Tiller Pre-Contact Reference Condition Study

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Executive Summary

Project Purpose

The purpose of this study is to produce a reliable landscape-scale description of late precontact (pre-1826; ca. 1800) reference forest conditions for the eastern portion of present-day Tiller Ranger District of the Umpqua National Forest in Douglas County, Oregon. The primary intended use of this information is to help update Community Wildfire Protection Plans. The findings from this study will assist Douglas County in planning for mitigation of landscape-scale fire hazards, forest restoration, cultural resource protection, and other applications in which knowledge of past forest conditions may prove useful and which have direct relevance to wildfire protection planning.

Study Area Description

The study area is in Douglas County, Oregon, on the western slope of the Cascade Mountains, and extends from the Cascade Crest at elevations greater than 6,000 feet, westward to the confluence of Jackson Creek with the South Umpqua River at approximately 1,100 feet elevation. The southern boundary of the study is the watershed line between Jackson Creek and Elk Creek and the Rogue River; the eastern boundary is the Cascade Crest; the northern boundary is the watershed line between the South Umpqua and North Umpqua rivers; and the western boundary is the South Umpqua River and the watershed line between Boulder Creek and Dumont Creek. The area is 232,000 acres in size, mostly contained within the Tiller Ranger District of the USDA Umpqua National Forest. Significant private lands also exist in the study area, with the majority of these being situated at lower elevations toward the western boundary, and primarily used for purposes of farming, ranching, or timber production. All land is located within Tsp. 27 S. to Tsp. 31 S.; and Rng. 1 W. to Rng. 3 E. (See Chapter I).

Research Methods

This study uses the "method of multiple hypotheses" as the basic framework for conducting research. This method involves approaching a specific research question with all information available from relevant disciplines; making a reasoned answer to the question based on the weight of the gathered evidence; and then posing more specific questions that can be asked in order to better consider the original hypothesis.

Principal datasets for this project include a literature review (see Chapter IX); original General Land Office survey notes; the systematic selection of 25 "Areas of Special Interest," stratified for more specific analysis; historical maps and other archival records; historical aerial and fire lookout tower panoramic "Osborne" photographs; oral histories and traditions; and a comprehensive set of GPS-referenced field photographs that detail current conditions. Stand reconstruction fieldwork was performed in key locations in order to quantify basic stand development changes from ca. 1800 to the present time (see Appendix B).

The basic premise of this research is to describe forest conditions for the study area as they existed 200 years ago, and to contrast them with current conditions in order to consider if a return to past conditions could mitigate current risks and problems associated with catastrophic-scale wildfire. Maps and tables created from Geographic Information Systems (GIS) software are the primary formats used to compare spatial and temporal vegetation distributions. Figures and text are used to illustrate and describe the ancient landscape, compare it to current conditions, and to consider vegetation patterns at a finer, more localized scale. (See Chapter II).

Human Use and Occupation

There is very little history or other information available about the people who lived in the study area 200 years ago; however, much can be inferred from what is known of neighboring Tribes of that time, the presence and extent of current and historical vegetation patterns (particularly those of traditional food and fiber plants), archaeological research, and known precontact travel and trade routes. Because people at that time did not have horses and because the South Umpqua headwaters are not navigable by canoe, travel was by foot, along well-established ridgeline and streamside trail systems. Primary destinations would have been local village sites, seasonal campgrounds, peaks, waterfalls, the mouths of streams, and various crop locations, such as huckleberries, camas, and acorns.

Trail networks indicate where people went at certain times of the year, where they stayed along the way, and where they came from (or went to). Trails connect townsites with principal seasonal campgrounds based on food harvesting and processing schedules, fishing and hunting opportunities, and trade. Freshwater springs at higher elevations were a critical element, such as Neil Spring near Huckleberry Lake or Grasshopper Spring on the border of Grasshopper Meadow. Fish runs at South Umpqua Falls, acorn harvests in the Pickett Butte area, tarweed burning at Bunchgrass Meadows, camas digging at Bear

Wallows, and huckleberry picking at French Junction would have been the types of activities and locations that would dictate where people were concentrated, and when.

Two hundred years ago, Takelma-speaking ancestors of today's Cow Creek Tribe likely occupied the lower elevations and western oak savannahs of the study area, with strong personal and family ties to local communities in the areas of present-day Tiller, Drew, and Milo. Takelmans fished the lower elevations of the South Umpqua and Jackson Creek, particularly in areas around the falls and mouths of streams, and tended crops of acorns, tarweed, camas, fawn lilies, huckleberries, salal, manzanita, and other foods on the slopes adjacent to these streams.

Southern Molalla likely occupied the ridgelines and headwater subbasins, such as the Fish Lake and Five Lakes areas. Molallans were known for elk hunting, using snowshoes and dogs, and for huckleberries. Winter villages were likely at the lower elevations of the study area, perhaps even shared with their Takelman neighbors. Summer campgrounds were likely situated along established trade routes, huckleberry fields, and sources of freshwater.

Highly probable (or possible) seasonal uses of the study area was made by the Latgawa from Rogue River to the south – most likely in the Anderson Camp, Huckleberry Lake, and Abbott Butte areas; the Klamath along the eastern ridgelines, perhaps centering on the French Junction area; Kalapuyan-speaking Yoncallans and Athapaskan-speaking Upper Umpqua from the valleys to the north and northwest; and Paiutes from the high deserts to the east. (See Chapter III).

Fire History

Because people were present in the study area on a daily basis 200 years ago, fire was also constantly present. In order to keep campfires and cooking ovens fueled, firewood and other fuels had to be systematically and regularly gathered across the landscape. Firewood gathering activities probably focused on areas closest to campgrounds, campsites, and along trail networks. Different fuels had different uses: grass, twigs, moss, and cedar for kindling; Douglas-fir and pine for heat and light; alder, maple, and vine maple for smoking; and madrone, oak, and manzanita for cooking. Patch fires were used seasonally to rejuvenate food plants, for weeding, and to create weaving materials: late winter and early spring fires were used to maintain bracken fern prairies; summer fires were used for harvesting tarweed land other seed crops; and fall burning was used to rejuvenate huckleberry fields, treat hazel clumps, and harvest acorns. Broadcast burning was performed on seasonal basis for clearing trails and underbrush, for hunting, and for creating fuels; mostly in late summer and early fall when plants were dry and before snow or heavy rains had set in. Individual and clumps of trees were burned to create logs and firewood, as hearths, and to harvest pitch.

Because intentional anthropogenic fire was a constant presence in the landscape at that time, and for thousands of years previously, vegetation composition, structure, and distribution patterns reflected the historical human uses of the landscape. Lightly-fueled areas including prairies, savannahs, and open park-like forests were established and maintained, greatly reducing the likelihood – or even possibility – of large- or catastrophic-scale wildfires. Lightning fires occurred, but they encountered limited fuels within an anthropogenic mosaic maintained by human-set fires, and hence lightning fires were constrained to burn within that established vegetation composition, structure, and distribution. (See Chapter IV).

Native Wildlife: Plants and Animals

The study area contains a wide diversity of native plants and animals typical of the western Cascades of Oregon, including the southern-most extent of Alaskan yellow cedar and northern-most extent of Shasta red fir. Although Douglas-fir currently dominates most of the study area -- with the exception of higher elevation peaks and ridgelines -- relict stands and groves of Oregon white oak, ponderosa pine, sugar pine, western redcedar, and chinquapin strongly indicate past conditions, when Douglas-fir populations were more limited and savannahs, grasslands, brakes, and berry fields were more extensive.

Significant numbers of native insects, birds, and mammals were also observed and/or documented in the study area, including elk, deer, coyotes, black bears, cougars, western gray squirrels, skunks, ruffed grouse, Canada geese, turkey vultures, frogs, butterflies, ticks, and mosquitoes. Wolves were last documented in the study area in the mid-1940s, although there is some questionable evidence they may have returned in the past few years. Other extirpated species include California condors, grizzly bears, and wolverines. The only introduced animal species noted was turkeys, and exotic invasive scotch broom, meadow knapweed, and tansy ragwort plants were observed along certain roads, trails, and landings. (See Chapter V).

Precontact Vegetation Types (ca. 1800)

Project research indicates four primary "zones" can be used to represent basic vegetation types and sub-types that existed in the South Umpqua study area 200 years ago: Oak Zone; Pine Zone; Douglas-fir Zone; and Subalpine Zone. The zones represent a west-to-east change in elevations, with the Oak Zone located to the west in the lowest elevations; the Pine Zone located more easterly, at greater elevations and along slopes adjacent to the Oak Zone; the Douglas-fir Zone adjacent to the Pine Zone on steeper lands and higher elevations; and the Subalpine Zone along the ridgelines and peaks at the highest elevations and eastern-most locations in the study area. (See Chapter VI).

Oak Zone. White oak and pine savannahs, extensive grassland meadows and prairies, and patches of Douglas-fir, redcedar, and pine typified much of the western and lower elevation (below 2,400 feet) portions of the study area 200 years ago. The presence and arrangements of these plants, as well as widespread populations of camas, cat's ears, fawn lilies, iris, tarweed, yampah, and hazel, indicate regular systematic use of the landscape by people – most likely Takelman-speakers -- at that time. The average number of trees larger than saplings per acre was probably ten or less. Human occupation of this zone was probably year-round, with relatively large seasonal villages and campgrounds near the mouth of Jackson Creek and at South Umpqua Falls: two locations that (according to historical reports) were heavily used during times of anadromous salmonid and lamprey eel runs.

Pine Zone. The presence of ponderosa pine and sugar pine with little understory vegetation typified much of the mid-slope (2,400 to 3,800 foot elevation) areas in the study area 200 years ago. The pine zone was typically open and park-like with large, widely spaced pines; patches of oak, chinquapin, serviceberry, and hazel; scattered stands of Douglas-fir; and grassy meadows. The average number of 8-inch diameter and larger trees per acre was likely less than 20. The location and age of remnant old-growth trees indicate regular seasonal use of the pine forestlands by Takelmans from lower elevations and southern Molalla from higher elevations. The harvesting of ponderosa pine cambium in the spring and oak, sugar pine, hazel, and chinquapin nuts in the fall may have been times of most intensive occupation of this zone. Hunting for game animals with dogs by Molallans likely occurred on a year-round basis, depending on the daily and seasonal movements of deer, bear, and elk.

Douglas-fir Zone. Although Douglas-fir was present in almost every type of environment in the study area 200 years ago, it existed in nearly pure stands from 3,800 to 5,000 feet elevation, separating the lower elevation pine stands from the higher elevation subalpine vegetation types. Due to generally steep slopes, isolated location, seasonal snow, and relative lack of food plants, accessible water, and animals, this zone likely experienced the least amount of daily use and occupation by people. The densest stands of trees in the study area occurred in this zone, but they were still often (or even mostly) open and park-like with only 20 to 30 trees per acre. Grassy meadows and fern brakes also existed throughout this zone. Established ridgeline and streamside trails were regularly used by both game animals and people to reach lower and upper elevations, where food and freshwater were more available. Ridgeline trail networks that crisscrossed this zone were regularly burned to promote grassy meadows, bracken fern, beargrass, serviceberry and other food and fiber plants.

Subalpine Zone. The highest elevations of the study area (above 5,000 feet) formed an international precontact network of foot trails that connected tribes of the South Umpqua with Indian nations in California, Washington, the Columbia Basin, and beyond. This seasonal "travel zone" was covered in snow much of the year, but contained extensive fields of forbs and grasses, huckleberries, manzanita, and other berries, fruits, nuts, bulbs, edible roots, and fuels that were readily available at other times. The existence of numerous year-round springs, likely "vision quest" sites, flats, benches, and gently sloping ridgelines add further evidence of intensive year-round and seasonal use; particularly by southern Molallan hunters, who used dogs and snowshoes to hunt elk and other prized game animals throughout the Umpqua and Rogue River headwaters. In late summer and early fall, other Tribes undoubtedly visited these lands to hunt, trade, socialize, harvest huckleberries and beargrass, and to move trade goods along the landscape. Takelmans from lower elevations likely gathered at Huckleberry Lake, Big Squaw Mountain, and Quartz Mountain, among other locations, during summer and fall; Takelma-speaking Latgawans probably used Huckleberry Lake, Anderson Camp, and Hershberger Mountain areas as well. Klamaths likely moved slaves and other trade goods along the eastern ridgelines, following the Klamath Trail to campgrounds in the Black Rock and French Junction areas, before heading north along Camas Creek into the North Umpqua Basin, or south into the Rogue River basin. It is also possible that Paiutes from the east, Upper Umpquas from the north, and Kalapuyan-speaking Yoncallans from the northwest also entered the area at these times; also possibly for reasons of trade, harvesting of favored crops, spirit quests, or simply visiting friends and relatives. This area has the most extensive fields of prized huckleberries in the South Umpqua headwaters, which also contained scattered trees; principally Douglas-fir, incense-cedar, hemlock, and Shasta red fir. (See Chapter VI).

Subbasins

Two hundred years ago, transportation routes and vegetation types were in place in accord with subbasin drainage patterns and elevations. As a result, anthropogenic burning patterns often conformed to subbasin boundaries and ridgeline trail networks. There were seven primary subbasins described in this study: Jackson Creek (101,995 acres); Boulder Creek (31,522 acres); Castle Rock Fork (27,212 acres); Buckeye Creek (25,573 acres); Black Rock Fork (20, 576 acres); Quartz Creek (16,560 acres); and Zinc Creek (8,893 acres). In turn, Jackson Creek, the largest subbasin, could reasonably be subdivided into smaller subbasins: Beaver Creek; Whisky Creek; Squaw Creek; Upper Jackson Creek; Tallow Creek; and Collins Ridge. (See Chapter VII).

Conclusions

1. Two hundred years ago, vegetation types in the South Umpqua headwaters consisted of prairie and meadow grasslands, oak savannahs, park-like pine woodlands, brakes, berry patches, stands and patches of Douglas-fir forestlands, and high elevation shrublands and patches of mixed conifers.

2. Since 1825, the measured density (trees per acre) and basal area of representative South Umpqua headwater forests have increased more than five-fold. In these same stands, tree biomass has accumulated from 10 to 20 times more than they had held 200 years earlier. (See Appendix B).

3. Relative proportions of tree species have also changed significantly over the past 200 years. In late precontact time, pines and oaks were the dominant tree species below 3,800 feet elevation. Today, Douglas-fir, grand fir, and incense-cedar are the most prevalent species; particularly in younger age classes. Pacific silver fir has invaded higher elevation subalpine shrublands since late precontact time, and Douglas-fir, hemlock, and cedar have also become more common in these locations.

4. There has been a significant decrease in daily and seasonal occupation and use of the study area by people from late precontact time to the present. Related decreases in daily and seasonal hunting and fishing, plant harvesting, systematic firewood gathering, and fire use have been contemporaneous.

5. Precontact human influences on the vegetation were significant. In particular, human-set fire played a primary role in the development and maintenance of landscape-scale patterns of forests, woodlands, savannas, grasslands, brakes, trail networks, and shrublands.

6. The elimination of anthropogenic fire and other traditional human influences over the last past 200 years is the key factor that has altered forest conditions during that time. Grazing, logging, tree planting, fire suppression, and road-building have had comparable effects.

7. Large, infrequent, a-historical, wildfires have replaced low severity fires in the study area during the past two centuries, in part due to a massive build-up of biomass (fuels), resulting in increased wildfire, insect, and disease risk and in changes to native wildlife habitats and populations. A primary result of this change has been a significant and corresponding increase in snags and downed woody debris.

8. These findings will be useful in: evaluating and mitigating catastrophic fire hazards and risks; informing the maintenance and preservation of historic cultural landscape features; advancing understanding of forest dynamics, historical human influences, and historical landscape geography; and informing restoration (active management to recover historical cultural landscapes) efforts.

Questions

This research was conducted using the method of multiple hypotheses, first described by Chamberlin in 1890 (Chamberlin 1965): "the effort is to bring up into view every rational explanation of new phenomena, and to develop every tangible hypothesis respecting their cause and history." The following questions are specific to the primary purpose of this study, may justify additional research in order to be better considered, and are briefly addressed in accordance with the specific findings of this project.

1) What is the role of climate change in these altered vegetation patterns? There are many reasons why “climate change” cannot be the cause of changes in forest conditions for the alterations in forest development pathways in the South Umpqua headwaters over the last 200 years: 1) No significant climate change has taken place in the western Cascades since 1650 (Graumlich 1985; Carloni 2005), yet wholesale changes in forest conditions have occurred; 2) Precontact cultural landscapes with prairies, brakes, savannas, berry fields, and open, park-like forests occurred across climate zones throughout the Western Hemisphere, indicating that the vegetation types were not climate-dependant; 3) No new open, park-like forests are arising in any climate, even where lightning fires are allowed to burn; 4) Anthropogenically-induced prairies, savannas, and open, park-like forests were persistent vegetation types for thousands of years despite historical perturbations in global climate; 5) Other explanations for the alteration in forest conditions (e.g., Indian burning practices) are more robust, well-documented, and free of the nagging anomalies noted above. (See Appendix B).

These conclusions confirm other recent scientific findings on the topic. For example, for an area on the eastern slope of the Cascades in Washington, Haugo, et al. (2010) found:

> Fire suppression, grazing, and logging explain changes in species composition more clearly than climate variation does, although the relative influence of these factors varies with elevation. Furthermore, some of the observed changes in composition are opposite what we expect would be most suited to projected future climates. Natural resource managers need to recognize that the current state of an ecosystem reflects historical land uses, and that contemporary management actions can have long-term effects on ecosystem structure.

2) What is the role of fire suppression in these altered vegetation patterns? Modern fire suppression is a recent (ca. 1930) addition to forest influences in the region. Prior to then, fire suppression was not a significant factor in forest development. Profound changes in forest structure and composition had already taken place in the study area by 1930. Those changes resulted from the elimination, about 100 years earlier, of traditional land management activities including intentional and expert anthropogenic burning. Modern fire suppression is applied to a greatly altered forest, one with a-historical accumulations of biomass. Without modern fire suppression, today's landscape is prone to a-historical catastrophic-scale wildfires due to the quantity and continuity of fuels across the watershed (Zybach 2003; Carloni 2005).

3) What is the role of lightning fire in past and current forest structure? Lightning ignitions interact much differently with the modern, altered landscape. In the precontact era lightning played a relatively minor role because lightning fire spread and severity were constrained by discontinuous and limited fuels within the historical anthropogenic mosaic of the cultural landscape (Kay 2007). Modern lightning fires encounter a-historically abundant and continuous fuels, leading to a-historically large and severe fires.

4) What is the risk of wildfire under current conditions? The risk of large and severe fires appears much greater today than in any other time in history due to increased living and dead fuel accumulations, continuity of fuels across the landscape, extended canopy closures, and prevalence of ladder fuels.

5) Do increased risks associated with lightning-caused wildfires correspond to increased threats to ESA habitat and populations? The recent historical increase in local wildfire extent and severity has and will continue to destroy nesting, foraging, and roosting habitat for arboreal birds. Significant increased risks from uncontrollable wildfires are also borne by other forest, grassland, and shrubland plants and animals in the area.