

Table 13. Native and exotic wild vascular plants, 1500-1999.

<u>Wild Plant Types</u>	<u>Native</u>	<u>Exotic</u>	<u>Total</u>	<u>% Native</u>
Ferns & Graminoids	009	000	009	100
Grasses	026	035	061	43
Herbs	225*	082	307	73
Rushes and Sedges	022	000	022	100
Shrubs and Vines	031	004	035	89
Trees	027	018	045	60
TOTAL	340	139	478	71

*Only two wild vascular plants have been identified as possibly being extirpated from Soap Creek Valley since 1845: two small populations of grass lilies (*Sisyrinchium douglasii*), believed to have existed near Lewisburg Saddle and Coffin Butte shortly after 1900 (Murphy 1995), and a population of “big white” moccasin flowers (probably mountain ladyslippers, *Cypripedium montanum*) near Sulphur Springs in the mid-1900s (Murphy 1995). Both species were considered very rare at the time, and neither species is known to exist in the area at this time.

Native plants are those species known, or believed, to have lived in the immediate vicinity of Soap Creek Valley sometime after 1500 and prior to 1826.

Exotic wild plants are believed to have been introduced into Soap Creek Valley after 1825 or, more likely, after 1845.

% Native equals the percentage of total number of native wild plant species found in Soap Creek Valley in 1845 divided by the total native and exotic wild plants existing in Soap Creek Valley today.

(Kimmins 1987) in Soap Creek Valley from a pattern of oak and bunchgrass savannah to one of Douglas-fir and fern forest.

Afforestation of prairies and savannah (1830-1999). Afforestation is the process by which previously unforested areas, such as meadows, beaver ponds, or prairies, become filled with forest trees. The documented afforestation of Soap Creek Valley wetlands, meadows, and prairies by conifer and hardwood trees has been an on-going process for at least 170 years; one that can be explained by a chronological series of events and circumstances:

- 1) The reduction of Willamette Valley human populations by disease in the early 1830s directly resulted in reduction of local fire use (Boyd 1986). Soap Creek Valley areas of marshy wetland, grassy prairie and oak savannah required periodic fires for their maintenance. The reduction and eventual elimination of regular broadcast burning practices that had killed seeds and seedlings of

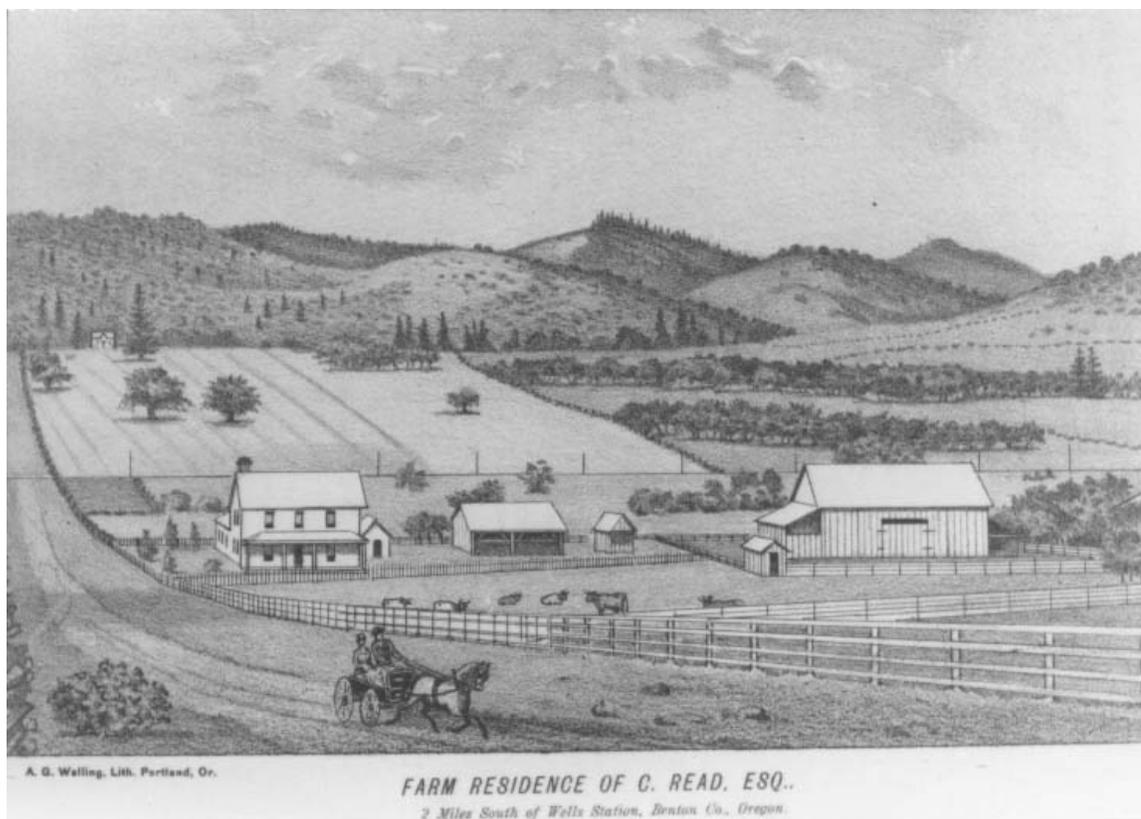
scattered trees and stands of trees in The Valley, resulted in successful encroachment of ash, oak, Douglas-fir, and grand fir stands in areas formerly dominated by grassy openings (Fig. 17; Thilenius 1964; 1968; Rohner 1993; Olson 1994).

2) Livestock populations introduced by white settlers in the mid-1840s converted remaining Soap Creek Valley grasslands to pasturage by grazing and trampling native plants, including young tree seedlings (Longwood 1940; Crosby 1986). Flatter prairie lands that went ungrazed were mowed for hay to feed livestock in winter (Fig. 18). Catastrophic snowstorms (see Table 11) in 1861-62 (Oliphant 1932), 1881-82 (Oliphant 1932; Nettleton 1956; Jackson 1980; Starker 1984; Dickey 1995), and 1937 (Rohner 1993; Dickey 1995) killed large numbers of local livestock, particularly sheep and cattle, allowing trees to become established in areas of reduced grazing and mowing (Lord 1939; Sprague and Hansen 1947).

3) The introduction of tractors and automobiles to Soap Creek Valley in the early 1900s resulted in a decreased need for livestock for transportation and farming, which resulted in decreased grazing and mowing for hay (Glender 1994; Murphy 1995). Reductions in livestock resulting from technological changes had the same effect as large scale livestock die-offs caused by snowstorms, and increase in afforestation of prairie soils along margins of established stands of trees.

4) Establishment of the Oregon State Tree Nursery in the 1920s (McDaniel 1931; Nettleton 1956) and a CCC camp in the 1930s (Thomas 1980; Zybach c.1991) adjacent to Soap Creek Valley (Sekermestrovich 1991) resulted in the first forest plantations (predominantly Douglas-fir) in The Valley (Fig. 19). Removal of remaining domestic grazing animals at the beginning of WW II (Rohner 1993) and increased value of conifer timber following the war, resulted in planting of remaining Soap Creek Valley prairie lands with Douglas-fir and other conifer seedlings in the 1950s that has continued to the present time (Blanchard 1995: personal communication; Garver 1996: personal communication; Rowley 1996; Davies 1997; personal observation).

Fig. 17. Drawing of oak afforestation from NE viewpoint, 1885. Several named landmarks are visible from this perspective of Soap Creek Valley. The view is westward from the approximate location of present-day Adair Village (see map 2) toward Peavy Arboretum and the ridgelines of northern Soap Creek Valley. Identifiable features include Glenders Hill, Tampico Ridge, Forest Peak, and Writsman Hill (see map 2 and Table 2). This is one of a number of local landscape drawings by James T. Pickett (Munford 1988) that illustrate an 1885 history of Benton County (Fagan 1885). Pickett was noted for the detailed accuracy of his drawings, which can be favorably compared to original land surveys, timber cruises, landscape photographs, and aerial photographs. Note relict grasslands on southern slopes of Soap Creek Valley, many of which persist to this time (Zybach, Sherer, and Sondena 1990), and scattered conifers rising above dense oak woodlands on remaining slopes. Original land surveys in this area depicted open grasslands and scattered oaks and “oak openings” less than 35 years before drawing was made (see Chapter V). Thilenius (1968) traces general Willamette Valley oak woodland development to 1862, but relates forestation process only to cessation of Indian burning and doesn't factor in potential effects of livestock-killing snows, floods, and freezes of 1861-1862 (Tables 10 and 11). Using Thilenius' figures, the oak canopy in this drawing would be less than 25-years old.



Expansion of Douglas-fir Range (1650-1999). Old-growth Douglas-fir dating to the mid-17th century, many specimens of which still exist in Soap Creek Valley, likely helped to reforest and afforest adjacent burns, prairie and meadow areas, as described in preceding paragraphs. At the time of decimation of local Kalapuyan families in the 1830s, several stands of Douglas-fir existed in Soap Creek Valley that were less than 150 years of age (Nettleton 1956; Johnson 1996: personal communication), the likely progeny of older trees within their perimeters, or immediately adjacent to them (Lord 1939; Isaac 1949).

Oak woodlands that afforested Soap Creek Valley savannah and prairies following settlement in the 1840s (Storm 1941; Franklin & Hemstrom 1981; Olson 1994; see Fig. 17) have also been replaced by conifers—in most instances, Douglas-fir (Olson 1994; personal observation). This process has been described by Rohner (1993), Olson (1994), and Rowley (1996) and documented by drawings, photographs, maps, and scientific research (Sprague & Hansen 1947; Thilenius 1964; 1968; Towle 1974; 1982).

Three basic methods by which the succession of grassland to oak woodland to conifer forest in Soap Creek Valley occurred have been described:

1) Oak woodlands afforested several predominantly east- and south-facing prairies and pastures that had been too hot and/or dry for conifer establishment (Fig. 17). The oak overstory subsequently provided sufficient shade and moisture for conifer seedlings to survive (Sprague & Hansen 1947; Olson 1994). Young conifers eventually outgrew the oak overstory and, in turn, began to shade the parenting oak out of existence (Sprague & Hansen 1947; Wakefield 1984: personal communication; personal observation). This ultimately established a nearly pure stand of Douglas-fir. This process, if left unchecked, can take a few decades to a century or more to complete. It continues to the present time in many areas of Soap Creek Valley (Fig. 20).

2) Oak woodlands were purposefully “slashed” (Olson 1994; Cook 1995) and “grubbed” (Rohner 1993) for pasturage (Fig. 21). Slashing and grubbing refer to practices of clearcutting and/or uprooting stands of oak trees in order to create pasture or cropland. After being used for ranching and/or farming purposes, these lands seeded or were planted to conifer (Figs. 19 and 21; Olson

Fig. 18. Mowed Soap Creek Valley prairie, c.1899. Soap Creek Valley meadows and grassy prairies that were not grazed during summer months were often mowed and stored for feeding livestock during Fall and Winter. Note size of trees encroaching on prairie boundaries, along wooden fenceline. Photograph by Samuel Moore, provided by Soap Creek Schoolhouse Foundation, courtesy Myra Moore Lauridson ([Grabe 1990](#)).

Fig. 19. McDonald Forest 1936 Douglas-fir plantation, c.1950. This photograph documents one of the first conifer plantations to be established by OSU students in Soap Creek Valley (Rowley 1981). These trees are the result of student and CCC tree planting projects in an area that had been logged in the late 1920s ([Hindes 1996](#)) and burned in the early 1930s ([Sekermestrovich 1990](#); [Rowley 1996](#)). OSU College of Forestry, photographer unknown.

Fig. 18



Fig. 19.



1994; Garver 1996: personal communication; Rowley 1996), predominantly Douglas-fir (Munger 1940).

3) Oak woodlands were directly converted to conifer stands by “release cuttings” (Garver 1996: personal communication; Rowley 1996), and by “conversion” reforestation projects (Zybach 1983; Blanchard 1995: personal communication; Garver 1996: personal communication). Release cuttings are the removal of unwanted overstory trees and other competing vegetation by mechanical means, including cutting with chain saws or machetes. This method of conversion depends upon an existing population of desired trees, such as an understory of redcedar, grand fir, and/or Douglas-fir that is being shaded or crowded by unwanted deciduous trees, such as oak, bigleaf maple, or alder (Fig. 22). Unwanted overstory trees and competing vegetation can also be controlled or killed with chemical applications (Rowley 1996: personal communication). Conversion reforestation projects are planned actions that result in removal of undesired tree and/or brush species and subsequent establishment of preferred tree species (Zybach 1983). Examples of conversion reforestation projects include changing oak woodlands to Douglas-fir plantations (Fig. 21), or converting mixed alder, bigleaf maple, and grand fir stands to a mixed Douglas-fir, grand fir, and redcedar plantation.

Summary. The expansion of Douglas-fir into the grassy prairies and oak savannah of Soap Creek Valley has been the most widespread change in horizontal and vertical forest tree cover patterns to occur during historical time (see Figs. 17, 19, 20, 21, and 22). This change is a result of seeding made possible by historical reductions in prescribed burning practices and livestock grazing, and by purposeful afforestation and conversion reforestation projects. Other Soap Creek Valley plant migrations, including the expansion of oak woodlands into former prairie lands and meadows (Figs. 17 and 20) and movement of understory plants and weeds (Rowley 1990: personal communication; Johnson 1996: personal communication), have been either relatively ephemeral phenomena (as in the instance of oak migration, see Fig. 20), or of incidental importance to horizontal and vertical forest cover patterns (e.g., wilding fruit trees: see Fig. 16) when compared to the effects of Douglas-fir migration patterns and consequences.

Fig. 20. Smith Peak oak and Douglas-fir succession, 1938-1990.

Left Photograph. Maxine Dickey and oak woodlands approximately one mile north of Smith Peak, on southern banks of Berry Creek, c.1938 (see Map 2). New Berry Creek School teacher, Maxine Van Patten, had her photograph taken near this stand of “grub” oak by a student, Edith Tandy ([Dickey 1995](#); [Vanderburg 1995](#)). Van Patten later married local OSC Fisheries and Wildlife student, Donald Dickey. Oak stand is typical of woodlands that afforested Soap Creek Valley area following settlement in 1846. Note vertical structure that features close spacing between trees and lack of lower, spreading limbs that typified savannah oak of presettlement era.

Right Photograph. This photograph, taken eastward from Tampico Road near the summit of Smith Peak (see Map 2) in 1990, illustrates the succession from savannah oak woodland to Douglas-fir forest that has taken place during the 20th century in much of Soap Creek Valley. Note the dramatic change in vertical structure from widespread oak limbs in open, grassy prairie to closely grown conifers that have matured in shady environment. Also note the apparent even-aged nature of the oak and Douglas-fir tree canopies in these photographs. Photograph by author.



Fig. 21. Lewisburg Saddle view NE., Soap Creek Valley, 1914-1989.

Top Photograph. Taken by Ernest Cook in 1914, looking eastward over his property (Cook 1995; Zybach 1994b). The Cook farmhouse and outbuildings are in right foreground, Writsman Hill (see Map 2) in center background. Note pre-1914 clearcut to the east, in area that is now a portion of McDonald Forest (see Map 4; Fig 19), and the relative size and spacing of slashed tree stumps in foreground area cleared for pasturage (Olson 1994).

Bottom Photograph. Taken from a location slightly uphill from Cook's 1914 perspective (Zybach 1989; Zybach 1994b). Writsman Hill is in the left-center background and Coffin Butte is clearly visible to the northeast (see Map 2). Note great amount of conifer afforestation and reforestation that has taken place in Soap Creek Valley during the 20th century. Also note increase in deciduous tree growth that has taken place along Soap Creek (center, valley floor) in 75 years time between photographs. Relict prairie lands visible on the southern slopes of Writsman Hill and Forest Peak can be more clearly viewed in the bottom photograph of Fig. 16, taken ten years later than this photograph. (Photograph by author.)

Fig. 21.



Fig. 22. Writsman Hill Douglas-fir stand, June 12, 1999. Nearly pure stand of Douglas-fir on the northern aspect of Writsman Hill (see Map 2) is a partial result of “stand release” reforestation methods used by OSU Research Forests foresters in the 1980s (Garver 1996: personal communication). This location, also known as “Steele Hill” (Metsker 1929b), was a source of Christmas Trees by the Rohner family in the 1930s (Rohner 1994), and was a grassy prairie in the 1850s. Note recent home construction at the base of the hill. (Photograph by author.)



Discussion. Soap Creek Valley became one of the earliest forested areas in western Oregon to convert from “natural” and/or “leave-tree” seeding to hand planting of conifer seedlings for reforestation and afforestation projects. This was partly due to a series of related circumstances, including the proximity of the OAC School of Forestry in 1910 (Jackson 1980), the development of the Oregon State Nursery in the 1920s and 1930s (McDaniels 1931), the beginning of OSU Research Forests lands purchases in Soap Creek Valley during 1926 (Metsker 1929b; Starker 1984; Jackson 1980), and the ready availability of CCC and NYA labor for road building, tree planting, and fire fighting projects in the 1930s (Berg 1983; Sekermestrovich 1990; Zybach c.1991). Another result of this coincidence is that

OSU and private forestlands in Soap Creek Valley (see Map 3) now contain some of the most intensely managed and measured conifers in western Oregon. For the past 70 years, management focus has been upon the growth and harvest of commercial logs and the successful afforestation of balds and other grassland (Wakefield 1984: personal communication; Garver 1990: personal communication; Davies 1997). OSU research studies have focused on recreational hunting, hardwood management, recreational planning, etc., in Soap Creek Valley from time to time, but the current conifer pattern is clearly intended to achieve an optimum commercial level of timber production (Jackson 1980; Wakefield 1984: personal communication; Starker 1984; Dunn 1990; Garver 1996: personal communication; Rowley 1996; Davies 1997; personal observations). In recent years, this management approach has resulted in public discussion and controversy (Grabe 1990; Anderson 1993; OSU College of Forestry Planning Team 1993).

Summary. Despite a measurable decrease in “wildland” (uncultivated) acreage, and the simultaneous expansion of even-aged stands of seeded and planted Douglas-fir trees (see Figs. 14, 19, 20, 21, and 22), “biodiversity richness” of wild vascular plant and wild terrestrial vertebrate species in Soap Creek Valley has generally increased during the past 175 years (see Map 3; Appendix E; Figs. 5, 6, 14, 15, and 17; Tables 12 and 13). “Evenness” (or “species importance”) of wildlife species’ distribution has varied as a result, as might be expected. For example, wild rodent populations tend to congregate near human developments and habitations, while large wild carnivore populations tend toward the deeper, protected recesses of forests.

In particular, since settlement:

1) The greatest loss of Soap Creek Valley wildlife habitat has been the thousands of acres of oak savannah, grass prairies, wetlands, meadows, and berry patches maintained by local Kalapuyan broadcast burning practices until the mid-1800s.

2) The greatest increase in local wildlife habitat has been the expansion of thousands of acres of even-aged stands of Douglas-fir trees (mostly through seeding before 1930, and through plantations since then).

3) Total local wildland acreage has decreased significantly, with relatively large areas now devoted to housing, automobile traffic, solid waste disposal, and raising domestic animals, crops, and landscape plants (this effect has particularly restricted the range and potential population of many wild plants and animals).

4) Wild vascular plant species diversity has increased dramatically, largely through introductions of exotic grasses, herbs, shrubs, and trees.

5) Wild terrestrial vertebrate species diversity has remained about the same. Large, wild carnivore populations were largely exterminated, with grizzly bears, timber wolves, lynx, and wolverines remaining locally extinct to this time. Although not the focus of specific extermination projects, other vertebrates, including California condors, western rattlesnakes, and whitetail deer, have also been extirpated through human actions and remain locally extinct. Numbers of introduced vertebrate species, including house mice, bullfrogs, possums, nutria, Chinese pheasants, turkeys, and turtles, approximately equal the number of species extirpated during the same time period.

EFFECTS OF HUMAN ACTIVITIES

The history of people in Soap Creek Valley probably exceeds 10,000 years; and is perhaps much longer. The incremental and cumulative effects of human history, much like that of the ice age Bretz Floods, has likely had a long-term and identifiable impact on local wild vascular plant and vertebrate animal populations. This section examines the relationship between human history in Soap Creek Valley and changes in The Valley's forest cover patterns.

At occasional intervals, discussion and summary statements are included in the text of this section in particular reference to the following questions: Were human influences on Soap Creek Valley forest cover patterns, particularly those within the prehistoric 1500-1825 range of this study, incidental or pervasive? How do they compare to other types of influences, particularly the catastrophic events and demographic processes listed in Tables 8 and 9? Do human actions tend to exacerbate or mitigate "natural" (non-human) processes and events that