Chapter V.
Chronological Account of Forest Cover Changes

> This countryside is not good now. Long, long ago it was good country. They were all Indians who lived in this countryside. Everything was good. No one labored. Only a man went hunting, he hunted all the time. Women always used to dig camas, and they gathered tarweed seeds. Such things were all we ate. They gathered acorns, they picked hazelnuts, they picked berries, they dried blackberries.
>
> —John B. Hudson, 1933

Most historical changes to Soap Creek Valley forest cover patterns can be characterized as resulting from the effects of human plague and subsequent reduction of broadcast burning by native Kalapuyan families, human influenced wildlife demographics, periodic catastrophic snowstorms (see Table 11), freezes, and windstorms, and value-driven human activities (see Chapters III and IV). This chapter places these combined events and processes into chronological order, from 1500 to the present. The chronology is divided into three primary sections: the "late prehistoric" period of time preceding written documentation (from 1500 until 1825), the "early historical" period preceding living memory (1826 to 1899), and the current period, in which oral histories add significant primary and secondary sources of data to our understanding of Soap Creek Valley forest cover patterns (the 20th century). Four forest cover maps are presented for the latter two periods: 1826 and 1853 patterns for the early historical period, and 1929 and 1945 patterns for the living memory period. These maps can be compared to Map 19, the theoretical "climax model" of "potential vegetation," compared to one another, and can be further analyzed through the use of GIS methodology, as illustrated by Maps 6 and 7.

This chronology places Soap Creek Valley events and activities in temporal context to one another and helps to identify resulting cumulative effects on The Valley's forest cover patterns. Another value is to aid in differentiating between the effects of incidental, periodic, and cyclic occurrences (Hansen 1961; 1967). Such determinations are helpful for predicting prehistoric and future conditions within The Valley's boundaries, for testing multiple hypotheses associated with

this thesis (Chamberlin 1965), and for identifying interrelated cause-and-effect changes to local forest cover patterns.

PREHISTORIC CONDITIONS, 1500-1825

It is unknown how long Kalapuyan families lived in the Willamette Valley before their discovery by European Americans in 1806 (Thwaites 1959). However, technologies used by Kalapuyans during early historical time were employed locally for at least 9000 years to roast filberts (Friedel, Peterson, McDowell, & Connolly 1989), at least 5000 years to bake camas using bigleaf maple and Douglas-fir firewood (Reckendorf & Parsons 1966), and over 2000 years to hunt small game with bows and arrows (Aikens 1975). Thus, archaeological findings can provide certain insights into reconstructing prehistoric patterns of vegetation. The work of early ethnologists (Jacobs 1945; see Appendix H) adds to our understandings of late prehistoric and early historical cultural practices and subsistence strategies and how prehistoric peoples managed local landscapes (Snyder 1979; Boyd 1986; Gilsen 1989). Plant pollens (Hansen 1947; Heusser 1960), tree rings (Starker 1939; Bennet 1948; Nettleton 1956; Drew 1975; Graumlich 1987; Fritts & Shao 1995; Associated Press 1997), and persistent patterns of vegetation (Chapter III; Stout 1981; Zybach 1988; 1992a) are also useful tools for reconstructing prehistoric conditions, including forest cover patterns.

Perhaps the most easily recognized prehistoric forest cover patterns are those including old-growth trees (see Figs. 36 and 37; Table 19). Table 19 lists the largest and oldest Soap Creek Valley tree species on record and compares their sizes and ages to other areas in the Douglas-fir Region. Note that no Douglas-fir has been identified in Soap Creek Valley that existed before 1600 and no oak has been recorded that sprouted before 1550. Ages for Soap Creek Valley trees were determined by ring counts (Starker 1939; Rowley 1990; Zybach et al., 1990: personal communication; Johnson 1996: personal communication). Diameters were obtained from PLS survey notes (see Appendix F), early timber cruises (Bagley 1915), and OSU Research Forests inventory data (Nettleton 1956; Johnson 1996: personal communication). Note the great disparity in Douglas-fir and redcedar ages between local and regional measures, and the difference in

diameters for all species. (The difference in diameter measures for bigleaf maple is possibly due to a typographical error, as 20-inch diameter specimens of this species are very common; older maples often attain a diameter of three feet or more).

Table 19. Extreme ages and diameters of wild tree species, 1853-1999.

	AGES			DIAMETERS		
Species	SCV	DFR	Difference	SCV	DFR	Difference
Douglas-fir	400	1,200	-800	84	170	-86
Grand fir	200	300	-100	40	80	-40
Redcedar	300	1,200	-900	48	250	-202
Hemlock	200	500	-300	40	100	-60
Maple	200	300	-100	48	20	+28
Cottonwood	100	200	-100	42	49	-7
Alder	100	100	0	30	30	0
Oak	450	500	-50	42	35	+7
Madrone	150	*	*	26	*	*
Yew	300	*	*	16	*	*
Ash	100	*	*	22	*	*

WFR Douglas-fir Region (Heilman, Anderson, & Baumgartner 1981; Zybach, Barrington, & Downey, 1995)
SCV Soap Creek Valley (see Map 2)
AGES Ages (in years) of species for SCV based on ring counts and estimates; for DFR based on Franklin (1981) and Franklin and Dyrness (c.1988).
DIAMETERS Diameter (in inches) of SCV species based on PLS and timber cruise data; for DFR based on Franklin (1981) and Franklin and Dyrness (c.1988).
* No measure available for DFR from either source used.
NOTE: Measures taken from Franklin (1981) are for "maximum" ages and diameters; for Franklin and Dyrness (c.1988), measures are those "typically attained" by species, with the qualification that "Maximum ages and sizes are generally much greater than those indicated here." "Typical" DFR measures are given for grand fir, bigleaf maple, red alder, white oak, and black cottonwood, which are not listed in Franklin (1981).

The oldest Douglas-firs measured in Soap Creek Valley have been less than 400 years (Starker 1939; Nettleton 1956); about one half the age listed by Franklin (1981) as "typical" for the species and one third the age listed by Franklin and Dyrness (c.1988) as "maximum." Also, there is little evidence of conifers in the entire Oregon Coast Range (including Soap Creek Valley) in excess of 600 years of age, much less 750 years or 1,200 years (Andrews & Cowlin 1940; Zybach 1988; Teensma, Rienstra, & Yeiter 1991). Douglas-fir ages of this magnitude have been recorded in isolated areas of the western Cascades (Teensma 1987; Associated Press 1997), Olympic Mountains (Henderson, Peter,

Lesher, & Shaw 1989), and Vancouver Island, British Columbia (Henderson 1993: personal communication; Sandstrom 1996: personal communication), but are uncommon in those areas as well (Andrews & Cowlin 1940). Soap Creek Valley Douglas-fir and redcedar ages and sizes are within regional bounds described in eyewitness accounts by Leiberg (1900), Gannett (1902), Munger (1916), and Pinchot (1987), rather than the "typical" numbers listed by Franklin (1981).

Fig. 36. "Greg George Doug": old-growth Douglas-fir, 1989. OSU Forestry student, Greg George, stands next to namesake tree, at the time believed to be the largest Douglas-fir on OSU Research Forests property (see Map 4). This tree is located in Soap Creek Valley to the north of Lewisburg Saddle (see Map 2), and is likely more than 300 years of age, providing insight into local forest conditions for the past several centuries. (Photograph by author.)

Munger's (1916) description of tree ages for all of Washington and Oregon is consistent with findings for Soap Creek Valley: "Most of the so-called virgin stands are not over 350 or 400 years old, and trees over 600 years are quite uncommon."

1500-1625: Prehistoric Old-Growth

Alexander R. McLeod and David Douglas visited the Soap Creek Valley area in early October, 1826 (Davies 1961; Douglas 1905). Documentation of their travels described miles of barren plains burned clear of living vegetation by Kalapuyans, and occasional groves of oak and scattered "pine" (Douglas-fir) three and four feet in diameter on east slope Oregon Coast Range hills. Fig. 36 shows the largest Douglas-fir known in Soap Creek Valley. It is located near a group of trees dated to 1602 (Starker 1939), a five-foot diameter Douglas-fir measured in 1853 (Elder 1853), and a tree that contained ax marks dating to 1826 (Jackson 1980; Rowley 1997). A question is: Where are/were these trees'—which were of large second growth and young old-growth status when first described by Douglas and McLeod—parent seed sources located? No direct evidence exists for conifer in Soap Creek Valley earlier than 1600, yet such trees must have existed there, or very nearby (Kummel et al., 1947; Isaacs 1949). This question can be partly answered through examination of tree rings (see Fig. 37), timber cruises (see Map 11 and Table 14), and land surveys (see Chapter II; Appendix F).

However, the question remains: Where were the 1500-1600 era trees located that gave birth to these 1600-1800 stands of prehistoric second growth? And why are these trees so much smaller and younger than others of their species in the region (see Table 19)? Were the lands of Soap Creek Valley largely bereft of trees before these stands were created, or do remnant pockets of old-growth represent a relict population of a much larger stand that was deforested sometime in the late 16th or early 17th century? And, if the latter is true, why weren't relict stumps and snags of former forested areas noted by any 1820s explorers, 1840s pioneers, 1850s land surveyors, 1880s artists, or 1890s photographers?

Fig. 37. Old-growth logging stump, T. 11 S., R. 5 W., S. 6, 1990. Sometime around 1890, a regular practice of clearcut logging began in this section (Olson 1994), but the area and volume of large trees remained greatest for Soap Creek Valley (see Tables 14, 15, 20 and 21; Appendices F and G) until the entire stand was finally clearcut during and shortly after WW II (Sauerwein 1948; Jackson 1980; Rowley 1997). Section 6 also contains the only significant redcedar stand in Soap Creek Valley (see Appendix G; Garver 1996: personal communication), and was the probable location of the only large stand of western hemlock in The Valley (Olson 1994; Rowley 1998: personal communication). Prehistoric Soap Creek Valley families likely visited the stand for cedar and hemlock products, as partly evidenced by a relict meadow to the immediate north of the cedar grove (Bagley 1915). After the section was clearcut, its owners traded the land to OSU and it is now part of Paul M. Dunn Forest (Rowley 1997; see Map 3). Photograph by Kevin Sherer.

Most forested land in western Oregon can be defined in terms of even-aged stands of individual conifer species (Gannett 1902; Munger 1916; Andrews & Cowlin 1940). Forests are primarily Douglas-fir (Munger 1940), but also consist of even-aged stands of western hemlock (Silen 1989: personal communication), Sitka spruce (Vaughn c.1890), and other tree species native to Soap Creek Valley and the Douglas-fir Region (Leiberg 1900; Pinchot 1987; Rowley 1990: personal communication; Zybach 1994b). Many of these stands are extensive and

individual age classes have existed for centuries, spread over hundreds of miles on a north-south axis covering tens and hundreds of thousands of acres (Franklin & Hemstrom 1981; Zybach 1988; Henderson 1990; Teensma et al., 1991). Other stands, including those in Soap Creek Valley, are isolated from the major timber belts of the western Cascades and Coast Ranges, yet retain the characteristic "even-aged" nature of the larger stands (Nettleton 1956; Rowley 1990: personal communication; Johnson 1991: personal communication; personal observation).

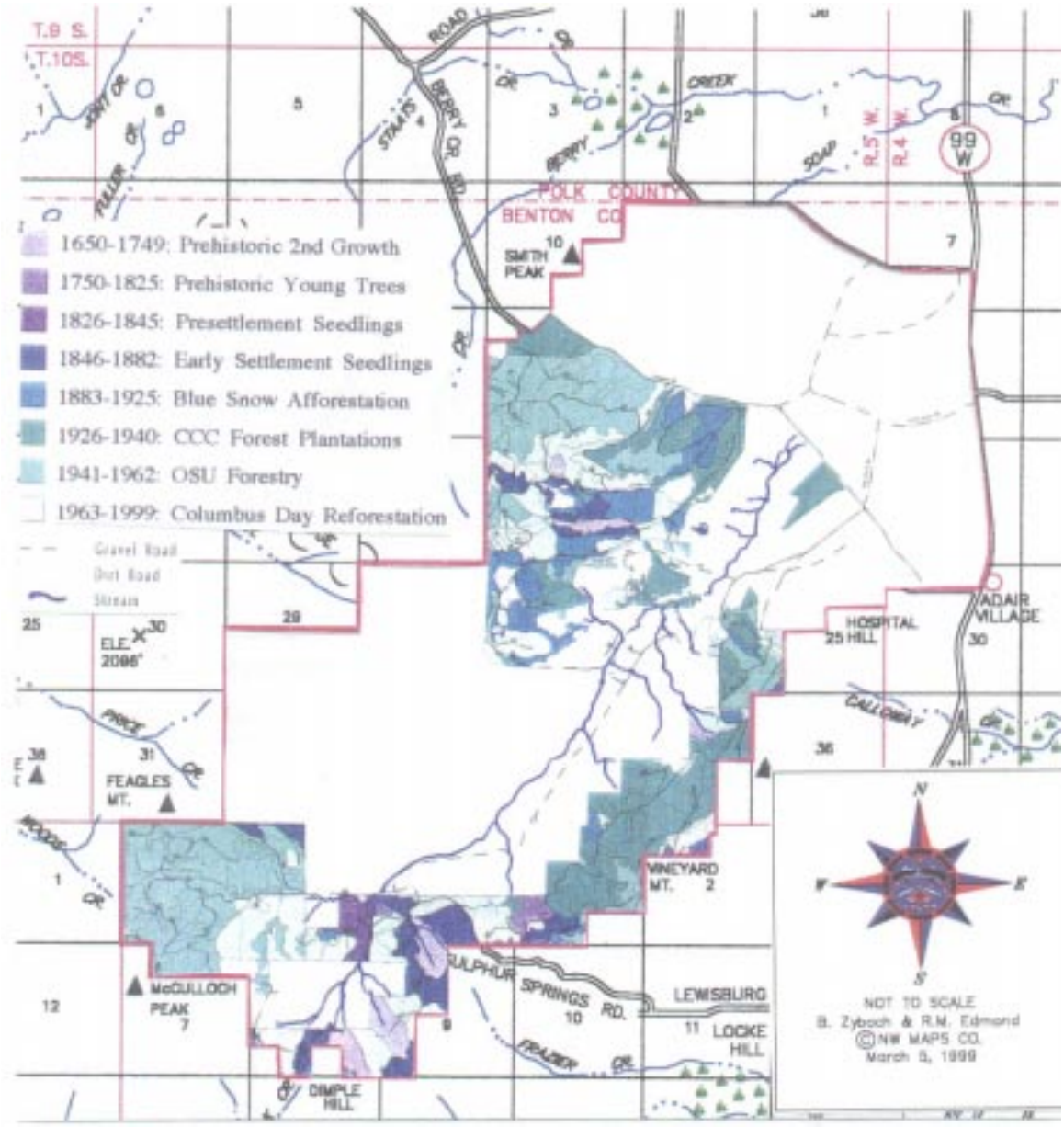
Ages of stands of OSU Research Forests' trees in 1990 within the study area are provided in Map 20. Note the relict stands of old-growth trees north of Writsmans Hill, north of Dimple Hill, east of Lewisburg Saddle (north of Vineyard Mountain), and along Bakers Creek (see Map 2 and Table 2). Also note the apparent outward expansion of the forest from these areas, as evidenced by a progressive reduction in age classes. Prehistoric even-aged stands are generally assumed to be products of catastrophic events; primarily fire (Franklin & Hemstrom 1981; Henderson 1993: personal communication; Pinchot 1987), wind (Starker 1939; Stout 1981; Henderson et al., 1989) or volcanic eruption (Sandstrom 1996: personal communication). Another possibility is that many of these prehistoric forests are a result of afforestation processes, similar to those that have seen the historical forests of Soap Creek Valley extend into adjacent savannah, meadows, and prairies (see Chapter III; Fig. 37). Map 20 illustrates the general rate of conifer afforestation in Soap Creek Valley that is documented temporally by Figs. 17, 18, 19, 20, 21, 22 and 38, and spatially by Figs. 26, 28, and 31 and by Map 12. This process appears to be representative of much of the Douglas-fir Region during the past 300 years or more (Zybach 1988), and may well have contributed to the establishment of older even-aged stands in the region (Andrews & Cowlin 1940; White 1995). If so, it is possible that the vast tracts of old-growth Douglas-fir encountered by pioneer Oregon lumber-men (MacCleery 1992) partly resulted from catastrophic losses of people rather than catastrophic losses of trees (Zybach 1988). This possibility raises important ethical and management questions for Douglas-fir Region land use planners, foresters, and wildlife specialists.

Discussion. What were Soap Creek Valley forest conditions in 1500, the initial point of this study (see Chapter IV)? There is little evidence of forest trees in Soap Creek Valley before 1550 (Nettleton 1956), and there is no evidence of

Fig. 38. Forest Peak prairie afforestation, 1991. Grassy prairies and meadows of Soap Creek Valley, dating to prehistoric times, have been incidentally and systematically afforested during the past 175 years. Alistar Zybach, 13-years old at the time of this photograph, gives size and structural perspective to planted and seeded Douglas-fir. These trees are beginning to displace perennial herbs and grasses in a portion of relict prairie visible in Figs. 16 and 21. Photograph by author.

major deforestation preceding their establishment. At that time, scattered oak trees and groves began growing over a wide portion of The Valley; followed in 50 years by the establishment of several stands of Douglas-fir in Soap Creek headwaters (see Sprague and Hanson 1946). It is unlikely the oak could have become so widespread if the previous forestland condition was Douglas-fir or grass, unless human intervention took place. Two conclusions are possible: 1) a 1500-era oak forest or savannah was completely destroyed by fire, wind, and/or

Map 20. OSU Research Forests' conifer stand ages, 1650-1992. A breakdown of Soap Creek Valley timber stand age classes by cultural markers (see Chapter II; Appendix C; Table 6) shows distinct patterns of afforestation and reforestation, as illustrated by this map of OSU Research Forests lands. The spread of Douglas-fir from a few isolated mid-1600s patches and steep headwater stands (see Tables 20 and 21) suggests a relationship to local human activities. Note in particular the dramatic change in age classes for Tsp. 11 S., Rng. 5 W., Sec. 5 and 6 (see Maps 2 and 11; Tables 14 and 15; Figs. 37 and 38; Appendices F and G).



disease, but scattered sprouts and acorns remained viable; or, 2) the land was cleared (perhaps centuries earlier) and the oak were planted by people. The second possibility is not so farfetched as it may seem. Wilkes (1845) remarked

that the oak groves of the Willamette Valley in 1841 were so regularly spaced as to "appear to have been planted by the hands of man," and Kalapuyans of that time were known to cultivate tobacco from seed in isolated openings (Douglas 1905). At the time of settlement, white oak was found throughout the Willamette Valley, in western Washington, on the San Juan Islands (White 1995), and on Vancouver Island, Canada. People cultivated oak in the Sacramento Valley (Wilkes 1845), in northwestern California (Thompson 1991), and in southern Oregon. Although Kalapuyan people were known to be largely dependent on camas and tarweed for subsistence during early historical time (Zenk 1990), it is possible that their ancestors or predecessors in Soap Creek Valley were equally dependent on acorns, or favored oak for some other reason. If so, were those people capable of clearing a forest or planting a grassland in order to establish oak trees? This possibility seems not to have been considered by most forest ecologists or historians, yet the record of agricultural development in other areas of North America, including the Mississippi Valley, the Great lakes region, and southern Mexico, demonstrates the widespread practice of establishing and nurturing favored plant species over hundreds and thousands of years time (Burland 1970). Could the establishment and maintenance of white oak during the past 8,000 years in western Oregon (Hansen 1947; see Fig. 3) parallel the development of corn crops in Mexico during the same time period? If so, could the groves of oak described by Douglas (1906) and Wilkes (1845) in the early 1800s have been the result of purposeful management practices by Kalapuyans and/or earlier generations of people? Whether the Soap Creek Valley oak groves encountered by early surveyors (see Appendix F) were planted, or not, one thing seems certain: their existence was encouraged and maintained by Kalapuyan burning practices in late prehistoric and early historical time.

1626-1825: Prehistoric 2nd Growth

Prehistoric Soap Creek Valley forest cover patterns can be inferred reasonably for periods of time subsequent to the establishment of historical stands of old-growth. Specimens of individual trees and patches of perennial herbs, shrubs, and grasses can be located with similar methods and the same sources of information used in the preceding section. GLO and DLC surveys of the 1850s and 1880s add precision to details obtained from tree ring data and

vegetation patterns (Bourdo 1956). Table 20 demonstrates how these combined sources of information can be used to locate possible parent tree seed sources that may have helped afforest Soap Creek Valley grasslands during historical time (see Figs. 3, 4, 17, 21, and 38). The Benton County timber cruise of 1915 (Bagley 1915; Map 11; Table 14; Appendix G) adds additional details, including locations of old-growth and patterns of forestation (Map 11), and tree species, heights, volumes, and diameters (Table 14). Table 21 summarizes original survey and cruise data. This table presents mapped tree locations and diameters and local tree ring data (Starker 1939; Rowley 1990: personal communication; Johnson 1991: personal communication) to obtain better understanding of prehistoric plant associations and stand sizes, locations, ages, and structures. This combination of data sets can be used to produce relatively accurate and detailed predictive maps and general descriptions of forest cover patterns for nearly 200 years of prehistoric time.

Table 20 also provides a general forest cover pattern for early historical Soap Creek Valley; a pattern directly inherited from late prehistoric time. This pattern includes scattered, nearly pure stands of ash that populate northern Valley flood plains established over 12,000 years earlier by Lake Allison; oak savannah on The Valley's foothills, southern, and eastern slopes; and Douglas-fir in steep tributary canyons, on higher elevations, and along southern headwaters (see Maps 2 and 5). Further detail can be added to these patterns by using land surveyors' field notes assembled in the 1850s and 1880s (see Map 2 and Table 21): camas and willow to areas containing ash; hazelnut and grasses to oak savannah; and bigleaf maple, yew, and fern to areas with Douglas-fir. Early aerial photos (see Figs. 26, 28, and 29), relict old-growth (see Figs. 36 and 37), swampland, and prairie patches (see Chapter III) add greater certainty to these predictions.

EARLY HISTORICAL CONDITIONS, 1826-1899

Forest conditions at the time of settlement in western Oregon, including those for Soap Creek Valley forests, are a matter of some controversy. Popular opinion dictates that much of the landscape was dominated at that time by a

Table 20. Size, location, and species of bearing trees, 1826-1882.

T-R-S	Landmark	Ash	A-Dia,	Oak	O-Dia.	DF	D-Dia.	M/M
			ASH					
10-5-12	County Line	4	8-15	3	15-18			
10-5-13	Coffin Butte	4	6-20	1	20			
10-5-24	Tampico Rd.	3	11-18	8	18-40			
10-5-14	Rifle Range	2	10-10	13	10-40			
10-5-23	Writsman Hill	1	14	21	10-36			1/0
10-5-11	Oak Hill	1	10	9	10-40			
10-4-7	Robison Rd.	1	12	4	10-30			
10-4-19	Tampico Ridge	1	20	2	10-15			
			OAK					
10-5-26	Soap Creek Road			17	8-36			0/1
10-5-34	Soap Creek Schoolhouse		10	12-30				
10-5-25	Glenders Hill			9	8-36			1/0
10-5-35	Nettleton Road			8	10-30			
10-5-27	OSU Research Ponds			8	10-30			1/1
10-5-15	Tampico Road			5	13-30			
11-5-3	Vineyard Mountain			5	12-16			1/0
10-4-18	Coffin Butte			3	15-24			
10-5-10	Smith Peak			1	30			
10-4-30	Hospital Hill			1	20			
11-5-2	Radio Hill			1	10			
			DOUGLAS-FIR					
11-5-7	McCulloch Peak							0/2
10-5-22	Forest Peak			8	11-30	1	24	0/2
11-5-4	Lewisburg Saddle			5	8-16	1	60	1/1
11-5-8	Bakers Creek			3	8-16	1	14	1/1
11-5-9	Patterson Road			2	16-20	1	14	1/1
10-5-33	Bakers Mountain			5	8-15	2	8-10	0/1
10-5-29	Kings Valley Ridge			1	24	2	8-30	1/0
10-5-28	Writsman Creek			4	8-12	3	8-13	1/0
11-5-5	Sulphur Springs			3	8-16	3	6-12	1/1
11-5-6	Cedar Grove			1	8	4	6-60	3/1
10-5-32	Beldon Creek					5	10-50	3/1
30 Sec.	Total BTs	17	6-20	161	8-40	23	6-60	15/13

T-R-S — Township S., Range W., Section No.
Landmark — 1999 Soap Creek Valley landmark names. See Map 2 and Table 2.
Ash — Number of 1853-1859 ash BTs.
A-Dia. — Range of 1853-1882 ash BT diameters in inches.
Oak — Number of 1853-1882 oak BTs
O-Dia. — Range of 1853-1882 oak BT diameters in inches.
DF — Number and range of diameters for 1852-1882 Douglas-fir BTs.
D-Dia. — Range of diameters for 1852-1882 Douglas-fir BTs.
M/M — Number of bigleaf maple/misc. species for 1852-1882 BTs.

Table 21. Location, age, and species of tree seed sources, 1600-1915.

T-R-S	Seed 1	Seed 2	DF	Ash	Oak	Understory
		DOUGLAS-FIR				
11-5-6	1600 DF/RC	1650 DF/WF	4	1		fern/hazel/tassel
10-5-32	1650 DF/WF	1750 DF	5			fern/hazel/yew
11-5-5	1650 DF/WF	1750 DF/WF	3	3		fern/hazel
10-5-28	1650 DF/Oak	1800 DF	3	4		fern/grass/hazel
10-5-33	1650 DF/Oak	1800 DF/WF	2	5		fern/grass/hazel
10-5-29	1650 DF/Oak	1800 DF	2	1		grass/hazel
10-5-22	1650 DF/Oak	1750 WF/DF	1	8		fern/hazel
11-5-4	1650 DF/WF	1750 DF	1	5		fern/grass/hazel
11-5-8	1650 DF/WF	1750 DF	1	3		fern/hazel
11-5-2	1650 DF/Oak	1800 DF		1		
11-5-3	1650 DF/WF	1800 DF		5		arrowwood/grass
10-5-35	1650 DF/Oak	1800 DF		8		fern/hazel
11-5-7	1650 DF/WF	1750 DF				fern/hazel/tassel
11-5-9	1700 WF/DF	1750 DF/WF	1	2		fern/hazel
10-5-23	1750 DF/WF	1800 DF		21		
10-5-15	1800 DF/Oak	1850 DF		5		fern/hazel
				ASH		
10-5-12	Ash/Oak			4	3	camas/hazel
10-5-13	Ash/Oak			4	1	camas
10-5-24	Oak/Ash			3	8	
10-5-14	Oak/Ash			2	13	
10-5-11	Oak/Ash			1	9	
10-4-7	Oak/Ash			1	4	
10/4/19	Oak/Ash			1	2	
					OAK	
10/5/26	Oak/Alder				17	
10/5/27	Oak/Maple				9	Pine (*)
10/5/25	Oak/Maple				8	
10/5/34	Oak/Willow				10	Pine (*)
10/4/18	Oak				3	
10/4/30	Oak				1	
10/5/10	Oak				1	
30 Sec.	Totals		23	17	161	

T-R-S	Township S., Range W., Section No.
Seed 1	Estimated stand age. DF = Douglas-fir, WF = white fir, RC = redcedar
Seed 2	Estimated stand age
DF	Douglas-fir bearing trees, 1853-1882
Ash	Ash bearing trees, 1853-1859
Oak	Oak BTs, 1853-1882
Understory	Shrub, grass, and herbs noted by PLS surveyors, 1853-1882
Pine (*)	Although native pine occurs in Benton Co., none has been identified in Soap Creek Valley to this time. Surveyor may have used common name for DF (Douglas 1905) or misidentified WF.

"blanket" of large, old conifer trees that has been subsequently reduced in size and contiguity (FEMAT 1993):

> At the time of settlement . . . the Northwest was blanketed with forests. Perhaps 60 to 70 percent of the forest was old growth . . . over 200 years of age . . . Even on public lands, cutting has created so many holes in the blanket of the forest, that the fabric holding the segments together has been severed.

This perspective has been generated, in part, by modern forest scientists. For example, according to Franklin and Dryness (c.1988):

> At the time of the first settlers, conifer stands clothed almost the entire area of western Washington and northwestern Oregon from ocean shore to timberline except for the Willamette valley and some prairies in the Puget Sound trough. Presently, 82 percent of western Washington and Oregon is still classed as forest land.

Map 19 illustrates a condition of land blanketed with old trees; a condition not supported or documented by the findings of this study (see Chapter III). For example, Thornton T. Munger, a forest scientist who lived in the Pacific Northwest during the early twentieth century, noted in 1916:

> Instead of finding an uninterrupted forest carrying 100,000 feet or more per acre reaching from the Cascades to the Pacific, the first settlers seventy-five years ago [1840] found in The Valleys great areas of "prairie" land covered with grass, brakes, or brush which were burned and kept treeless by the Indians, and mountain sides upon which forest fires had destroyed the mature forest and which were then covered by a "second growth" of Douglas fir saplings or poles.

Maps, figures, tables, quotations, and references contained in this thesis support Munger's 1916 eyewitness account over more current descriptions. Map 21 summarizes theses data in a format that can be compared to Map 19 and to general popular and scientific accounts.

1826-1845: Exploration and Epidemic

The first historical account of the Soap Creek Valley area was provided by the 1826 Hudson's Bay Company (HBC) beaver hunting expedition led by Alexander Roderick McLeod (Douglas 1905; Davies 1961) that passed southward, up the west side of the Willamette Valley. Traveling on horseback, the troupe established a new trail from HBC headquarters in Vancouver, on the Columbia River, to the Umpqua River. The HBC expedition is the first known to horse trail traversing the length of the Willamette Valley, along a route that approximately follows the course of Highway 99W today (see Maps 13 and 18). In addition to McLeod's crew of predominantly Metis ("French Canadians": usually refers to Canadian-born "half-breeds" of French and Iroquois ancestry; see Jackson 1995 for a discussion of these terms) trappers, was Scottish botanist David Douglas, who gathered plant specimens to send to Europe. Both McLeod and Douglas kept detailed daily journals, which have been published and widely quoted (Douglas 1904; 1905; Davies 1961). Their journals constitute the earliest historical accounts of native Polk and Benton county people, plants, and animals.

On October 4, 1826, in the approximate area of Berry Creek (see Map 2), McLeod noted a group of Kalapuyans "gleaning a miserable existence digging roots" (Davies 1961). These observations were in the immediate vicinity of prehistoric sites noted by Rohner (1993) and Hanish (1994), on land claimed as "ancestral" by Luckymute and Chapanafa Kalapuyans a quarter century later (see Chapter III; Map 13; Mackey 1974). Thus, the written accounts of McLeod and Douglas constitute the first records of prehistoric (and now, "early historical") human families, land management practices, food harvesting methods, and forest cover patterns, in the Soap Creek Valley area. They are also the first records of domestic animals (the expedition's horses) to graze in the vicinity of Soap Creek. Douglas and McLeod noted an almost total lack of grass and unburned vegetation along the entire length of the Willamette, a result of "Indian burning." Purposes ascribed by Douglas (1905) for the widespread broadcast burning of Kalapuyans included hunting, honey production, and "habit." The reference to honey is curious because honeybees are not thought to have been present in the Willamette Valley the late 1840s, when they arrived via the Oregon Trail (Carey 1971). In this instance, Douglas may have been referring to the Kalapuyan practice of burning out wasp nests and eating the cooked larvae (Boyd 1986).

On October 5, 1826, the men camped in a "small circular valley" (Douglas 1905) that may have been Soap Creek Valley. From the present location of the Soap Creek bridge on Tampico Road, The Valley appears to be circular, surrounded by Coffin Butte, Tampico Ridge, Glenders Hill, Bakers Mountain, Writsmans Hill, and Smith Peak (see Map 2; Table 2; Zybach and Fraser 1998). In 1979, Rowley (Jackson 1980; Rowley 1996) described "axe marks" dating to 1826 in a Soap Creek Valley tree near Lewisburg Saddle. If Rowley's interpretations are correct, this likely constitutes the earliest physical evidence of Europeans (and of metal) in Benton County; and perhaps the only remaining physical evidence of McLeod's and Douglas' historic journey that has been identified in western Oregon.

In 1834, HBC Chief Trader John Work and his beaver hunting brigade followed the same route blazed by McLeod's 1826 expedition. Work noted similar conditions of universal broadcast burning in the Willamette Valley that had been recorded by his predecessors (Scott 1923). He had also noted widespread sudden sickness and subsequent death among hundreds of Indian families during his journey through western Oregon and northern California during the previous two years (Scott 1928; Maloney 1942; Cook 1955; Boyd 1986). Many of the men and women in his troupe had also fallen ill at the time, and several died during the course of the expedition. It is currently believed that Work may have carried malaria with him on his travels through Idaho, eastern Oregon, California, and western Oregon (Boyd 1990: personal communication), and the spread of this disease was a primary cause of the decimation of many of the Indian communities he visited during that time. By 1841, Charles Wilkes noted that only 400 or so Kalapuyans survived in the entire Willamette Valley (Wilkes 1845)—the remnants of at least a half dozen nations estimated to have numbered 10,000 to 12,000 or more individuals prior to the time of the Lewis and Clark expedition in 1805-1806 (Boyd 1986; 1990). When the first American emigrants settled in Soap Creek Valley in 1846, Klickitat Indians (who had owned horses for several decades and had associated with white trappers for nearly 40 years) were claiming ownership of the Willamette Valley, having "conquered" the decimated Kalapuyans (Fagan 1885; Minto 1903; Rawie 1994).

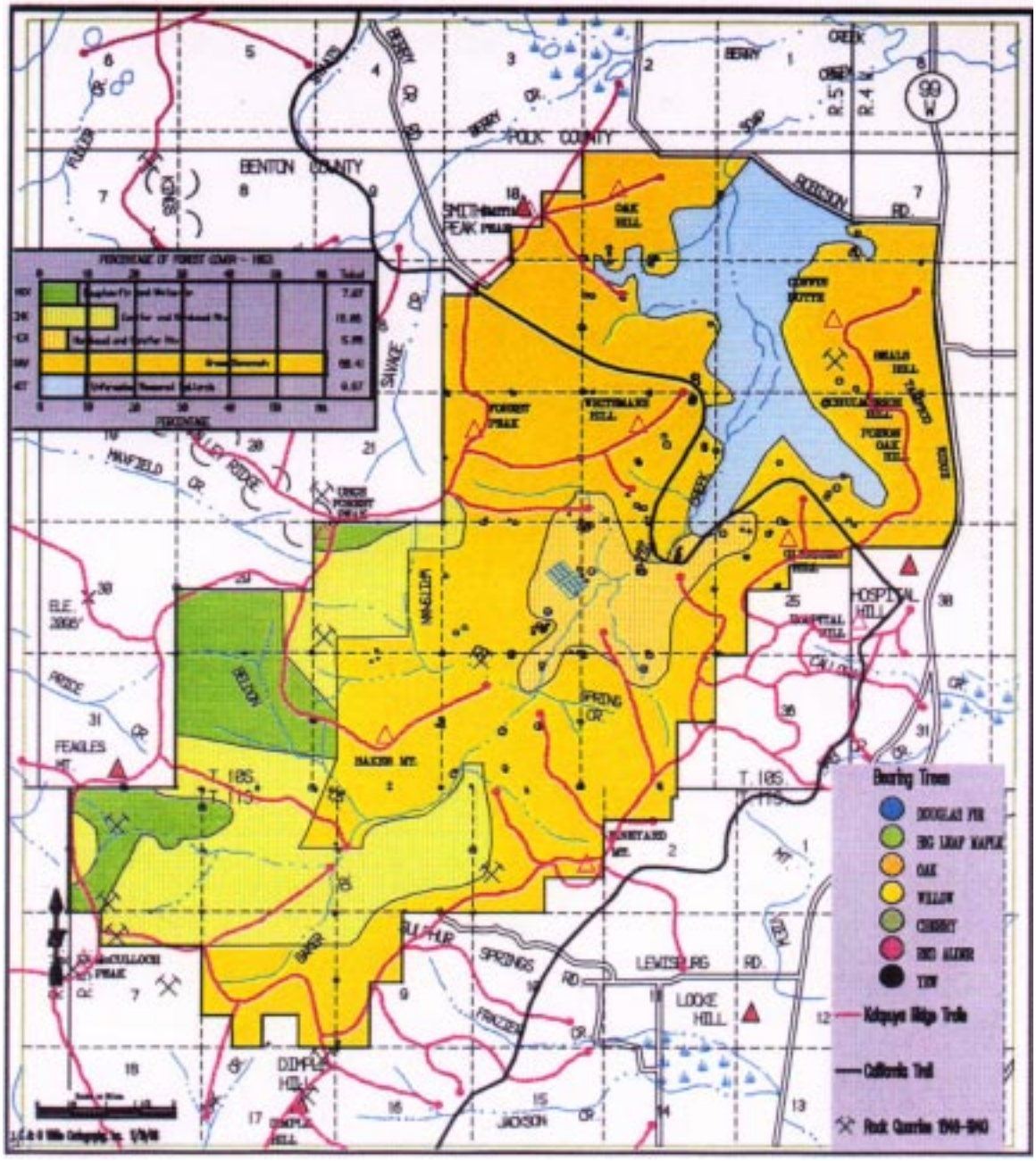
Horizontal forest cover patterns of Soap Creek Valley in 1826 are depicted in Map 21. This provides a measure of plant species diversity called

"importance" (Kimmins 1987). Map 21 is based on public land surveys completed between 1852 and 1882 (see Maps 2 and 11; Tables 20 and 21; Appendix F). Mapped Kalapuyan foot trail routes (see Map 18) have been developed throughout the area by reconstructing archaeological data, anthropological research (e.g., Minore 1976), and oral history information (Zybach et al., 1990; Rohner 1993; Hanish 1994; Cook 1995; Rowley 1997). At that time, grizzly bears, whitetail deer, California condors, lamprey eels, and cutthroat trout also inhabited the Soap Creek Valley area on a seasonal basis (Boyd 1986; Jacobs 1945; see Appendices E and H). Most of the landscape could be characterized as wet and bunchgrass prairies, oak savannah, and conifer forests. A large camas field, located to the northwest of Coffin Butte, and a stand of cedar, about 2 miles upstream from Sulphur Springs, were likely resource gathering and processing areas for local families. Other local plants used by Kalapuyans in 1826 included tarweed, oak, brackenfern, blackberries, strawberries, hazelnuts, arrowwood, yew, and onions (see Table E.3). This map represents initial conditions for Soap Creek Valley for historical time (see Chapter IV), and—based on available evidence—likely represents general conditions for 1500 as well.

1846-1882: Ranching and Home Construction

The settlement of Soap Creek Valley by American pioneers in 1846 was quickly followed by establishment of permanent homes, fences, plowed fields, wagon roads, orchards, and the eviction of remaining local Indian families (Longwood 1940). Bear and wolves were systematically exterminated from the area through hunting (Fagan 1885; Storm 1941), blacktail deer replaced whitetail deer (Poesch 1961), and orchardgrass, bachelor buttons, and vetch spread outward from the settlers' lawns and fields (Glender 1994). Large herds of cattle and horses, many destined for trade in the gold fields of California, southern Oregon and, later, eastern Oregon and Idaho, grazed available prairies and meadows (Longwood 1940). Kalapuyan burning was replaced by mass livestock grazing, and prairies remained largely free of tree seedlings and brush (see Figs. 18 and 24). An attempt to create a small town in The Valley during the mid-1850s quickly failed for a variety of economic, geographical, and political reasons.

Map 21. Forest cover patterns & bearing tree locations, 1826. Soap Creek Valley was largely grassy savannah and prairie at the time of discovery by Europeans. This map is based on original PLS BTs and surveyor notes of conditions between 1850 and 1883 (see Appendix F). Note Kalapuyan foot trail network and the location of horse trail blazed in 1826 (see Fig. 28; Map 13). Wetland to west of Coffin Butte was a major camas grove used by Kalapuyan families (Rohner 1993). The cedar grove in SE 1/4 of NW 1/4 of Sec. 6, Tsp. 11 S., Rng. 5 W. was also a likely resource procurement site for prehistoric families (see Appendix G; Zybach et al., 1990).



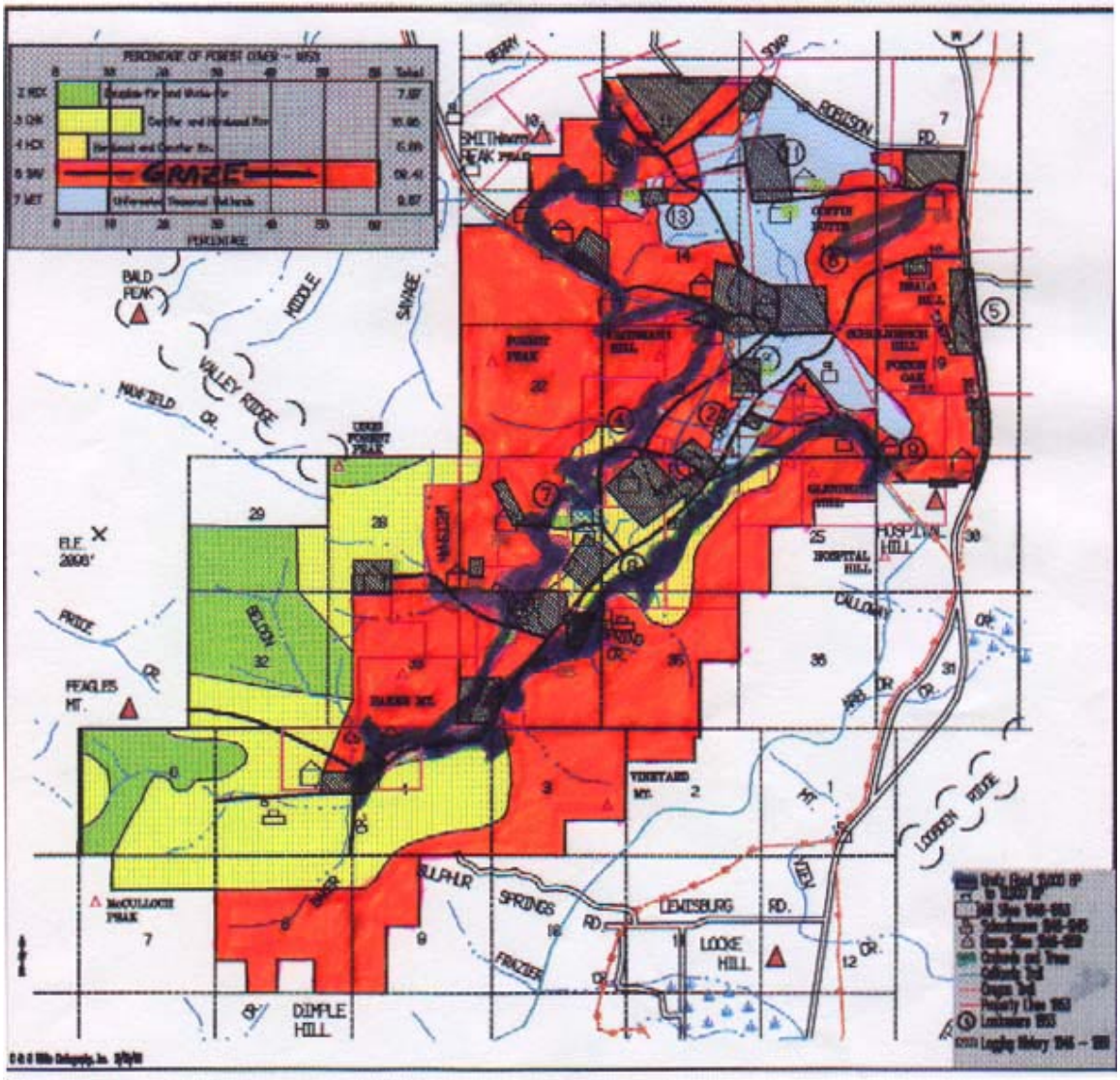
The snowstorm of 1861 likely killed a majority of the livestock in the Willamette Valley (Oliphant 1932), including herds based in Soap Creek Valley. Economic depression, brought about partly by the Civil War, prevented local farmers and ranchers from rebuilding their herds for several years (Oliphant 1932; Longwood 1940). The snowstorm of 1881-82 also had a devastating effect on local livestock populations (Oliphant 1932; Nettleton 1956; Jackson 1980; Starker 1984), and local landowners began to develop alternate strategies to produce income.

Map 22 shows the original locations of pioneer homes, orchards, fields, and wagon roads—and new property boundaries—that had been established by landowners between 1846 and 1853 (see Maps 2, 5, and 10; Table D.2). Note the extent of the conifer forest is about the same as 27 years earlier (Map 21), but virtually all savannah and prairie lands have been converted to fenced crops (to reduce open range livestock damage) and unfenced pasture by local residents. Very little of the forested area has been claimed by these pioneer landowners, indicating the relative property values of that time that separated grassy prairies and tillable flats from timbered hillsides. Basic methodology used to construct this map (and Map 21) from original land survey data is described by Bourdo (1956). This method has been subsequently used by a number of researchers to describe other areas of pioneer-era vegetation patterns in the Willamette Valley (see Habeck 1961; Thilenius 1964; 1968; Johannessen, Davenport, Millett, & McWilliams 1971; Towle 1974; 1982).

1883-1914: Fencing and Farming

By the early 1880s, a new generation of farmers and landowners had succeeded their pioneer predecessors in Soap Creek Valley. Steamboats were regularly transporting local crops to the international ports of the Columbia River and railroads had connected the Willamette Valley to national markets in California and the eastern US. Pastureland that had been dedicated to the production of beef and wool were being converted to wheat and oat crops and planted to commercial fruit and nut orchards. (Longwood 1940). Still, basic farming methods remained the same as they had been for decades, and farm families continued to depend upon horses for transportation and powering farm

Map 22. Forest cover patterns & landowner boundaries, 1853. Pioneer settlement in 1846 resulted in significant changes to Soap Creek Valley forest cover patterns: establishment of year around residences, cessation of Indian broadcast burning, grazing of prairie grasses by domestic livestock, and widespread plantings of exotic trees, herbs, shrubs, and grasses. Numbers within property boundary lines (see Maps 5 and 11) correspond to landowner names in Table D.2. Hatched areas are locations of first cleared and fenced fields in Soap Creek Valley, many of which were planted to wheat (Longwood 1940; Murphy 1995). Note correlations of land claims to pasture lands and to the extent of Bretz Flood influences.



equipment (see Fig. 24). The national economic depression of the 1890s likely affected local families to a lesser degree than their urban counterparts due to a tradition and capability of self sufficiency. Increased populations in western Oregon led to attempts to settle hillside lands that had been avoided by pioneer