## Chapter VIII. Discussion, Conclusions, and Questions

This report has provided descriptions of late precontact forest conditions in the South Umpqua River headwaters for the ca. 1800 time period, based on several lines of evidence and using modern technology to display findings. The purpose of this study was to produce such a result for the intended use of helping to update Douglas County Community Wildfire Protection Plans. The question is: How might knowledge of past forest conditions, in a practical sense, prove useful and have direct relevance to wildfire protection planning? As Carloni (2005: *ix*) states: " And most pragmatically, what can studies of current and past fire and forest patterns contribute to future management decisions?"

County Commissioner Laurance's answer (see Appendix A) to this conundrum is, in part: "Fire Regime Condition Class (FRCC) 1 is similar to the forest which European explorers first found here . . . Within FRCC 1 the risk of losing key ecosystem components to fire is low . . ." His perspective is shared by many others, including numerous scientists, foresters, land surveyors, resource managers, and local residents quoted and referenced in this study. GLO Surveyor Norman Price, for example, provides an excellent summary of this perspective (see Figure 8.01).

The following discussion provides an example of how the perspectives and technical products from this study can be used to assist in establishing objectives and prioritizing geographical areas during the planning process. The most salient findings of this research are listed as "conclusions," for the consideration of resource managers, wildfire protection planners, and interested citizens – and hopefully have added educational value as well for teachers and students with a focus on Oregon history, forest ecology, geography, anthropology and/or other related studies. Finally, in line with the "multiple hypotheses" methodology used to conduct this study, a series of more refined questions are listed for which additional research might be justified to address the objectives of this study. Brief answers are also supplied for each question, based on the current findings of this study, but with the idea that entirely different answers might be forthcoming with additional data or alternative perspectives.

### Discussion

Chapter VII provides a series of maps purporting to show ca. 1800 forest vegetation and land use patterns for each of the subbasins in the study area. These maps were carefully assembled following the methods described in Chapter II with data and perspectives described and given in the remaining chapters and the appendices. Map 6.04 shows the sum total of these findings for the entire study area.

Figure 8.01 GLO Surveyor Norman Price and wife, ca. 1940.

Price helped survey much of the study area in the late 1930s (e.g., Price et al. 1929). His observations regarding his survey of Tsp. 34 S., Rng. 8 W. to the southwest of the South Umpqua River are relevant to the findings of this research:

"Most of the township is covered with such a dense growth of buckthorn, manzanita, lilac, madrona, chinquapin, and sweet acorn that no grasses can thrive. A small area on what is known as Peavine Mountain, in sec. 21, sustains a growth of native peavine sufficient to graze a few head of cattle for about six weeks. It is an historical fact that in the days immediately following the occupation of this country by the Indians this country was all covered with a fine growth of native grasses and practically no underbrush. The Indians accomplished this by setting fire to the vegetation on one side of the river one year and the other side the next year. Thus they kept the country open and clean and were never in danger of a forest fire."

Map 8.01is the ca. 1800 forest vegetation type patterns shown in Map 6.04, but without the ca. 1800 trail network. Superimposed on this map are two separate interpretations of FRCC 3 independently supplied to the Douglas County Surveyor's Department by a Douglas County forestry consultant in the form of a printed map. The image was then scanned and converted to a GIS layer by the Surveyor's "GIS Team" (see Acknowledgements), combined with Map 6.04 and resulting in Map 8.01.

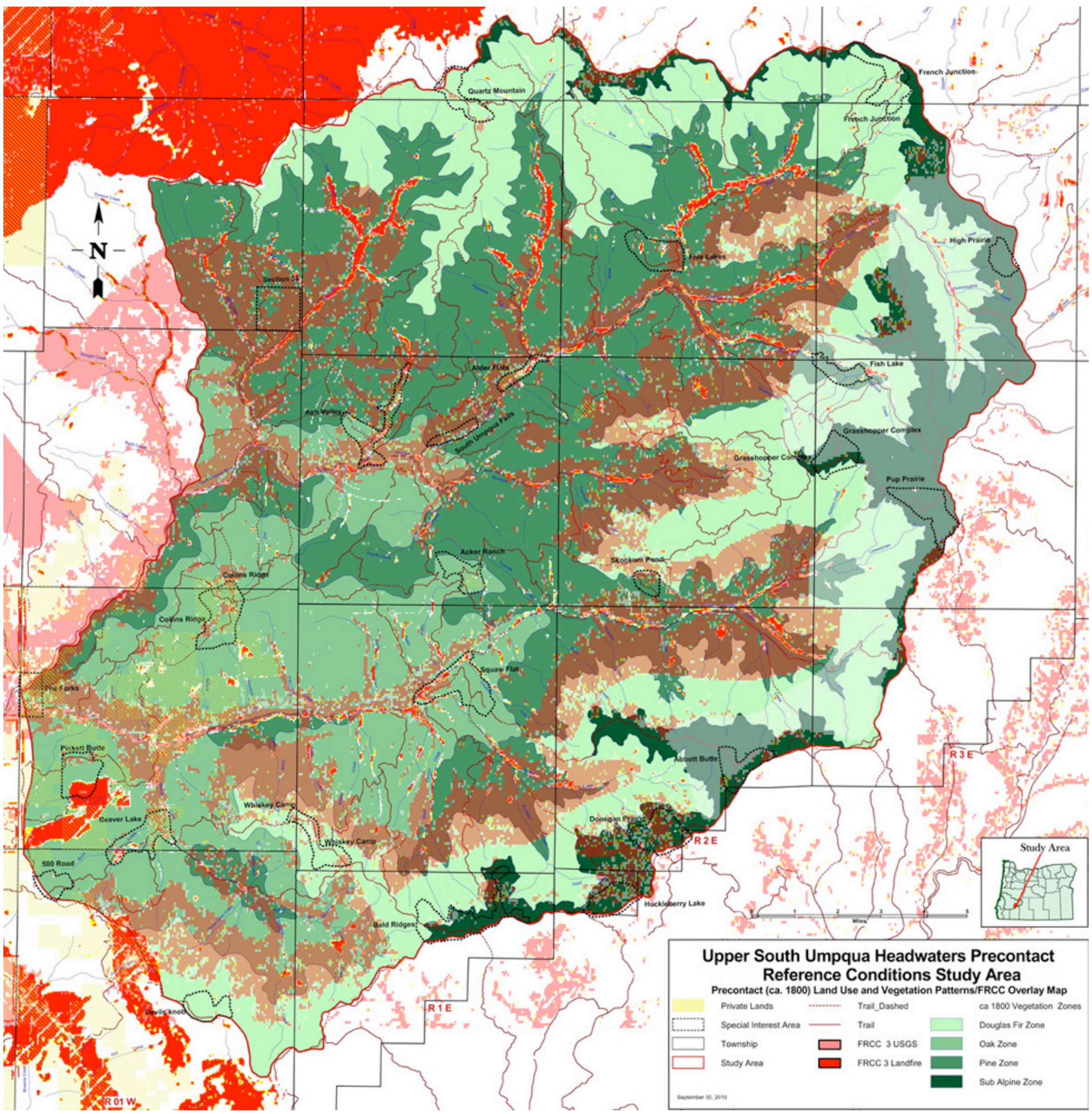
(Note: FRCC is the standard assessment tool used by federal agencies in implementing Goal #3 of the National Fire Plan, "Restoring Fire-adapted Ecosystems." The exact methodology or particular version of the FRCC classification system used to produce the hard copy map used for Map 8.01 is unknown at this time; but that information is largely irrelevant for these purposes – the important aspects are that 1) the map was produced and provided independent of this project, and 2) it represents two valid interpretations of FRCC 3 for the study area at some point during the past few years).

FRCC is defined as (National Interagency Fuels, Fire, & Vegetation Technology Transfer 2010: 98):

> A measure of departure from reference (pre- settlement or natural or historical) ecological conditions that typically result in alterations of native ecosystem components. These ecosystem components include attributes such as species composition, structural stage, stand age, canopy closure, and fuel loadings.

FRCC 3 is defined as (National Interagency Fuels, Fire, & Vegetation Technology Transfer 2010: 98):

> Greater than 66 percent departure: Fire regimes have been substantially altered. Risk of losing key ecosystem components is high. Fire frequencies may have departed by multiple return intervals. This may result in dramatic changes in fire size, fire intensity and severity, and landscape patterns. Vegetation attributes have been substantially altered.




Map 8.01 GIS-generated ca. 1800 vegetation pattern and 2010 USGS and Landfire FRCC 3 patterns.

Notice three distinct correlations: 1) the invasion of pine woodlands with Douglas-fir seeding moving downhill on the southern and eastern portions of the study area, creating a closed canopy and stress on existing older trees, resulting in predictable increase in risk of catastrophic-scale wildfire (see Figure 8.02); 2) the exact correlation with riparian areas currently choked with dead trees and shrub closed canopies, creating strong potentials for wildfire spread and reduced potential for streams to serve as wildfire buffers (see Figure 8.03); the strong correlation of FRCC 3 with subalpine vegetation, due to invasions of conifers into historical brushfields and grassy prairies and meadows (see Figure 8.04).

Figure 8.02 Example of FRCC 3: Aftermath of Boze Fire, July 12, 2010.

Map 8.01 and Figures 8.02, 8.03, and 8.04 demonstrate two important aspects of this study. First, the strong independently derived correlation between the research findings of this study and the FRCC 3 pattern confirm the quality and utility of this work and the methodology from which it is derived. Second, risks and conditions associated with FRCC 3 classification are confirmed by recent events and on-site documentation of current conditions. Note, also, the condition of relict grassy prairie relicts in Figure 8.04; despite the severity of the 2009 Rainbow Creek Fire depicted in this photograph, the grassland areas were expanded and rejuvenated due to this event.

Figure 8.03 Example of FRCC 3: Fish Lake Creek large woody debris, July 30, 2010.

**Conclusions**

1. Two hundred years ago, vegetation types in the South Umpqua headwaters consisted of prairie and meadow grasslands, oak savannas, park-like pine woodlands, brakes, berry patches, stands and patches of Douglas-fir forestlands, and high elevation grasslands, 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. This measure represents only trees currently greater than 8-inches in diameter; 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 frequent 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. Another primary change has been the spread of large numbers of even-aged Douglas-fir and understory shrubs throughout the study area, creating large contiguous stands of ladder fuels and closed canopies across the landscape.

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 or before (Graumlich 1985; Zybach 2003; 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 these vegetation types were not climate-dependant; 3) No new open, park-like woodlands or grassy prairies 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.

Figure 8.04 Example of FRCC 3: Black Rock Lookout, July 13, 2010 (see Chapter IV; Bartrum ca. 1925).