

APPENDIX K: SOCIAL THRESHOLDS

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PAST CONDITIONS

Pre-Euro-American Settlement

The domestication of fire was significant to human evolution, and is considered to have occurred some 500,000 years ago. With fire as a tool, *Homo erectus* was able to migrate into colder latitudes in Eurasia. A portable heat source allowed geographical expansion, cooking (which greatly increased food sources) and the ability to drive grazing animals. According to Pyne (1997):

“It was fire as much as social organization and stone tools that enabled early big game hunters to encircle the globe and to begin the extermination of selected species. It was fire that assisted hunting and gathering societies to harvest insects, small game, and edible plants; that encouraged the spread of agriculture outside of flood plains by allowing for rapid landclearing, ready fertilization, the selection of food grains, the primitive herding of grazing animals that lead to domestication, and the expansion of pasture and grasslands against climate gradients...” (p. 4)

Humans first entered the greater Pacific Northwest (Washington, Oregon, Idaho, Northern California, Nevada, western Montana, and southern British Columbia) during the late Pleistocene when much of the mountain country was cloaked in glaciers (Ruby and Brown 1992). Boyd (1999) notes that there is some indication that early Pleistocene hunters used burning to manipulate the environment thousands of years ago.

This pre-Euro-American settlement discussion focuses on the use of fire by aboriginal peoples in the Willamette Valley. The history and uses of anthropogenic fire in this region is extensive and serves as a proxy for aboriginal use of fire elsewhere in the INFMS study area. Clearly not all peoples in all areas used fire in the same way or for the same reasons. However, given the extensive and varied uses of fire in the Willamette Valley, it is reasonable to assume that most subsistence uses for all aboriginal peoples of the area are covered by this discussion.

According to Boyd (1999) studies of fossil plant spores and pollen indicate that the Willamette Valley was dominated by oak savanna for more than 6,000 years. While this ecotype has its origins in a warmer drier climate, the oak savanna persisted through millennia despite the modern climate more conducive to forest growth. Since natural fires are infrequent, some other force must account for the continuation of the subclimax vegetation. It is believed that regular aboriginal fires were the main cause. Dan Flores (1997) notes that “the West looked and

functioned ecologically the way it did 400 years ago had everything to do with the fact that Native Americans managed it with fire...”

The Willamette Valley prairies described by early trappers and explorers had been actively managed and manipulated, if not actually created by the Native inhabitants. The Willamette Valley was, according to Boyd (1999), the most intensively fire-managed environment in the pre-settlement Northwest.

Those aboriginal peoples were primarily the Kalapuya, with Mollala, Tenino, Northern Pauite, and Chinook associations (Mid-Willamette LSR Assessment, 1998). The Kalapuya were the sole residents of the Willamette Valley prairies. Since they share material cultural traits with Northwest Coast peoples (Chinook, Tillamook, Alsea, Siuslaw) and Plateau peoples (Mollala, various Sahaptins), (Ruby and Brown, 1992) some inferences are made concerning aboriginal use of fire throughout the study area.

Prior to European contact, the Willamette Valley (Fire Zone 4 – Valley/Foothills) was open oak savanna grassland burned annually by the aboriginal inhabitants. Surrounding the relatively flat valley bottom was dense Douglas-fir forest. Apparently the aboriginal people preferred open areas, no doubt for visibility and security as well as subsistence reasons. Any incursion of conifers was probably considered an invasion by unwanted species. The valley contained numerous seasonal lakes and marshes that have disappeared with the establishment of agriculture and water diversion projects. Lightning is rare in the valley, typically occurring in higher elevations of the Cascades. The climate is moderate and 75% of the annual precipitation falls October through March.

The Kalapuya less frequently used the higher elevations of surrounding Coast and Cascade Mountains, where dense conifer forests dominated. Use of fire in either the Coast or Cascade Mountains would have been limited by climatic and geographical conditions. As Morrison (1999) notes: “On the western side [of the Cascades], where the human use of fire was less apparent, the timber was dense...” (p. 227). Aboriginal peoples made seasonal trips to the mountains for hunting, fishing and gathering berries. It is expected that they used fire in higher elevations as they would in the valley floor and fringes to the extent conditions allowed (Boyd, 1999; Pyne, 1997). The trans-mountain trails used by early explorers and trappers were probably maintained by aboriginal firings.

The Kalapuya subsistence use of fire served both immediate and deferred purposes. **Immediate effect** uses are those where fire was used for hunting and gathering. **Deferred effect** uses are those where fire was used to produce long-term effects. Sadly, Boyd (1999) points out that because deferred effects were less apparent to early observers and “early anthropologists did not do in-depth interviews with knowledgeable Kalapuya informants,” virtually no data exists about deferred effect uses (p.110). But inference can be made based on data acquired from neighboring indigenous cultures.

Known immediate effect subsistence uses of fire by the Kalapuya include: deer hunting, tarweed (*Madia* spp.) gathering, insect collecting (grasshopper, black crickets and yellowjacket larvae), and the use of smoke to drive ground squirrels out of their burrows.

Inferred long-term effect uses of fire include: firing under oak trees to remove brush and facilitate acorn gathering, burning to improve visibility (for single deer hunting or for security purposes) and burning prior to the broadcast of tobacco seeds. According to Boyd (1999) “it is likely that the Kalapuya burned to promote growth of desirable basket-making materials and to create environments favorable to the growth of wild berries and root crops” (p.115).

Hazel (*Cornus cornuta*) and acorn (*Quercus garryana*) were an important food source for native peoples. Low-intensity understory burning on a regular basis (after the season’s harvest was complete) maintained a well-groomed, orchard-like grove. This technique increased the yield of nuts and kept the oak from becoming too dense.

Hazel, today a common understory component in oak stands, was also an important basketry material for the Kalapuya, Grand Ronde and Coastal Siletz people. Low-intensity burning would reduce competition to favor the hazel.

It is likely that the Kalapuya used annual burns to maintain a variety of microhabitats that both facilitated the hunt and were favored by deer. By excluding isolated pockets of Douglas fir from these burns, they could keep deer and elk in the valley. Boyd (1999) notes that annual burning encouraged the re-growth and year-round availability of forage grasses used by deer and elk.

Tobacco appears to have been an intentional “crop” of the aboriginal people, and it appears that they knew the value of wood ash as a fertilizer. Seeds were placed in burned, rotten logs.

Wild blackberry (*Rubus ursinus*), huckleberry (*Vaccinium* spp.), strawberry (*Fragaria* spp.), salal (*Gaultheria shallon*), blackcap (*Rubus leucodermis*), and salmonberry (*R. spectabilis*) were important food sources, either dried and stored or eaten fresh from the vine. Periodic burning increased yields.

Aboriginal peoples also used fire to create and sustain suitable habitat and increase growth of root crops such as camas (*Camassia quamash*), wild onion (*Allium* spp.), tuber of lupine (*Lupinus* spp.), and the rhizome of bracken fern (*Pteridium aquilinum*).

The burning season was late summer and early fall, after the harvest was complete and typically after some rain had fallen. Control methods were simple: burn in anticipation of the coming winter rains.

According to Boyd (1999), research demonstrates that “the Indian use of fire in the Willamette Valley was so frequent and widespread that it maintained what ecologists would call a “fire climax” biotype. With control over and knowledge of the ecosystemic effects of fire, the Indian established an important symbiotic relationship with their environment” (p. 128).

Robbins (1999) observes that with the arrival of ever-increasing numbers of Euro-Americans after 1800, the relative cultural and ecological stability of several millennia in the Pacific Northwest began to erode. According to White (1992), aboriginal uses creating these landscapes were dismissed as wasteful or ignored.

The Settlement Era

The search for beaver led to the exploration of the Willamette Valley by Euro-Americans in the early 1800s. In September 1826, David Douglas described the “plains burned by the Indians to drive game animals in certain parts for more convenient hunting.” The Hudson Bay Company set up a fur-collection station in the modern Eugene area in 1829. Methodist missionaries established the Willamette Mission near modern Salem in 1834, which, over the next decade, encouraged immigration and contributed to an increase in population (Boyd 1999; Pyne 1997; Ruby and Brown 1992).

By 1845, the 2,000 settlers in the Valley outnumbered the vanishing Indians. As Pyne (1997) asserts, the fire practices of initial settlers were not very much different from those of the aboriginals that they displaced. Early settlers adopted fire hunting and that evolved into burning forest pasturage for domestic stock.

It was in the 1850s that the population of the Valley swelled from 13,000 to 52,000. Settlement spread from the valley floor to the foothills. To replace depleted wild game, agriculture was taking hold. Much land was cultivated to wheat, oats, hay, potatoes, onions, and orchards. Herds of cattle were abundant. A variety of mills had been built.

The sources of fire changed as agriculturists replaced hunting and gathering societies. Fire moved out of the grasslands and into the surrounding timber. Landclearing and logging added to the intensity and the frequency of fires.

In 1872, the first railroad ran through the valley. This would prove to be a routine source of human-caused ignition, especially in the South Cascade Fire Zone. Data from the National Fire Occurrence Library (Kansas Computer Center) indicates that 127 fires, totaling 1,574 acres and directly attributable to the railroad, occurred between 1970 and 1994 on national forest land in the South Cascades zone (personal communication, John Orbeton, February 2000).

According to Pyne (1997) “evidence clearly shows that the frequency of large fires increased with the appearance of American settlers” (p. 335). Throughout the 19th century, smoke was reported to be so thick that in 1868 it was suggested that lighthouses be established along the Willamette River to guide steamers. Between aboriginal fires and land-clearing fires set by settlers, most of the major river valleys were cloaked in smoke in August and September. Public attention was focused on the smoke, not the fires.

Human caused fires and smoke continued through the remainder of the 19th century, wherever there was expansion: slashing, landclearing, roads, and railroads. This was especially true along the Cascades, where Pyne (1997) notes: “sheepmen arrived with herd and torch, firing the mountain landscaped for pasturage” (p. 338). It was common practice for the herdsmen to burn brush and timber wherever it caused difficulty. Usually the fires were set in September and could burn thousands of acres of timber and brush.

Industrial logging arrived in the Northwest around the turn of the century. Large-scale slash burning was added to the fire lexicon of the Willamette Valley. Burning the debris left at logging sites was generally done in the fall to reduce the possibility of wildfire and subsequent loss of the valued resource. In 1902, a combination of slash burns and abandoned campfires fanned by east winds resulted in at least 80 major fires that killed settlers and produced smoke sufficient to turn day into night. As Pyne (1997) notes: “Large-scale logging arrived in the early twentieth century, in the era of the conservation movement, amid the fears of a timber famine and the growing acceptance of fire control as a necessity for a successful timber industry” (p. 327). In 1904 the Booth-Kelly Lumber Company established a cooperative fire patrol in Lane County.

The period encompassing World Wars I and II and the Great Depression (1914-1945) saw increasing immigration into the state, increasing timber harvest to fuel the machines of war and an increase in what are called “job hunting fires,” a means of generating employment. The Civilian Conservation Corps (CCC) hit the fireline for the first time on the Tillamook Burn of 1933. In 1939 smokejumpers and organized fire crews were created and the fire prevention campaign featuring Smokey Bear was developed in 1945.

Cooperative fire and forestry ventures continued through the 1940s. The post-WWII housing boom focused on logging of federal lands, beginning a trend that would last through the 1980s. However, smoke has always been a serious concern in the Northwest. Farm and cities developed in the valley troughs running between the Coast Range and the Cascades. Agriculture succeeded on the former prairies where it could not in the forest. Occupation of the forests was left to forestry. As Pyne (1997) observes: “this settlement pattern meant that the effluent of the logging industry would be funneled into the sites of greatest human density” (p. 342).

In the decade following World War II, the grass seed industry became established in Lane, Linn and Marion counties. Annual fall field burning was an excellent way to remove litter and destroy pathogens. It also produced huge volumes of smoke that typically was trapped in the Willamette basin, especially in the Eugene area. By the mid-1960s, unregulated field burning was banned, slash burning (now done to prepare the logged site for tree planting as well as hazard reduction) was highly regulated and tough standards for air quality were in effect (Pyne,

1997). Field burning would be allowed only under permit and would be highly regulated by the State of Oregon Department of Agriculture (personal communication, Jim Trost).

The period from the 1970s to the present brought rapid change. Much of that change reflects changes in American culture including growing urbanization. Between 1960 and 1998, the populations of Lane, Linn, and Marion counties almost doubled (Oregon Blue Book 1999). As a population becomes more urban, it loses economic ties to the land and perceives land as a recreational resource rather than a producer of goods and services.

Summer homeowners and retirees moved into the river valleys of the Willamette National Forest. According to Rakestraw (1991) these newcomers expected the forest to be managed for social rather than economic benefits.

Increasingly people were looking at wildlands as an aesthetic and/or spiritual value as well as a recreational resource. Recreational uses grew exponentially. On the Willamette National Forest, for instance, Rakestraw (1991) cites dispersed and developed recreation use in 1980 at 1.6 million "recreation visitor days". By the end of 1998, that usage had climbed to over 12 million (Willamette National Forest Annual Report 1988). In addition, an ethic that values wildlands simply as wildlands has emerged. One need not use them at all or even visit them to appreciate them. Just knowing they exist is sufficient reason to have them.

CURRENT CONDITIONS

Urbanization & the Wildland/Urban Interface

In measuring the socioeconomic characteristics of Oregon, Vaidya (1999) found that household incomes are rising, home ownership continues to rise, education levels have increased, and Oregon is still a state settled by migrants. Vaidya also found Oregonians rating the state favorably in terms of environmental issues, notably clean air and water.

Human habitation and development exists in all of the fire zones. The Valley/Foothills Fire Zone (with population centers Eugene/Springfield, Veneta, and Cottage Grove) is the most developed, the most urbanized and the most densely populated. However, each of the other zones include towns, communities (incorporated and unincorporated), transportation networks, recreation facilities, and a mosaic of public and private lands to varying degrees, as shown below:

Fire Zone	Communities	Recreation
High Cascades (1)	<ul style="list-style-type: none"> Breitenbush Idanha Marion Forks McKenzie Bridge Blue River 	<ul style="list-style-type: none"> Clear Lake Cougar Recreation Area Waldo Lake Many other recreation facilities
Low Cascades (2)	<ul style="list-style-type: none"> Gates Detroit Finn Rock Vida Nimrod Leaburg Dorena Disston 	<ul style="list-style-type: none"> Opal Creek Detroit Green Peter Reservoir Foster Reservoir Many other recreation facilities
South Cascades (3)	<ul style="list-style-type: none"> Oakridge Westfir 	<ul style="list-style-type: none"> Middle Fork of the Willamette River Hills Creek Reservoir Many other recreation facilities
Coast (5)	<ul style="list-style-type: none"> Blachly Walton Deadwood Mapleton Florence 	<ul style="list-style-type: none"> Abundance of developed and dispersed recreation areas.

The High, Low and South Cascade and the Coast Range Fire Zones, while less densely populated, are all more characteristic of urban/wildland interface. Structures and improvements are frequently surrounded by forest and often in deeply incised, step terrain.

For most inhabitants of the area, interactions with fire are infrequent, aside from the occasional campfire or backyard debris burn. Wildfires, natural and human-caused, occur with the greatest frequency in fire zones where lightning is more common (High and South Cascade Fire Zones) and/or recreational or industrial uses occur. Fire is relatively uncommon in the Coast Range Fire Zone.

According to Perry (1985), fire suppression efforts in the wildland/urban interface are complicated by a number of correctable circumstances: access to structures is often poor; road access for equipment is often inadequate; locations of structures aren't always mapped or even known by firefighting agencies; often fuels have not been treated near structures; slopes are frequently steep; structures are generally wood construction; water systems can be poor to non-existent; and response times can be long.

Population pressures of the 20th century have pushed people into fire-prone areas. As wildland/urban interface areas grow in size and number, the probability of more fires and greater losses increases (Bailey, 1991). Although efforts to reduce the wildfire hazard have increased, threats to wildland/urban communities have not been addressed because of the inability of agencies to cooperate, the low priority accorded such threats,

and the lack of sufficient funding to deal with the threat (Cook, 1997). According to Lavin (1997) the risk of fire can only be reduced when landowners and residents cooperate with state and/or local agencies. Federal, State and local fire agencies are realizing that without homeowner's involvement, little can be done to reverse the wildland/urban interface fire loss trend.

Hurd (1995) and Agee (1989) point out that while resource management plans and objectives may be sound ecologically, socio-political considerations and obstacles must be confronted and addressed. Communication, education and meaningful public participation will be essential to the acceptance and support for natural fuels management activities.

PUBLIC ATTITUDES AND PERCEPTIONS

According to Stephen Pyne:

“The larger effects of fire on earth are thus really the effects of anthropogenic fire. They depend not merely on the genetic and ecological potential for exploiting a fire that is inherent in the natural system but also on the potential within the culture—on its domesticated flora and fauna, on its hunting and gathering preferences, in its perceived meaning of fire, on its understanding of fire behavior and its comprehension of fire's effects, on its ability to apply and to withhold the fire of its own or of nature's making.” (p. 39)

In the early 1900s, the Forest Service developed a policy of immediately extinguishing all forest fires. This policy received strong public support (Hendee, *et al.* 1968; Folkman 1979) and prevailed for over half a century. Through that time, only fire fighting methods and technology changed.

In 1977, the policy was changed from one of strict control to one allowing use of wildfire as a management tool. However, due in part to the success of the agency's Smokey Bear campaign, public acceptance of this change has been very slow in developing. While attitudes are changing (Stankey 1976, Rauw 1980, Stenberg 1982) the public is still resistant to the concept of anything less than complete fire suppression. In Rauw's 1980 study of residents and visitors of the Olympic National Park, a large proportion of the people surveyed felt that all fires should be controlled at any cost.

In 1986, Oregon's Department of Environmental Quality proposed a Visibility Protection and Smoke Management Plan to limit agricultural field burning and industrial forest residues (slash) burning. Concerns expressed at public hearings were:

- Effects of smoke on air quality and public health;
- Effects of reduced visibility on scenic quality;

- Waste of resources resulting from the burning of logging slash; and
- Economic impacts of proposed restrictions on commercial forestry and agriculture.

One third of those members of the public (not affiliated with advocacy groups) felt that burning should be prohibited at all times (Oregon DEQ, 1986).

During the drought years of the late 1980s, major wildfires occurred in the Pacific Northwest. After the fires were extinguished the Forest Service put together teams of resource specialists to plan for the recovery of these burned over lands. How these areas were to be recovered was a contested issue by various citizen groups as well as various Forest Service resource specialists. The public's perceptions of the wildfire areas were varied; however, some generalities can be made:

The general public with no first hand observations of the fire area (most were in unroaded areas) believed that the whole area was burned intensely, leaving a totally black landscape with no living vegetation remaining (they felt that this was a landscape with no redeeming scenic qualities). Instead, the fires burned with varying degrees of intensity, leaving a mosaic of areas ranging from green to green-and-brown to black (thus creating landscapes with more variety).

The general public felt that the best way to bring the landscapes back to a healthy, green condition was to harvest or salvage the remaining trees and replant new trees. However, the burned forest could be replaced without salvaging trees; some dead and down material was beneficial to the new forest; and some logging/salvage practices were detrimental to recovering a new forest and maintaining scenic integrity (USDA Forest Service 1988, 1989, 1990).

Public support is attainable if prescribed fire is used to reduce the risk of catastrophic wildfire, or to manage ecological conditions by simulating the historic fire regime (Zwolinski, *et al.* 1983; Gardner, *et al.* 1985; Taylor and Daniel 1985). However, public support is less likely if people perceive that: there is a potential health or visibility problem (smoke); water quality may be reduced; aesthetic or recreation site quality will be degraded; or there is a high risk of a fire escaping control efforts (Shelby and Speaker, 1990).

DESIRED FUTURE CONDITIONS

Fire policy has a critical sociopolitical component and most managers understand that modern forestry is heavily involved in educating and communicating with the public (Manfredo, *et al.* 1990). It is suggested that educational efforts concentrate on the most often expressed reasons for disapproval:

- Fear that fires would escape control efforts and endanger lives and property;

- Concern that fires would harm natural systems;
- Belief that natural systems are too complex to be managed by fire; and
- Belief that fires should not be allowed for any reason (Cortner, *et. al.* 1984).

Recognizing and addressing the difference in perceptions of fire held by professional fire managers as compared to those of the general public is crucial to effective, successful communication and interaction.

The general public does not have the detachment that allows fire managers to function under high stress circumstances. Rather, as pointed out by Daniels, *et. al.* (2000), psychologists refer to fire as one of the four fundamental fears (along with snakes, water and the dark). Acknowledging the legitimacy of the emotional element of people's response to fire must occur before the public can be expected to accept the more intellectual aspects of fire management.

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