” The youthful disciple of Gifford Pinchot took his job seriously, traversing the Palouse, Walla Walla, Yakima, Wenatchee, Chelan, Methow, Okanogan, Umatilla, John Day, and Deschutes valleys to account for the drifting and blowing sand. “It was pretty evident,” Cox later reported, “that the real cause of the trouble with sand along the Columbia came from crowding of the ranges and breaking up of the sod by sheep and horses.” During the early years of settlement, the Columbia River carried “practically no sand;” nor could the problem be attributable to cattle. The culprits, according to Cox, were horses and sheep that caused the Columbia and Snake rivers to develop huge deposits of sand which commenced “to blow inland after the annual subsidence of the streams.”<sup>65</sup>

Even a casual perusal of the early observer accounts of the mid-Columbia country would have suggested alternative explanations to that cause-and-effect relation. Traveling southeastward from the Walla Walla River on his return trip to the United States in July 1812, Robert Stuart witnessed high winds and blowing sand “sufficiently to produce an almost suffocating effect.” David Douglas, after a nighttime of rain in the same vicinity in June 1826, found “great relief, the atmosphere being cool and the sand prevented from blowing.” The level plain around him, he remarked, was “destitute of timber and comprised of “gravel and sand.” Nathaniel Wyeth, enroute down the Columbia to make his fortune in the fur trade in 1832, left the Hudson’s Bay Company post at Fort Walla Walla and soon encountered “a furious wind” where “the sand flew so as to obscure the air.”<sup>66</sup>

The accounts of wind and blowing and drifting sand mounted with each successive visitor to the mid-Columbia River region. John Kirk Townsend, who reached the junction of the Walla Walla and the Columbia River during the low-water month of September, saw high and rocky banks “interrupted by broad, level sandy beaches.” Thomas Farnham outdid all others in his rhetorical sketches of a desert-like country of “vast rolling swells of sand and clay” as worthless as the “wastes of Arabia.” But the more widely read Fremont described the mid-Columbia/Walla Walla terrain best: “a plain of bare sands, from which the air was literally filled with clouds of dust and sand, . . . this place being one of the several points on the river which are distinguished for prevailing high winds.”<sup>67</sup>

Fremont’s account also provides an alternative explanation for the deposits of sand visible during the period William Cox called “the annual subsidence of the streams.” Moving down the Columbia River from Fort Walla Walla on October 31, 1843, the lieutenant and his entourage toiled through “loose deep sand .... the stream being interspersed with many sand bars (it being the season of low water).”<sup>68</sup> Cox was probably correct in claiming that some rangelands were being overgrazed; however, his assumption that overgrazing contributed to the problem of sand in the river and elsewhere would appear to be wide of the mark. Solid evidence suggests that the “drifting and blowing sand” may have been around since the midHolocene, or at least since the climate of the interior Northwest began to warm.

<sup>65</sup>Statement Regarding W. T. Cox’s Experiences and Observations in Forestry, 974, File “Cox, W. T.,” Gifford Pinchot Papers, Collections of the Manuscript Division, Library of Congress. For a brief account of William T. Cox’s career as state forester in Minnesota, see William G. Robbins, *American Forestry: A History of National, State, and Private Cooperation* (Lincoln: University of Nebraska Press, 1985, 67-72.

<sup>66</sup>Rollins, ed., *The Discovery of the Oregon Trail* 75; Davies, ed., *Douglas of the Forests*, 70; and F. G. Young, ed., *The Correspondence and Journals of Captain Nathaniel J. Wyeth, 1831-6* (Eugene: University Press, 1899, 173.

<sup>67</sup>Townsend, *Narrative Journey Across the Rocky Mountains*, 172; Farnham, *Travels in the Great Western Prairies*, 79; and Jackson and Spence, eds., *The Expeditions John Charles Fremont*, Vol. 1, 553.

<sup>68</sup>Statement regarding W. T. Cox’s Experiences and Observations in Forestry, 5; and Jackson and Spence, eds., *The Expeditions of John Charles Fremont*, Vol. 1, p. 555.

The industrial revolution came to the interior Pacific Northwest with the rail networks that linked the region to national and international markets in the decade of the 1880s. First in England and western Europe and then in the United States, industrial capitalism marked the onset of increasingly intrusive patterns of human activity in the natural world. In terms of heavily capitalized and broadly based transportation and extractive enterprises, the railroad represented a vastly accelerated move to take advantage of the natural bounty of the intermontane region. At the same moment, distant places like Chicago, New York, Minneapolis-St. Paul, and even London, Berlin, and Paris assumed increasing importance to what took place in the interior Northwest. If “history happened fast” in the region, then steel rails were the transcendent vehicle for that quickening pace of activity.

The rapid building of railroads through eastern Oregon and eastern Washington during the 1880s introduced economic, social, and environmental changes that were revolutionary in their consequences. Increases in population, the formation of new counties, the spectacular expansion in the acreage of cultivated land, and the advent of large-scale industrial mining enterprises were all part of the story. Rail construction through the Walla Walla Valley and around the fringes of the Columbia plain led to an increase in wheat production to more than 2,500,000 acres within a decade. It is important to emphasize that this expansion in tillable acreage marked the emergence of commercial agriculture in a large way, with successful farmers adopting the most improved machinery of the age. Through those commercial developments, wheat-the classic frontier cash crop-replaced the native bluebunch wheatgrass and Idaho fescue on the arid grasslands of the Palouse Hills. One Washington State University scientist concludes that most of the arable land in the Palouse was under cultivation by 1910.<sup>69</sup> Wheat was an exotic; as such, its cultivation eliminated native plants, flora, and grasses. In short, the market was reshaping the ecology of the Palouse Hills.

The industrial transformation of forest ecosystems in the interior Northwest came more slowly. Distance, the absence of a viable means of transportation, and still sizable timber stands closer to markets in the Great Lakes states limited regional harvests; hence, most logging and milling of lumber before 1900 was directed to local demand. On the fringes of the Columbia plain, mills at Spokane Falls, Coeur d’Alene, Colville, Colfax, Walla Walla, and Yakima cut timber for booming local construction activity. The relation between the up-river forests and the downstream settlements on the Palouse River provides an interesting case study of the reciprocal ties between different landscapes. The forests were sources of firewood and fencing material as well as lumber for building purposes. The first crude mill began operating on the river in 1871, sawing only for nearby construction needs. Those early mills, without access to distant markets, prospered and suffered with the expansion and contraction of the local economy. Lumber capitalists from the Great Lakes States, who began arriving shortly after the turn of the century, subsequently absorbed most of the early enterprises. By that time, the local mills had exhausted the timber that could be easily felled and floated downriver.<sup>70</sup>

The cutting and milling of timber in eastern Oregon follows a similar pattern. Several small sawmills were established in the booming mining districts in the John Day; Burnt River, and Powder River valleys in the 1860s to cut lumber for building materials and timbers for bridge, sluice, and mine construction. The modest productive capacity of those early mills was sufficient to meet the demands of the boom-and-bust mining economy between 1860 and 1880. Although much of the easily accessible timber adjacent to the fledgling mining communities had been cut, the vast interior of the Blue Mountain forests was still untouched. The manipulations and maneuvers of distant capitalists, however, soon altered that relatively slow pace of activity.

<sup>69</sup>Oliphant, “History of the Livestock Industry in the Pacific Northwest,” 4-5; Johansen, *Empire of the Columbia*, 317-318; Whitney, *A Sierra Club Naturalist’s Guide*, 255; and Helmut K. Buechner, “Some Biotic Changes in the State of Washington, Particularly During the Century, 1853-1953” *Research Studies, State College of Washington* 21 (1953), 168-169.

<sup>70</sup>John Fahey, *The Inland Empire: Unfolding Years, 1879-1929* (Seattle: University of Washington Press, 1986), 188-189; Robert Wayne Swanson, “A History of Logging and Lumbering on the Palouse River, 1870-1905” (M. A. Thesis, Washington State University, 1958), 2, 13, 17, 45; and Keith C. Peterson, *Company Town: Potlatch, Idaho, and the Potlatch Lumber Company* (Pullman: Washington State University Press, 1987), 6-12.

The completion of a transcontinental railroad in 1884, linking the Columbia River-via the Blue Mountains and Grand Ronde Valley-to the Union Pacific Railroad at Huntington on the Snake River, accelerated the pace of industrial activity in the forests of eastern Oregon.<sup>71</sup> Using a variety of tactics, including dummy entrymen, David Eccles, a western lumberman, began purchasing blocks of timber in the early 1880s to supply railroad ties for the construction of the Union Pacific subsidiary, the Oregon Short Line. With a group of associates, Eccles incorporated the Oregon Lumber Company in 1889, soon to emerge as the leading producer of western pine lumber in the State.<sup>72</sup>

To tap the timber wealth of the southern Blue Mountains, Eccles and his partners formed a subsidiary corporation, the Sumpter Valley Railroad Company, and constructed a narrow-gauge line 19 miles up the Powder River. The first logs rolled down the route to Baker City and the company’s state-of-the-art mill on August 1, 1890, thus establishing a regimen for harvesting, transporting, and milling timber that lasted through the Second World War. In the succeeding years, the railroad pushed deeper into the mountains, and by 1910, the line extended 80 miles to Prairie City and the John Day Valley. In the late 1890s, mining boomed throughout the Sumpter Valley region, creating business for the Oregon Lumber Company, especially in mine timbers, and bringing a huge volume of traffic for the railroad. Eventually, several operators built small sawmills in Sumpter to cut timbers and lumber for the mines. But the railroad’s long-term, bread-and-butter traffic centered on the area’s impressive timber stands.<sup>73</sup>

The population growth for Baker County between 1880 and 1910 reflects the increased human activity along the extensive Sumpter Valley Railroad and its several spur lines. As table 2 indicates, both mining and lumbering operations attracted people to the area, with the county’s population growing from 4616 in 1880 to 18,076 in 1910: The expanding population base and an increasingly sophisticated and productive technology suggest the influence of industrial activity in transforming the landscape of the southern Blue Mountain region. The railroad was itself an intrusive force-linking resources, processing facilities, and markets-enabling lumbermen to gain access to stands remote from manufacturing sites. When he conducted a reconnaissance through the region for the Federal government in the early 20th century, H. D. Langille reported that “the destruction of the timber [was] almost complete” along much of the Oregon Lumber Company’s railroad.<sup>74</sup>

**Table 2—Population of Baker County**

<b>Year</b>	<b>Population</b>
1870	2,804
1880	4,616
1890	6,764
1900	15,597
1910	18,076
1920	17,929
1930	16,754

<sup>71</sup>Randall V. Mills, “A History of Transportation in the Pacific Northwest,” *Oregon Historical Quarterly* 45 (1946), 291-292; and Enoch A. Bryan, *Orient Meet Occident: The Advent of the Railways to the Pacific Northwest* (Pullman: Students Book Corporation, 1936), 162-163. Henry Villard, the financial guru behind the Oregon Railway and Navigation Company, also engaged in the wholesale advertising and promotion of the settlement of the Powder River Valley and adjacent areas. See James B. Hedges, *Henry Villard and the Railways of the Northwest* (1930; New York: Russell & Russell, 1967), 123-126.

<sup>72</sup>Mallory Hope Ferrell, *Rails, Sagebrush, and Pine: A Garland of Railroad and Logging Days in Oregon’s Sumpter Valley* (San Marino, CA: Golden West Books, 196, 9-13; Mosgrove, *The Malheur National Forest*, 71; Baker City *Record Courier*, November 7, 1946; and Shirley T. Moore, ed., *Sumpter Valley Railway*, USDA Forest Service, Wallowa-Whitman National Forest, Pacific Northwest Region, n.d., n.p.

<sup>73</sup>Ferrell, *Rails, Sagebrush, and Pine*, 13-33.

<sup>74</sup>Langille is quoted in Mosgrove, *The Malheur National Forest*, 71.



Although the railroad did nothing more than the bidding of its directors, a company history provides an appropriate commentary on the increased production made possible by the new transportation technology: “As the rails of the Sumpter Valley Railway were pushed up the Powder River Valley, timber was taken from each gulch and creek along the way.” The leading lumber trade journal in the Pacific Northwest, *The Timberman*, noted in 1903 that the Oregon Lumber Company was using “the only steam skidder in the state . . . to **daylight** (author’s emphasis) the forest around Whitney.”<sup>75</sup> The changing landscape of the southern Blue Mountains at the turn of the century was clearly a direct consequence of an impressive industrial technology designed exclusively to maximize production and to reward its financial backers.

The emergence of large-scale lumber production in the interior Northwest was directly linked to the four transcontinental railroads—the Northern Pacific (1883), Oregon Short Line (1884), the Great Northern (1893), and the Milwaukee Road (1909). Those ties were first evident in the vast Inland Empire, where the absence of viable, long-distance water transportation made railroads the critical element in marketing lumber beyond the region. Railroads were first put to use supplying timber for constructing branch lines to the mining districts and then for hauling lumber to those new centers of mineral production. David Mason, an early forester-authority on timber and lumber output in the region, pointed out that it was not until the 20th century “that the lumber industry of the Inland Empire began to do more than supply local demands.”<sup>76</sup>

Spokane, the transportation hub of the region’s dramatic burst in population, spurred lumber production in northeastern Washington to significant heights well before the turn of the century. Serving as the center of a vast network of rail lines that serviced the wheat-producing regions to the south and west and mining districts in Idaho and southern British Columbia, Spokane’s population grew exponentially after the Northern Pacific built its line through the community in 1881.<sup>77</sup> As table 3 indicates, Spokane County’s increase in population from 4262 in 1880 (fewer than Baker County!) to 139,404 in 1910 far outpaced the rate of growth for **any** county for **any** decade in all of eastern Oregon and eastern Washington. Because of the proximity of timber to the north and east of Spokane, those growth figures also imply a heavy demand for lumber to supply the construction needs of the burgeoning community.

**Table 3—Population Growth for Spokane County**

<b>Year</b>	<b>Population</b>
1880	4,262
1890	37,487
1900	57,542
1910	139,404
1920	141,289
1930	150,477

<sup>75</sup>Ferrell, *Rails, Sagebrush, and Pine*, 49. *The Timberman* is quoted in Ferrell, 49. Langille reported that stamp mills and mining were consuming a “considerable amount of timber.” See Mosgrove, *The Malheur National Forest*, 72.

<sup>76</sup>David T. Mason, *Timber Ownership and Lumber Production in the Inland Empire* (Portland: Western Pine Manufacturers Association, 1920), 11-13.

<sup>77</sup>For general histories of the development of the Spokane area, see John Fahey, *Inland Empire: D. C. Corbin and Spokane* (Seattle: University of Washington Press, 1965); and Fahey, *Inland Empire*.

Because Spokane dominated retail trade with its extensive hinterland, the city occupied an important position in the lumber business of the Inland Empire. Two large sawmills operated along the Spokane River before 1900; one of them, the Sawmill Phoenix, located in Spokane proper, shipped its logs on the Spokane Falls and Northern Railroad from timberlands near present-day Springdale. But when the major railroads lowered shipping rates in 1894, local lumber brokers began purchasing lumber from Puget Sound producers, practices that continued until the early 20th century, when Great Lakes lumber capitalists began looking to the Pacific Northwest for virgin stands of timber.<sup>78</sup>

Brisk regional construction activity, especially in bustling Spokane, continued to drive the lumber market in northeastern Washington until the First World War. But a slowdown in mining enterprises and rail construction brought an end to the economic boom, and the population of Spokane County grew by fewer than 2000 people between 1910 and 1920. It is ironic that the economic slowdown occurred simultaneously with the end of the massive transfer of timberland from public to private ownership, much of it to buyers from the Great Lakes States. David Mason points out, by 1909 forests that had not been transferred to the private sector were in National Forests.<sup>79</sup>

Historians and the public alike have celebrated the huge land purchases of Frederick Weyerhaeuser and his cohorts at the turn of the century. Although he is not as well known, F. A. Blackwell, who worked in Minnesota lumber camps as a youth, may represent the more typical early 20th century lumberman. Blackwell began purchasing timberlands in northern Idaho and northeastern Washington until he had amassed holdings in excess of 100,000 acres. And he was innovative at the production end, building a large flume that hurtled logs into a stream leading to Spirit Lake. In time, Blackwell was running sizable mills at Spirit Lake and Ione, operations linked to the Northern Pacific main line near Coeur d'Alene by 106 miles of steam railroad. But Blackwell's purchases and expansion in production facilities came in the midst of Spokane's greatest period of growth. When the regional economy slowed just before the Great War, Blackwell turned up victim to the economic shakeout and lost control of everything-timberlands, railroads, production facilities, and townsites.<sup>80</sup>

Blackwell's story was symptomatic of larger problems in the interior Northwest where economics and ecology intermixed in a symbiotic bond as a consequence of the feverish speculation in timberland purchases in the early 20th century. Inland Empire lumbermen aggressively sought buyers in distant eastern markets in a desperate effort to pay off their indebtedness after the downturn in the local economy. Those measures, however, failed to resolve their problems in the long run, because the lumber market remained glutted-except for a blip or two-for the entire period between 1910 and the outbreak of the Second World War. David Mason captured that veritable "catch-22" situation for Inland Empire producers at the end of the First World War:

*The lumber industry is not in a stable condition. This is made evident by the exceedingly small profits in the business, the existence of much unused milling capacity while additional capacity is being developed, and the constant tendency to- cut more lumber than the market will absorb. The principal cause of instability is the great pressure to liquidate the stumpage investment.*<sup>81</sup>

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<sup>78</sup>Fahey, Inland Empire, 189.

<sup>79</sup>Fahey, The Inland Empire, 201; and Mason, Timber Ownership and Lumber Production in the Inland Empire, 16-17.

<sup>80</sup>Craig E. Holstine, "A History of the Colville National Forest" (M.A. thesis, Washington State University, 1978), 35-37; and Fahey, The Inland Empire, 194-197.

<sup>81</sup>Fahey, The Inland Empire, 201; and Mason, Timber Ownership and Lumber Production in the Inland Empire, 13-14. For an extended discussion of the industry's problems with overproduction, see William G. Robbins, Lumberjacks and Legislators: Political Economy of the U.S. Lumber Industry, 1890-1941 (College Station: Texas A & M University Press, 1982), 5-12.

Less observable in the lumber producers' cash-flow statistics are the consequences for forest lands throughout the Pacific Northwest. For the interior region, the pursuit of the bottom line meant production-driven business practices that focused on taking only the best and most marketable timber from the woods and leaving huge amounts of debris on the ground. Waste, as Richard White has indicated, had little economic meaning in an age when the supply of timber seemed inexhaustible and perpetually glutted markets confronted the operator. The result of those practices is evident in some of the worst forest fires in the region's history, fires fed in part by the accumulation of heavy fuels lying on the ground. In contrast with earlier conflagrations, the fires that burned through logging debris were hot, consuming duff, seedlings, and standing trees alike. In truth, the new fire regimes represented a much more intrusive element in the forest ecosystem.<sup>82</sup> Those new conditions also underscore the degree to which economics and ecology were entwined in the industrial age.

If the railroad represented the opening wedge of the industrial revolution in the Inland Empire, the coming of steel rails to central and south-central Oregon had an even more dramatic effect in redesigning the regional landscape. Until the railroad reached Klamath Falls in 1909 and Bend in 1911, distant markets had little effect on the great ponderosa forests that stretched along the eastern slope of Oregon's Cascade Range. The effect of those newly built and efficient transportation arterials was to link those magnificent stands of ponderosa pine with outside markets, thus setting in motion the large-scale industrial production of lumber in the region. The Bend *Bulletin* heralded the "opening up" of this last great western pine region and the building of state-of-the-art facilities to mill the lumber as a "dream" become "actuality." The euphoria of the time and the setting emphasized pride in the volume of timber harvested and uninhibited boasting about the production records established in the mills. Less obvious in the historical literature were the changes taking place in the forested outback, beyond the towns and logging camps of central Oregon.<sup>83</sup>

In the struggle for profits in volatile and often glutted markets, the central Oregon districts possessed certain advantages over their eastern Washington counterparts: two-thirds of the central Oregon timber was privately owned; the area had relatively more even terrain; it was closer to California markets; and it had a greater volume of forest in pure stands of ponderosa pine. In its congressionally mandated forest surveys in the mid-1930s, the Forest Service found "pure or nearly pure" stands of ponderosa "reaching through the whole north-south extent of the State and from the lower slopes of the Cascades on the west to open desert lands on the east." And when the rails reached those virgin stands, other competitors were quick to notice. Ralph H. Bockmier, an eastern Washington producer, observed that the "Oregon competition," especially the mills at Bend and Klamath Falls, created competitive problems in the ponderosa trade immediately after the First World War.<sup>84</sup>

The population figures for the leading timber-producing counties in eastern Oregon and eastern Washington reflect that southward shift in lumber production (see appendices A and B). Oregon's newly created (1915) Deschutes County grew from 9622 in 1920 to 14,749 in 1930, and even during the decade of the Great Depression, a period of slow national growth, the population of the county increased by more than 25 percent. The influence of the railroads on Bend, the center of manufacturing in Deschutes County, is equally striking: 536 people in 1910 and 5414 in 1920. The population increases for Klamath County, where the Weyerhaeuser Company opened a huge mill in 1929, are even more impressive: 8554 in 1910; 11,413 in 1920; and 32,407 in 1930.<sup>85</sup>

<sup>82</sup>White, *Land Use, Environment and Social Change*, 88-91; and Pyne, *Fire in America*, 336-342.

<sup>83</sup>Thomas R. Cox, "Closing the Lumberman's Frontier: The Far Western Pine Country," (manuscript copy in the author's possession), 1; and Philip Cogswell, Jr., "Deschutes Country Pine Logging," in *High and Mighty, Select Sketches about the Deschutes Country*, Thomas Vaughan, ed. (Portland: Oregon Historical Society, 1981), 236-241.

<sup>84</sup>USDA Forest Service, *Forest Statistics for Klamath County, Oregon*, Forest Survey, Pacific Northwest Forest Experiment Station (February 1, 1936), 1; and Ralph H. Bockmier, Sr., "Inland Empire Lumber Industry over a Period of Sixty Years, 1900-1965." Typescript, R. H. Bockmier Lumber Corporation, 1967, in Washington State University Archives, Cage 387, p. 16-18; and Fahey, *The Inland Empire*, 207.

<sup>85</sup>Cogswell, "Deschutes Country Pine Logging," 241.

During those same decades, Washington's leading lumber-producing counties-Chelan, Ferry, Kittitas, and Stevens-all lost population, with some operators and workers shifting to the more active pine country south of the Columbia River.<sup>86</sup> Other mitigating factors (for example, mining) may explain the declining population in those counties; however, in an age of still labor-intensive activity in the lumber industry, the huge volume of production of the Oregon pine mills tells most of the story. Beginning in 1925 when the first aggregate figures are available, the timber harvests in eastern Oregon far outstripped those for eastern Washington. Indeed, Klamath County's lumber output in 1925 alone nearly equaled the total production for **all** of eastern Washington.<sup>87</sup>

Technology, natural competitive advantages over rival producing regions, and the virtual absence of any constraints on private timber harvesting (except for the market), contributed to the halcyon years of lumber production in the pine belt from Bend southward to Klamath Falls. But more than any other factor, the splendid, nearly pure stands of ponderosa pine explain the booming productivity of the area's mills. The USGS survey of the volume of sawtimber on the eastern slopes of the Cascades in 1900 indicated a total of 1,450,420 acres in "yellow pine;" of that huge quantity, only 33,700 acres had been logged. Moreover, the mid-1930s Forest Survey for Klamath County noted that the richest commercial belt of timber grew on terrain ideally suited to railroad and truck-road construction, much of it within a 30-mile radius of Klamath Falls. The survey also underscored the importance of the market in remaking the area's forest ecosystem: ponderosa pine comprised more than 96 percent of the total production between 1925 and 1934.<sup>88</sup>

The opening of the Weyerhaeuser Company's big mill in 1929 helped sustain the Klamath cut, even during the doldrums of the Great Depression. The county's total output remained above 300- and 400 hundred thousand board feet for most of the period, with the exception of 1932 when it dropped to 196,591. Production then rose to more than 600,000 board feet in 1936, remained above that figure through the early years of the Second World War, dropped gradually to a postwar average of about 200,000 board feet through the early 1960s, and then began an upward swing, triggered in part by Weyerhaeuser's decision to abandon select logging.<sup>89</sup> The move toward clearcutting-to what managers termed more cost-effective, "even-aged" stands-meant the abandonment of the mixed-aged forests that reflected selective harvesting. In its place, the company began to practice intensified forest management on its cutover lands.

Eventually, weak lumber prices and a decline in the supply of old-growth pine curtailed production at Weyerhaeuser's Klamath Falls sawmill, one of the largest in Oregon. The company announced that it would lay off nearly half of its 450 employees in mid-1985, citing the reduced volume of large ponderosa pine as a precipitating factor. The Portland *Oregonian* reported that the harvests of Klamath timber included stands that dated before the American Revolution. The hemorrhage of mill closures that occurred elsewhere in the ponderosa region in the 1980s included the complete shutdown of Weyerhaeuser's large mill in the small town of Bly.<sup>90</sup> Markets, corporate business strategies, and the management decisions

<sup>86</sup>Bockmier, "Inland Empire Lumber Industry," 26; and Fahey, *The Inland Empire*, 207.

<sup>87</sup>Brian R. Wall, *Log Production in Washington and Oregon: An Historical Perspective*, USDA Forest Service, Resource Bulletin PNW-42 (1972), 1519, and 30-45.

<sup>88</sup>John B. Leiberg, "Cascade Range and Ashland Forest Reserves and Adjacent Regions, *Twenty-First Annual Report of the United States Geological Survey to the Secretary of the Interior*, 1899-1900, Part V, Forest Reserves, 273; and *Forest Statistics for Klamath County, Oregon* 3-6.

<sup>89</sup>Wall, *Log Production in Washington and Oregon*, 41; and Cox, "Closing the Lumberman's Frontier," 12.

<sup>90</sup>Portland *Oregonian*, February 21, 1985.

of public land agencies affected the volume and species of logs flowing to the mills. In the long run, however, in the Klamath country as elsewhere, the heavy flow of market-selected species to the mills forged both a depressed local economy and a newly fashioned forest landscape. The industrial age proved again the close integration of the seemingly separate worlds of economics and ecology.

But it is Bend that provides the more fascinating story of the conjuncture between culture and nature, between economics and ecology, between a thriving and bustling lumber town and its timbered wealth. Bend's large-volume pine manufacturers, according to historian Thomas Cox, "represented the last, spectacular flowering of the old order," a production system predicated on liquidating standing timber as quickly as markets and the technical ability to produce permitted. The story of the Brooks-Scanlon and Shevlin-Hixon operations parallels that of other Great Lakes lumber capitalists who began purchasing large tracts of timber in the Pacific Northwest in the early years of the 20th century. Through mergers and buyouts, Shevlin-Hixon had amassed more than 200,000 acres of prime ponderosa timber when its immense mill began sawing lumber on March 3, 1916; Brooks-Scanlon, with a small but rapidly expanding acreage, opened milling facilities with a similar productive capacity the following month. The Bend Bulletin was ecstatic about those developments:

*The dream, Bend, the sawmill and lumbering center of Central Oregon is now an actuality .... After years of "watchful waiting" by men who were possessed with faith that one day saws would be humming and that the vast area of Deschutes timber would be manufactured at Bend, they have today to take a 10-minute walk from the center of town to see that realization of their dreams.<sup>91</sup>*

Each of the large pine manufacturing facilities employed about 600 men, with a ratio of perhaps two workers engaged in the logging end of the business for every mill operative.<sup>92</sup> The continually expanding cutting capacity of the plants eventually reached 200 million board feet a year, a prodigious amount, the impressive volume of timber tributary to Bend notwithstanding. For nearly three decades, the town and the surrounding countryside bustled with the kind of activity that prompted the Forest Service to boldly proclaim: "The history of the economic development of Deschutes County is largely the history of its lumber industry."<sup>93</sup> A strong case can be made that Bend was the most timber-dependent community in Oregon, or at least until the timber began to run out and entrepreneurs launched an effort to capitalize on a resource of another kind, namely snow.

The relatively even terrain provided a showcase of sons for experimenting with new, highly productive technological devices in the woods. Railroads spanned out from Bend in three directions to the rich stands of ponderosa pine, where loggers began using the highly efficient steam-powered McGiffert loader to hoist logs onto flatcars. The subsequent development of the Ledgerwood skidder and the gasoline-powered caterpillar tractor further advanced the volume of timber that loggers were able to move in a single day. And then at the close of the Second World War, the companies quickly turned to the most revolutionary

<sup>91</sup>Cox, "Closing the Lumberman's Frontier," 3-4; and Cogswell, "Deschutes Country Pine Logging," 238-246. The Bend Bulletin, March 3, 1916. The Bulletin is cited in Cogswell.

<sup>92</sup>I made a similar calculation for the ratio of workers employed in sawmill and logging operations on Coos Bay during the days of steampowered logging. That ratio changed with the introduction of the chain saw and gasoline-driven engines to the woods. See William G. Robbins, Hard Times in Paradise Coos Bay Oregon 1850-1986 (Seattle: University of Washington Press, 1988), 41.

<sup>93</sup>Cogswell, "Deschutes Country Pine Logging," 246-47; and Philip A. Briegleb, Forest Statistics for Deschutes County, Oregon, USDA Forest Service, Pacific Northwest Forest Experiment Station (May 18, 1936), 6.

and productive tool of them all, the gasoline-powered chain saw. With the steady improvement in the performance of automotive vehicles for transporting logs, Shevlin-Hixon and Brooks-Scanlon gradually turned to the use of log trucks to haul timber from ever-greater distances.”

The voracious appetite of the big mills in Bend began to place pressure on the available timber supply as early as the 1930s when Brooks-Scanlon officials asked the Forest Service to release a greater volume of timber to sustain the viability of the local economy. The supply problem for the mills rested in the heavy cutting that already had taken place on private lands. The Federal Forest Survey of 1936 for Deschutes County reported 41 percent of ponderosa pine forests in private ownership and 58 percent in the National Forests. With the volume of privately held timber rapidly diminishing, lumber executives were casting about for fresh stands. Especially significant for the future of the forest ecosystem was the fact that ponderosa pine comprised more than 99 percent of the timber harvested.<sup>95</sup>

The Deschutes County Forest Survey indicated that the Bend mills altogether had produced an average annual cut of 235 million board feet between 1925 and 1934, a volume “in excess of the sustained-yield capacity of the forest land of the county.” Of the 210,000 acres of cutover land in the county, 68 percent had “practically no trees of saw-timber size.” Therefore, privately owned timber could sustain the existing mills in Bend for only 15 to 25 years “depending on what logs might be economically hauled in from Jefferson and Klamath Counties.” When private sources were exhausted, the survey concluded, restricted, sustained-yield sales of public timber “will mean a drastic reduction of the average annual lumber production of the county.” Subsequent developments would show that the Forest Survey erred only in timing: the private stands were gone within 10 years. The manufacturing output for Deschutes County during the 1940s tells the story.<sup>96</sup>

**Table 4—Lumber production for Deschutes County**

Year	Thousand board feet	Year	Thousand board feet
1940	258,050	1946	194,605
1941	196,672	1947	14,619
1942	248,334	1948	47,918
1943	200,743	1949	33,289
1944/45	no data	1950	42,499

A few short years after the nose-dive in production, Brooks-Scanlon purchased the Shevlin-Hixon timberlands and milling facilities and promptly closed the latter, putting 850 people out of work. A booming postwar economy and the emergence of a burgeoning tourist and winter-sports industry undoubtedly mitigated the economic fallout from the mill closure. But in a larger sense, the quick liquidation of the privately held ponderosa stands merely repeated old and familiar patterns in the industry, patterns repeated elsewhere in the Pacific Northwest, the Great Lakes States, and in the South.<sup>97</sup> More difficult and complicated to assess are the effects of those industrial and market-driven forces on the forest landscape.

Although the industrial penetration of the great timber stands in the Blue Mountains began in 1890 with the Oregon Lumber Company and its Sumpter Valley Railroad, that operation remained the only largescale effort to capitalize on the mixed pine and fir forests until well into the 1920s. Distance from markets, difficult terrain, and the lack of viable transportation arterials explain the restricted commercial entry

<sup>94</sup>Cogswell, “Deschutes Country Pine Logging,” 250-251; and Cox, “Closing the Lumberman’s Frontier,” 9.

<sup>95</sup>Briegleb, *Forest Statistics for Deschutes County*, 3-5.

<sup>96</sup>*ibid.*, 6. The yearly production figures are listed in Wall, *Log Production in Washington and Oregon*, 40.

<sup>97</sup>Cogswell, “Deschutes Country Pine Logging,” 257-259; Cox, “Closing the Lumberman’s Frontier,” 9; and William G. Robbins, “The Social Context of Forestry: The Pacific Northwest in the Twentieth Century,” *Western Historical Quarterly* 16 (1985), 413-427.

into the area. But even in the face of depressed lumber prices, the western pine industry continued to expand in the years after the First World War, spurred on in part by lumber capitalists from the Great Lakes States and the South, who were seeking fresh sources of timber.<sup>98</sup>

That reborn effort to gain access to Blue Mountain timber came at a time and in places where the Federal government controlled much of the forest land. Hence, lumber capitalists were forced to negotiate timber purchases through the Forest Service and to abide by the agency’s specified cutting regulations. The Kinzua Lumber Company, with sizable holdings of its own on the northwesterly reaches of the Blue Mountains, began cutting into prime stands of ponderosa pine in Wheeler County in 1928. Until the Kinzua firm appeared on the scene, four small mills had cut a small volume of lumber for a very limited local market. But Kinzua’s large-scale commercial venture linked the rich timber stands with the industrial world, and in the first eight years of the operation, the firm had cut nearly 28,000 acres. The production accomplishments of the Kinzua mill, like those in Bend and Klamath Falls, depended on access to nearly pure stands of ponderosa pine and a branch line of the Union Pacific Railroad.<sup>99</sup>

There was no mystery behind the successes of the ponderosa mills in the years leading up to the Second World War. Ralph H. Bockmier, a large-volume Spokane lumber dealer, recalled late in life that eastern markets in particular had a great preference for ponderosa and Idaho white pine. Because the stumpage value of mixed stands was low, the market dictated “select cutting.” What that meant for the mixed-species’ forests of northeastern Washington and northern Idaho was the wholesale cutting of pine, while white fir, Douglas-fir, larch, and Engelmann spruce were left standing. Reports to the Forest Service District 6 office in 1911 indicate a growing demand for “yellow pine” on the Whitman National Forest along the Sumpter Valley Railroad and increased harvesting of the same species in the pine belt tributary to Upper Klamath Lake. The market attractions of ponderosa pine literally made it the “tree of choice” for most lumbermen. Not until the building boom after the Second World War was the interior Northwest able to successfully market species other than pine. What the forest economist Brian Wall calls the “more mixed timber inventory of the Blue Mountains” hints at the selective approach of capitalists to that region as well. The production statistics for eastern Washington clearly show the early preference for ponderosa pine.<sup>100</sup>

<u>Year</u>	<u>Species</u>	<u>Percentage of cut</u>
1925	Ponderosa pine	72
	Douglas-fir	14
1970	Ponderosa pine	35
	Douglas-fir	33

With a relatively good market for finished pine in the 1920s, it is not surprising that westerly looking lumber capitalists would continue their hunt for untapped sources of ponderosa. At the moment the Kinzua mill was coming on line, developments at the southern end of the Blue Mountains bordering on the Harney Basin were moving in a similar direction. And there, too, ponderosa pine comprised by far the most important component in the forest complex. But unlike other points of access to Blue Mountain

<sup>98</sup>Thomas R. Cox, “Frontier Enterprise vs. the Modern Age: Fred Herrick and the Closing of the Lumbermans Frontier,” forthcoming in the Pacific Northwest Quarterly, manuscript copy in the author’s possession, 3; and Morton J. Lauridsen, Forest Statistics for Grant County, Oregon, from the inventory phase of the Forest Survey, USDA Forest Service, Pacific Northwest Forest Experiment Station (August 5, 1937), 8.

<sup>99</sup>Cox, “Frontier Enterprise vs. the Modern Age,” 3-4; and F. L. Moravets, Forest Statistics for Wheeler County, Oregon, from the inventory phase of the Forest Survey, USDA Forest Service, Pacific Northwest Forest Experiment Station (dune 10, 1937), 5-6.

<sup>100</sup>Bockmier, “Inland Empire Lumber Industry,” 16; and Wall, Log Production in Washington and Oregon, 21; Report of Offices in District 6, 1911, U. S. Forest Service, Portland Regional Office, Regional Forester-National Forests, 1904-1916, box 1, Record Group 95, Seattle Branch, National Archives and Record Center, 24-25; and Wall, Log Production in Washington and Oregon, 17.

timber, the forested slopes fronting the arid basin country were largely in public ownership.<sup>101</sup> For the prudent lumberman, therefore, the assurance of cutting rights to National Forest timber was a prerequisite to investment.

Fred Herrick, a Michigan-born lumberman who made a fortune and became a buccaneer of sorts in Idaho's white-pine country, initiated the move into the southern Blue Mountains. Juggling railroad construction with the promise of cutting rights to nearly a billion board feet of National Forest timber, Herrick completed a Union Pacific line from Crane to Burns in 1924 and continued building the promised road northward until he reached the end of his financial rope. The Forest Service canceled Herrick's timber contract, disqualified him from future bidding, and eventually awarded a new contract to the Chicago-based Edward Hines Lumber Company. Hines quickly completed the railroad up the Silvies River to Seneca and built almost overnight a modern, electrically operated plant of steel construction that cut its first pine log on January 27, 1930.<sup>102</sup>

The opening of the Hines mill boosted the population of Burns to 2599 by 1930, an increase of 154 percent. Skirting on the verge of bankruptcy during the early years of the Depression, the company eventually profited through its Forest Service contract and through the continued purchase of additional stands of private timber. And where Shevlin-Hixon was able to parlay its holdings into 34 years of operations, the Hines Lumber Company played out its hand as Harney County's only major industrial complex and largest employer for 50 years. During that period the mill provided work for a largely static county population, one that had begun to decline by the 1970s. Finally, with a depressed lumber market and an inefficient and obsolete plant badly in need of renovation, the Hines Lumber Company closed its doors in 1980, devastating Harney County and putting nearly 1000 people out of work.<sup>103</sup> The old Hines' facilities subsequently reopened, but under new management with a drastically reduced work force.

With the ending of the Second World War and improved markets for lumber other than pine, the gap in manufacturing volume between eastern Oregon and eastern Washington narrowed. Much of the increased production in Washington had to do with accessibility to the mixed fir and pine forests on the eastern slope of the Cascade Range. Yakima, Kittitas, Chelan, Okanogan, and Ferry counties all reported increases in log production at the onset of the 1950s. But unlike the industrial activity in Oregon's booming pine belt before the war, the increased output in eastern Washington took place in the midst of some local economies that were more diversified. Yakima County, which has set the pace for Washington in fruit production for most of the 20th century, also led the State's eastern counties in wood manufacturing during the 1960s.<sup>104</sup>

But production records suggest neither economic nor environmental stability. Industrial technology, the factor largely responsible for increases in output during the 20th century, has exerted an extraordinary influence in reshaping landscapes. In the corporate executive's account books, industrial technology also has contributed mightily to reducing labor as a factor in production. For the highly productive timber counties in eastern Washington, the influence of mechanized technology-as elsewhere in the Pacific Northwest-is clearly evident. As table 5 illustrates, there is no direct correlation between production and population for the period from 1930 to 1970. Indeed, for Ferry County, log production rose dramatically while a net decline in population actually occurred. And although the population of Okanogan County increased slightly during the same period, its volume of log production nearly doubled.

<sup>101</sup>F. L. Moravets, Forest Statistics of Harney County, Oregon, from the inventory phase of the Forest Survey, USDA Forest Service, Pacific Northwest Forest Experiment Station (May 7, 1936), 3-5.

<sup>102</sup>Cox, "'Frontier Enterprise vs. the Modern Age,'" 5-8, and 13-19; and Moravets, Forest Statistics for Harney County, Oregon, 6.

<sup>103</sup>Moravets, Forest Statistics for Harney, Oregon, 7; and Portland Oregonian, November 30, 1980.

<sup>104</sup>Wall, Log Production in Washington and Oregon, 21.



**Table 5—Lumber production and population in selected counties, 1930-1970**

Year	Chelan		Ferry		Kittitas		Okanogan		Yakima	
	Prod.	Pop.	Prod.	Pop.	Prod.	Pop.	Prod.	Pop.	Prod.	Pop.
1930	29,762	31,634	32,330	4,292	80,619	18,154	63,349	18,519	2,087	77,402
1940	52,326	34,412	31,820	4,701	49,926	20,230	101,462	24,546	54,219	99,019
1950	57,853	39,301	75,583	4,096	69,345	22,235	110,191	29,131	86,930	135,723
1960	74,545	40,744	123,717	3,889	149,564	20,467	103,800	25,520	146,960	145,112
1970	65,491	41,355	144,344	3,655	87,627	25,039	110,517	25,587	230,718	144,971

The tremendous timber harvests in the interior Northwest that began in the 1920s continued for more than four decades. The attractions of distant metropolitan markets propelled and sustained those years of record production. In the process, the forests as well as the fields and mineral areas of the interior Northwest were integrated more closely into national and international market arrangements. Those developments further intensified the symbiosis between two landscapes—the resource-abundant interior Northwest and growing urban centers in California, the Midwest, and elsewhere. Although both environments were dramatically transformed, it was the demand for commodities in the metropolis that largely directed and ordered the pace of change in the hinterland.<sup>105</sup> With access to an increasingly more sophisticated technology, especially in the years after 1945, farmers, miners, and lumbermen brought a revolutionary, and new human ordering to the landscape of the transmontane region.

Although the symbols for the transformation of the interior Northwest are apparent on every hand, none was more spectacular or more environmentally intrusive than the building of dams on the main stem of the Columbia River. Alterations to the riverine landscape originated with the application of steam power to the rail and river movement of commodities, developments that begin innocently but vastly stepped up the pace of change everywhere along the river corridor. The opening of The Dalles-Celilo Canal amidst celebrations and speech making on May 15, 1915, was merely another in a series of efforts to manipulate the contours of the river to meet the marketing and commodity needs of the dominant culture.<sup>106</sup>

Both national and international developments were key factors driving the transformation of the Columbia River system: the emergence of electrical power as a source of energy; the stability of the national political economy during the Great Depression; and the logistics of United States foreign policy during the Second World War and after. Out of that welter of demands on the Columbia system, a novel industrial literature emerged to define, explain, and justify the channeling, revetments, canals, and eventually the building of dams across the main stem of the river itself. That new story celebrated the “harnessing” of the “untamed” power of the Columbia, the benefits that would accrue to large numbers of people through the generation of cheap hydropower, the “improved” navigation on the river, and finally, the great expanses of land in the Columbia Basin that would be put to “productive” use through the building of giant canals that would bring water to the “lifeless acres.”<sup>107</sup>

<sup>105</sup>For a further elaboration of the environmental/ecosystem link between country and city, see William Cronon, *Nature's Metropolis: Chicago and the Great West* (New York: W. W. Norton, 1991).

<sup>106</sup>William F. Willingham, *Army Engineers and the Development of Oregon: A History of the Portland District U. S. Army Corps of Engineers* (Washington, DC: General Printing Office, 1983), 36, 74-80 and 92.

<sup>107</sup>The best expression of the booster mentality associated with the building of dams on the river is the film, *The Columbia*, produced by the Bonneville Power Administration in 1946. Much of the argument here is based on my essay, “Narrative Form and Great River Myths: The Power of Columbia River Stories,” *Environmental History Review* (forthcoming 1993).

From the time of the great New Deal public works programs of the 1930s until the salmon crisis of recent years, much of the public has viewed that definition of the “working river” in a positive light. The application of engineering skill and scientific expertise, the promoters argued, heralded a bright new future in which the contours of the land would be enhanced to benefit humankind. Journalists like Richard Neuberger singled out for heroic effort the construction workers who braved the heights of Grand Coulee Dam to expand opportunity in “the last great frontier of this country.” The giant Federal projects on the river, Neuberger claimed, would transform an area that supported “desert weeds and bushes, coyotes and rattlesnakes and prairie dogs” into a land of poplar trees, corn fields, farmhouses, and small communities.<sup>108</sup>

For Richard Neuberger and others of his age, the natural world of the free-flowing Columbia River had to be put to productive economic use to serve the larger social good. The popular Oregon journalist, state legislator, and United States senator was an exemplary spokesperson for his time and place, expressing attitudes and values that eventually became articulated into public policy. The result was a sustained period of construction on the river and its major arterials that lasted for more than 30 years, activities that transformed the landscape of the Great River of the West, remaking it into a managed, regulated, and highly productive waterway for its industrial users. The environmental writer, Marc Reisner, calls it “the most fateful transformation that has ever been visited on any landscape, anywhere.”<sup>109</sup>

The literature on the building of Columbia River dams is but part of a larger body of writing that extolled the efficacy and civic duty to intervene in the natural world for human betterment. And for doubters who raised questions about consequences or environmental effects, the experts assured that technical solutions were at hand. If the dams blocked anadromous fish from spawning grounds, then downstream hatcheries would solve the problem. If the rate of timber harvesting appeared to exceed what were deemed sustainable rates, then hybrid seedlings, eliminating vegetative competition, keeping fire from the forest—or what was termed “intensified forest management”—would enable both sustainable forestry and an increased volume of harvesting. Whether it be the Columbia River, the rich wheat-growing country in the Palouse, or timber stands on the National Forests, engineering and science were widely believed the solution to the seeming contradiction between increased productivity and sustainability. For several decades after the Second World War, few voices were raised in objection to that article of faith.

But in an age where environmental limits are more widely recognized, scientists, policy makers, and others are beginning to understand that streams, forests, and soils do not have an unlimited capacity for increased yield. Awareness is growing that the industrial world has wrought spectacular transformations to ecosystems, some of which people are only beginning to grasp. And it is increasingly apparent that the very symbol of industrial production, the machine, has been an intrusive force both in the natural world and in our economic life. Evidence abounds on every hand of the environmental and economic influence of technology in the fishing industry and in the harvesting of grain crops, as well as in the woods. Although mechanization has been a blessing in alleviating much of the drudgery associated with labor, and increased production has improved the quality of life for many people, it has come with a price.

With the exception of the fur trade, the full force of the market revolution in the Pacific Northwest coincided with the advent of the industrial era. As such, the region’s experiences with human-crafted machines provide fertile ground for studying the environmental consequences of industrial practices. That

<sup>108</sup>Richard Neuberger, *Our Promised Land* (1938; Moscow, Idaho: University of Idaho Press, 1989), 353-357.

<sup>109</sup>Marc Reisner, *Cadillac Desert: The American West and its Disappearing Water* (New York: Viking Penguin, 1986), 166 and 172. For Neuberger’s enthusiasm for engineering works on the Columbia River, see Paul C. Pitzer, “Visions, Plans, and Realities: A History of the Columbia Basin Project” (Ph.D. dissertation, University of Oregon, 1990).

is especially true for the most important historical industrial undertaking in the Northwest, the logging and milling of timber. Although the machine was an important component in logging operations as early as 1900, it moved into the woods with gusto during the 1930s when operators were switching from steam to the infinitely more mobile gasoline-powered engines. Although steam power was a highly efficient way to transport logs, it was also labor intensive, requiring large crews to fuel the steam boilers on the yarding machines and other equipment.<sup>110</sup> In contrast, the introduction of gasoline-driven yarding machines, the development of the caterpillar tractor, and the adoption of the log truck vastly increased the ability to move a huge volume of timber. Those devices also narrowed the technological gap between logging and sawmilling operations. Finally, the widespread use of the chain saw by 1950 served as the capstone to a technological environment that was far removed from the days of bull teams, steam-powered donkey engines, and logging railroads. The production statistics speak for themselves.

An environmental side to that equation is obvious. Logging with bull-teams and horses was relatively benign to forest environments east and west of the Cascade Range. But the introduction of the steam donkey, first developed in the redwood and Douglas-fir country and quickly adapted to pine logging, greatly increased human-induced disturbance to eastside forest environments. In fact, because of the easier terrain, pine loggers may have more readily adopted mechanized equipment. The coming of the machine to the woods of the interior Northwest, therefore, had both economic and ecological dimensions: it speeded the rate of timber harvesting and led to the rapid growth of communities; and it contained the seeds of social dislocation and environmental disruption when the timber was gone. It should also be remembered that logging practices on the private timberlands of Oregon and Washington had no restraints until the Second World War (and then they were minimal and usually went unenforced).

To accommodate the use of the practical and cost-effective steam and gasoline-powered machines, loggers and foresters developed new harvesting procedures-clearcutting the entire area within reach of the yarding machine's system of cables. Cutting practices, in effect, were adapted to technology. Indeed, a good case can be made that the machine and the markets that made its use profitable became the chief determinant in reshaping the forest environment. Science, insofar as it was used to answer to the needs of the machine, became an ally of production and capital markets.<sup>111</sup>

The new postwar marketing conditions, which were unlike anything the industry had ever experienced, helped spur further technological innovation. Whereas the lumberman's chief complaint before the Second World War was overproduction-the dumping of too much timber on a saturated market-by the close of the 1940s producers were struggling mightily to keep pace with demand. Those new marketing arrangements placed a premium on the most modern and productive forms of technology. The consequences were extensive alterations to forest landscapes everywhere, and widespread and unprecedented increases in disturbances to forest ecosystems. By 1950, most scientists and public officials were treating the forest as a thoroughly commodified part of nature. The complex and extensive ecosystems of plant life, animals, and microorganisms were simplified to quantifiable board-foot measurements to satisfy the needs of the hour.

Nothing is new in the commodity calculus attached to natural resources; viewing forests, rivers, grasslands, and mineral-rich mountain slopes for their commodity value has a long and hallowed tradition in American history. To be sure, treating complex ecosystems as goods to be modified at will or brokered in the marketplace has contributed to problems with our rivers and woodlands, but there is much more to the story. Since the coming of Euro-Americans to the Pacific Northwest, the dominant culture has played out a production-driven end game based on the assumption that more fish could be pumped from the

<sup>110</sup>For a discussion of the reduction in the labor force during the latter 1940s, see Robbins, *Hard Times in Paradise*, 130-131.

<sup>111</sup>For a more detailed discussion of this argument, see the author's essay, "The 'Luxuriant Landscape': The Great Douglas Fir Bioregion," *Oregon Humanities* (Winter 1990), 2-7.

river, more kilowatt hours of electricity could be generated from dams, and more board feet of timber could be grown in the forests if **only** rational engineering and scientific approaches were brought to the task.

Today, mounting evidence tells us that something has gone amiss, that we cannot have unlimited hydropower production and fish too, that we cannot endlessly manipulate forest ecosystems to produce more wood fiber. The best of the present work in the ecological sciences, much of it carried on in the region's land-grant colleges and in range and forest research stations, is based on a sound reckoning with the environmental changes that have occurred in the last century. Scientists are beginning to understand the wisdom of forester Edward I. Kotok, who cautioned nearly 50 years ago that too much emphasis was being placed on the end product rather than on "the maintenance or creation of a healthy, well-balanced biological complex that by its nature is conducive to favorable vegetative growth, water relations, and the support of animal life."<sup>112</sup>

In terms of places long occupied by humans, the landscape of the Pacific Northwest is a short-lived enterprise, say 20,000 years as a median benchmark. As a place dominated by Euro-Americans, the time frame narrows to roughly 150 years; for the intermontane Northwest, a century. East of the Cascade Range—as in the more westerly country—complex ecosystems have been drastically modified and simplified. In the arid country of the Inland Empire, cheatgrass and other annual bromegrasses have replaced bluebunch wheatgrass on land used exclusively for grazing. Elsewhere on the plateaus and gentle slopes of the Palouse, a monoculture crop, wheat, has replaced everything else. And in the Blue Mountains to the south, true fir and Douglas-fir have replaced some of the area once covered by great stands of ponderosa pine.<sup>113</sup>

With the exception of drought, windstorm, and lightning-caused fires, the spectacular changes to the landscape of the interior Northwest during the last century have been human-induced. The striking historical feature of this story is the abbreviated number of years in which those alterations have taken place, especially the accelerating rate of modification during the last few decades. As public citizens, we all have much to learn about the history of that complex ecological and economic web that is part of our daily lives.

<sup>112</sup>Kotok, "The Ecological Approach to Conservation Programs," 471.

<sup>113</sup>Buechner, "Some Biotic Changes in the State of Washington," 169; Boyd E. Wickman, Forest Health in the Blue Mountains: The Influence of Insects and Disease, USDA Forest Service, PNW Research Station, General Technical Report, PNW-GTR-295 (March 1992), 2; and Blue Mountains Natural Resources Institute Annual Report, USDA Forest Service, PNW Region (October 1, 1991 - September 30, 1992), 3.

**Appendix A--Population of eastern Oregon counties**

	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	19
<b>Baker</b>	2,804	4,616	6,764	15,597	18,076	17,929	16,754	18,297	16,715	17,295	14,5
<b>Crook</b>			3,244	3,964	9,315	3,424	3,336	5,533	8,991	9,430	9,9
<b>Deschutes</b>						9,622	14,749	18,631	21,812	23,100	30,4
<b>Gilliam</b>			3,600	3,201	3,701	3,960	3,467	2,844	2,817	3,069	2,3
<b>Grant</b>	2,251	4,303	5,080	5,948	5,607	5,496	5,940	6,380	8,329	7,726	6,9
<b>Harney</b>			2,559	2,598	4,059	3,992	5,920	5,374	6,113	6,744	3,4
<b>Hood River</b>					8,016	8,315	8,938	11,580	12,740	13,395	13,1
<b>Jefferson</b>						3,211	2,291	2,042	5,536	7,130	8,5
<b>Klamath</b>			2,444	3,970	8,554	11,413	32,407	40,497	42,150	47,475	50,0
<b>Lake</b>		2,804	2,604	2,847	4,658	3,991	4,833	6,293	6,649	7,158	6,3
<b>Malheur</b>			2,601	4,203	8,601	10,907	11,269	19,767	23,223	22,764	23,1
<b>Morrow</b>			4,205	4,151	4,357	5,617	4,941	4,337	4,783	4,871	4,4
<b>Sherman</b>			1,792	3,477	4,242	3,826	2,978	2,321	2,271	2,446	2,1
<b>Umatilla</b>	2,916	9,607	13,381	18,049	20,309	25,946	24,399	26,030	41,703	44,352	44,9
<b>Union</b>	2,552	6,650	12,044	16,070	16,191	16,636	17,492	17,399	17,962	18,180	19,3
<b>Wallowa</b>			3,661	5,538	8,364	9,778	7,814	7,623	7,264	7,102	6,2
<b>Wasco</b>	2,509	11,120	9,183	13,199	16,336	13,648	12,646	13,069	15,552	20,205	20,1
<b>Wheeler</b>				2,443	2484	2,791	2,799	2,974	3,313	2,722	1,84

**Appendix B--Population of eastern Washington counties**

	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960
Adams				2,098	4,840	10,920	9,623	7,719	6,209	6,584	9,929
Asotin				1,580	3,366	5,831	6,539	8,136	8,365	10,878	12,908
Benton						7,937	10,903	10,592	12,035	51,370	62,070
Chelan					3,070	15,104	20,906	31,634	34,412	39,301	40,744
Columbia			7,103	6,709	7,128	7,042	6,093	5,325	5,549	4,860	4,568
Douglas				3,161	4,926	9,227	9,392	7,561	8,651	10,817	14,890
Ferry					4,562	4,800	5,143	4,292	4,701	4,096	3,888
Franklin				696	486	5,153	5,877	6,137	6,307	13,563	23,342
Garfield				3,897	3,918	4,199	3,875	3,662	3,383	3,204	2,978
Grant						8,698	7,771	5,666	14,668	24,346	46,471
Kittitas				8,777	9,704	18,561	17,737	18,154	20,230	22,235	20,467
Klickitat	230	329	4,055	5,167	6,407	10,180	9,268	9,825	11,357	12,049	13,458
Lincoln				9,312	11,969	17,539	15,141	11,876	11,361	10,970	10,918
Okanagan				1,467	4,689	12,887	17,094	18,519	24,546	29,131	25,520
Pend Oreille							6,363	7,155	7,156	7,413	6,914
Spokane	996		4,262	37,487	57,542	139,404	141,289	150,477	164,652	221,561	278,330
Stevens		734	1,245	4,341	10,543	25,297	21,605	18,550	19,275	18,580	17,884
Walla Walla	1,318	5,300	8,712	12,224	18,680	31,931	27,539	28,441	30,547	40,135	42,198
Whitman			7,014	19,109	25,360	33,280	31,323	28,014	27,221	32,469	31,260
Yakima		432	2,811	4,429	13,462	41,709	63,710	77,402	99,019	135,723	145,110

**Robbins, William G.; Wolf, Donald W. 1994.** Landscape and the intermontane northwest: an environmental history. Gen. Tech. Rep. PNW-GTR-319. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 32 p. (Everett, Richard L., assessment team leader; Eastside forest ecosystem health assessment; Hessburg, Paul F., science team leader and tech. ed., Volume III: assessment.)

Traces the natural and cultural processes involved in shaping the environment in the intermontane northwest from the Indian period of domination to the present. Emphasizes increasing influence of humans as modifiers of landscapes and ecosystems, especially with the coming of the market system to the region and the onset of the industrial era. Focuses on the unique aspects of ecological change in the intermontane region: the very recent extension of the market system to the area; and the very rapid expansion of human-induced environmental disturbance over extensive areas in a very brief span of time.

Keywords: Environment, modification, market systems, cultural stability, fire, horse, reconnaissance surveys, railroads, Euro-Americans, Native Americans, timber, sawmills, grazing.

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