Cultural Resource Overview
of the Willamette National Forest
Western Oregon

Rick Minor and Audrey Frances Pecor

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CULTURAL RESOURCE OVERVIEW OF THE
WILLAMETTE NATIONAL FOREST,
WESTERN OREGON

BY
RICK MINOR
AND
AUDREY FRANCES PECOR

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Errata

Page 16, paragraph 4, line 9. Read "North Santiam," rather than "South Santiam."

Page 17, paragraph 3. This is misleading. Although a section of the western portion of the Oregon Central Military Wagon Road became part of the Willamette Pass highway, the Wagon Road itself crossed the Cascades at Emigrant Pass.

Page 17, paragraph 4, line 3. Change to read "...most important one has probably been that which was formerly located at McKenzie Bridge..."

Page 18, paragraph 4, line 4. Read "site 31" rather than "site 32."

Page 20, last paragraph, line 2. Read "Leo Paschelke" rather than "Les Paschelke."

Page 28, paragraph 2, line 1. Read "Another hot springs..." rather than "A more recently developed hot springs..."

Page 33, Figure 3. Site 11 is mislocated; it should be placed 4 miles south and 2 miles west of the location shown. Site 12 is mislocated; it should be placed approximately 6 miles east and 1/2 miles south of the position shown.

Page 54. Caption for Fig. 20 should reflect that the photograph was furnished by S. Frear.

Page 70-71, Table 4. Correct as follows:

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Page 155, paragraph 1. The reference to the Clear Lake Cutoff is irrelevant. Scott Trail crossed the Cascades at Scott Pass, between the North Sister and Belknap Crater, a few miles south of McKenzie Pass.

Page 155, paragraph 3, last sentence. Change to read "Although Minto's route crossed the summit of Minto Pass, much of his trail became the North Santiam highway, which now joins the Wiley Trail route (the South Santiam highway) shortly before crossing the Cascades at Hogg Rock."

Page 155, paragraph 4. Delete. See correction to page 159 for locations.

Page 159. On the map the Minto Trail should be shown reaching the eastern boundary of the Forest approximately 8 miles north of the location indicated. The Craig Trail should be shown crossing the Scott Trail and reaching the eastern boundary of the Forest approximately 3 miles north of the location shown.
INTRODUCTION AND ACKNOWLEDGMENTS

This volume presents a descriptive overview of the cultural resources occurring within Oregon's Willamette National Forest. Cultural resources are remains of sites, structures, and objects of human use, either prehistoric or historic. The value of cultural resources lies in their potential for providing information about former ways of life and in their historical significance to the community in which they now exist.

Recent federal legislation and policies direct the Forest Service, as well as all other federal agencies, to inventory, protect, and enhance the cultural environment on the lands which it manages. The present cultural resource overview represents a major step by the Willamette National Forest in the implementation of these directives.

As specified in the agreement under which this project was conducted, the research here reported consisted primarily of a search of existing documentary and archival records. The purpose of this overview is to present a discussion and evaluation of these records which will guide further cultural resource inventory work in the field, provide the necessary background for evaluation of cultural resources yet to be discovered, and facilitate the long-range management of these resources. The bulk of the volume discusses the past settlement and use of the Willamette National Forest, and included within it are sections describing the forest's environment, history, ethnography, and archaeology. As a conclusion to the historical and archaeological discussions, the inventories of cultural resource sites developed during the course of the research are briefly summarized, and recommendations are made for the management of specific sites. A companion inventory volume of limited distribution, prepared for administrative use, provides more detailed information on the cultural resource sites identified. As this work was restricted solely to documentary and archival research, the sites listed in the inventory have not been verified or assessed in the field. A concluding section of the overview makes general recommendations for the future management of the forest's cultural resources. A comprehensive bibliography of sources consulted during the preparation of this document constitutes the final part of the overview, and should prove useful to those who wish to further pursue various topics here discussed.

Preparation of this overview was carried out under the terms of Purchase Order No. 939-18-76, as amended, between the United States Department of Agriculture-Forest Service (Willamette National Forest), and the Department of Anthropology, University of Oregon. Dr. C. Melvin Aikens, Associate Professor, was Principal Investigator. The environmental, ethnographic, and archaeological sections were written by Rick Minor. The historical section is the work of Audrey Frances Pecor. The several sets of recommendations were co-authored with Aikens.
Drafts of this manuscript were reviewed by Edwin Graham, Recreation Assistant, Willamette National Forest, and by Dr. Leslie E. Wildesen, Forest Service Region 6 Archaeologist. The authors would like to express their appreciation to these individuals and to the many others listed below who graciously gave of their time and knowledge during the preparation of this overview.

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ENVIRONMENTAL OVERVIEW

The natural environment of the Willamette National Forest provides the context within which human use of the area, both historic and prehistoric, may be understood. Climate, topography, available food, and industrial raw materials have directly conditioned the nature of the cultural resource sites that remain to document past human occupation of the region. A brief environmental sketch is thus an essential backdrop to further discussion of the historic and prehistoric cultures.

LOCATION

The Willamette National Forest occupies an area of 1,667,821 acres on the west central slopes of Oregon’s Cascade Range, stretching some 110 miles in a north-south direction. Portions of six Oregon counties are included within the Willamette National Forest, with approximately 83 percent of the forest being located in Lane, Linn, and Marion counties, and the remaining 17 percent in Douglas, Clackamas, and Jefferson counties.

Adjacent to the Willamette National Forest are the Mount Hood National Forest on the north, the Deschutes National Forest on the east, and the Umpqua National Forest on the south. On the west, in the foothills of the Willamette Valley, the Willamette National Forest is bounded by a mixture of privately owned land and land administered by the U.S. Bureau of Land Management.

Portions of the present Willamette National Forest originally formed a part of the Cascade Forest Reserve established in 1893. In 1911 the Cascade Forest Reserve was subdivided into more manageable administrative units, and the Santiam and Cascade National Forests were among several national forests created. In 1933 the Santiam and Cascade National Forests were combined to create the Willamette National Forest.

The Willamette National Forest is administratively subdivided into seven Ranger Districts (Fig. 1).
Fig. 1. Administrative Subdivisions of the Willamette National Forest. Numbers in parentheses indicate acreage.
CLIMATE

The present climate of the Willamette National Forest region is typical of that generally found in the Oregon Cascade Range, with generally mild winters, moderately warm summers, and heavy annual precipitation, concentrated in the winter months. The climate is influenced by the position and intensity of high and low pressure systems over the North Pacific Ocean and by variation in topography. Moist maritime air masses moving from west to east provide a great deal of moisture for the western slope of the Cascade Range. Although the amount of precipitation varies greatly throughout the Forest, the general pattern is largely the same: precipitation is lowest in the major valley bottoms and increases as elevation increases. Conversely, average temperatures are higher in the major valley bottoms and decrease with increasing elevation. Precipitation varies from 40 inches annually on the western boundary valley bottoms to 140 inches on the peaks of the higher elevations (Legard and Meyer 1973:59). Most of the precipitation falls during the five month period from November to March. Precipitation in the valley bottoms falls mainly as rain, that in the higher elevations as snow. Above 4500 feet snow cover is usually present from early December until late April, and some snow remains throughout the year at elevations above 7000 feet.

Recorded temperature extremes range from a winter low of -150°F at Santiam Pass to a summer high of 112°F at Oakridge Ranger Station. Such extremes, however, are unusual; the average January temperature usually ranges between 25°F to 30°F and the average July temperature is about 85°F, as measured at the official U.S. Weather Bureau reporting stations at Detroit, McKenzie Bridge and Oakridge (Burns 1973:31-34).

Information obtained from paleoclimatic studies indicates that the climate of the Willamette National Forest and surrounding areas has not always been the same as it is today. The following summary of the information available concerning past climates is largely based on the analysis of pollen profiles from the Willamette Valley by Hansen (1942, 1947) and on coastal studies carried out by Heusser (1960).

The period following the retreat of continental glaciers in the Pacific Northwest is variously referred to as the Anathermal (Cooper 1958:941), Early Postglacial (Heusser 1960:183), or late Period II (Hansen 1947:113). This climatic interval, which dates between 10,500 and 8000 years ago, was a period of transition from cool and moist to warm and dry conditions as the influence of glaciation became more remote. In the later stages of the period, the climate was very similar to that of today (Heusser 1960:183; Hansen 1947:113).
The following climatic interval is variously referred to as the Hypsithermal (Heusser 1960:184), Middle Postglacial (Hansen 1947:116), or Period III (Hansen 1947:113). This was a period of accelerated warming and drying, which attained its maximum between 8000 and 3000 years ago.

The final period, from 3000 years ago to the present, is referred to as the Hypothermal (Cooper 1958:943), Late Postglacial (Heusser 1960:186), or Period IV (Hansen 1947:113). This period saw a return to cooler and moister climatic conditions similar to those found in the region at the present time.

**TOPOGRAPHY**

The Willamette National Forest contains a diverse natural environment. Elevations range from as low as 900 feet above sea level along the Santiam River to over 10,000 feet at the top of Mount Jefferson and the Three Sisters. Most of the forest lies within an elevation range of 2000 to 4000 feet above sea level. Included within the Willamette National Forest are two natural physiographic regions: the High Cascades and the Western Cascades (Baldwin 1976:53).

The High Cascades are located in the eastern one-third of the Forest immediately adjacent to the crest of the Cascade Range. This region consists of a gently sloping high plateau occasionally broken by dormant volcanic peaks. The rolling terrain is interrupted at intervals by glaciated channels carrying westward flowing streams. Elevations in the High Cascades range from around 4000 feet to over 10,000 feet, with an average of about 5000 feet. The major peaks within the Willamette National Forest, Mount Jefferson (10,497 feet), the Three Sisters (10,047-10,358 feet), Three Fingered Jack (7841 feet) and Mount Washington (7794 feet), are located within the High Cascades portion of the forest.

The lower two-thirds of the forest is located in the Western Cascades. This region is a broad upland of subdued land surface which has been deeply dissected by westward flowing streams, most of which originate in the High Cascades. Elevations in the Western Cascades range from 900 feet to over 5000 feet. Included within this subdivision is a lower mountain range running roughly parallel to the crest of the High Cascades, extending from Batchelor Mountain (5953 feet), southward through the Pyramids (5618 feet), Crescent Mountain (5750 feet), and Cone Peak (5660 feet), and ending in Lookout Mountain (5276 feet).

The division between the High Cascades and the Western Cascades is difficult to identify (Baldwin 1973:53), but the boundary is roughly defined by the headwaters of streams (Burns 1973:26). In contrast to
the plateau terrain of the High Cascades, the Western Cascades are maturely dissected, with steep mountains and deep valleys. Where older land surfaces have been exposed, steep gorges, cliffs, waterfalls, pinnacles and lakes have been formed. The boundary between the High Cascades and the Western Cascades thus interdigitates where streams have cut valleys into the plateau.

The main peaks of the High Cascades are remnants of extinct volcanoes of various ages and conditions. Recent volcanic activity appears to have centered near the Three Sisters and Mount Washington, extending north to Mount Jefferson and including a number of cinder cones and craters. Langille et al. (1903) recognized six great lava streams, the largest of which is centered on Belknap Crater. Other major lava flows are centered on Little Nash Crater to the north and Four-in-One Cone to the south of Belknap Crater. The numerous cinder cones, formed of coarse cinders and volcanic sand, give the area around Belknap Crater a peculiar desolate appearance.

In the High Cascades, small alpine glaciers have been formed by the accumulation of heavy winter snowfall at the higher elevations. About a dozen glaciers surround the Three Sisters and four surround Mount Jefferson, covering most of the area above 8000 feet. The larger glaciers include the Whitewater and Jefferson Park glaciers on Mount Jefferson, Collier and Hayden glaciers on the North Sister, and Prouty glacier on the South Sister.

There are over 18,000 acres of surface water in the Willamette National Forest. The forest's landscape is dotted with more than 300 lakes and dissected by over 2500 miles of streams and rivers. There are also five major reservoirs. Lakes are especially abundant in the High Cascades, but are less frequent in the more maturely-dissected landscape of the Western Cascades. Waldo Lake, the largest in the forest, has an area of 6000 acres and depths exceeding 400 feet. Streams are relatively rare in the High Cascades, but are numerous in the maturely-dissected terrain of the Western Cascades, where a dendritic drainage pattern has developed. The Willamette, McKenzie and Santiam Rivers and their extensive tributaries constitute the main drainage system of the Willamette National Forest.

GEOLOGY

The Western Cascades and the High Cascades have distinctly different geological characteristics and histories. The Western Cascades Range is composed of older Tertiary basalt flows, breccias, tuffs and intrusive rocks of late Eocene to late Miocene age, while in the High Cascades these strata have been covered by more recent Plio-Pleistocene lava flows (Baldwin 1976:53).
The geology of the Western Cascades and High Cascades, respectively, is described by Franklin and Dyrness (1973) as follows:

In the Western Cascades Province during the Oligocene and Miocene epochs, numerous volcanic eruptions and effusions produced deposits of basalts, andesites, and pyroclastic rocks, frequently in a complex pattern. Pyroclastic rocks in this area include tuffs, breccias, and agglomerates. Besides these extrusive rocks, a small amount of granite outcrops in several places, notably along the McKenzie River. Subsequent alteration by alpine glaciation occurred during the Pleistocene epoch. Glaciation is evidenced by widely spaced deposits of glacial drift and the characteristic U-shape of the major valley drainages (Franklin and Dyrness 1973:23-24).

The High Cascades Province is geologically young; some flows of lava (scoriaeous basalt) are only several hundred years old. The most extensive depositions were extruded from volcanic vents during the late Pliocene and Pleistocene epochs. These flows are of gray olivine basalts and olivine-bearing andesites with subordinate amounts of dense porphyritic pyroxene andesites. Scattered over the area are younger flows comprised of andesites and basalts which are dated as upper Pleistocene and Recent epochs. Most major peaks in the area are made up of olivine-bearing andesite and originated during the upper Pleistocene epoch. The smaller cones, commonly called cinder cones, are generally comprised of gray to red basaltic and andesitic pyroclastic rocks (Franklin and Dyrness 1973:25-26).

Bedrock in the Cascade Mountain Range, especially in the higher elevations, south of the McKenzie River, is frequently obscured by a mantle of pumice and ash from several recent volcanic eruptions in the High Cascades. The most extensive deposition of these materials resulted from the explosive eruption of Mount Mazama, which occurred about 7000 years ago (Kittleman 1973:2958). The Western Cascades, in general, have not been appreciably affected by this relatively recent volcanic activity, as most of the lighter volcanic ash produced by eruptions in the High Cascades has been distributed eastward due to the direction of the prevailing winds.

A special geologic feature which attracted aboriginal peoples to the High Cascades is the presence of an obsidian source in the area near Three Sisters (Peterson et al. 1976:27-29). Metal deposits which attracted miners to the area in historic times include gold, silver, copper, lead, and zinc (Callaghan and Buddington 1938).
SOILS

Many types of soils are found in the Willamette National Forest, reflecting the differential effects of climate, time, vegetative cover, parent material, and topography on the soil forming process.

Because of the recent volcanic activity, extensive areas in the High Cascades are mantled with deposits of volcanic ejecta, such as pumice, cinders and ash (Franklin and Dyrness 1973:26). Deposits of these materials are commonly one and a half to two feet deep. Typically, soils developed from these materials exhibit a thin, light-colored surface layer of sandy loam or loamy sand underlain by a transitional layer which grades into the unaltered coarse sand or gravelly sand parent material. Underlying sediments are predominantly derived from glacially deposited materials. These soils are generally dark-colored gravelly to stony loams that restrict the movement of water.

Soils in the Western Cascades can be placed into two major groups: those developed from tuffs and breccias and those developed from basalts and andesites. Each set of parent materials has generally produced contrasting soil types. (Franklin and Dyrness 1973:24).

Soils developed from tuffs and breccias, materials which are readily weatherable, tend to be deep and fine textured. Well-developed soils derived from these materials typically possess moderately thick dark brown clay loam surface layers and reddish-brown silty clay loam subsurface deposits. Soils derived from tuffs and breccias are frequently imperfectly drained, and mass soil movements (e.g., slumps or earthflows) are common.

Soils developed from basalt and andesite, on the other hand, are generally well drained and tend to be stonier and coarser textured than those derived from tuffs and breccias. These soils typically are reddish-brown in color, with a sandy loam or loam surface layer, and a loam or clay loam subsoil. Soils derived from basalt and andesite are generally more stable and not as subject to mass erosion as those developed from tuffs and breccias.

VEGETATION

A comprehensive description of the vegetation characteristic of the Willamette National Forest can be extracted from "Natural Vegetation of Oregon and Washington" by Franklin and Dyrness (1973). Their report recognizes several major vegetation zones which vary primarily in relation to elevation and moisture. The following
description of the vegetation zones within the Willamette National Forest is derived principally from their exhaustive study.

The Tsuga heterophylla Zone is the most extensive vegetation zone found within the Willamette National Forest. This zone occurs at elevations ranging from 450 to 3000 feet. The major forest trees found in this zone are Tsuga heterophylla (western hemlock), Pseudotsuga menziesii (Douglas fir), and Thuja plicata (western redcedar). Abies grandis (grand fir) and Pinus monticola (western white pine) occur sporadically, and Taxus brevifolia (western yew) is found throughout the zone but always as a subordinate species. Abies amabilis (Pacific silver fir) is commonly found near the zone's upper altitudinal limits. In the southernmost portion of the Willamette National Forest Libocedrus decurrens (incense-cedar), Pinus lambertiana (sugar pine), and Pinus ponderosa (ponderosa pine) are likely to be found in this zone.

The understory species found in the Tsuga heterophylla Zone vary primarily in relation to moisture gradients. In dry areas the understory is characterized by Holodiscus discolor (creambush oceanspray) and Gaultheria shallon (salal). Very moist areas, on the other hand, are characterized by an understory composed primarily of Polystichum munitum (swordfern) and Oxalis oregana (Oregon oxalis). Areas of intermediate moisture content are characterized by Rhododendron macrophyllum (Pacific rhododendron) and Berberis nervosa (Oregon grape) or by codominance of Polystichum and Gaultheria.

The Abies amabilis Zone lies between the temperate Tsuga heterophylla Zone of the lowlands and the subalpine Tsuga mertensiana Zone. In the Oregon Cascades this zone is generally found at elevations between 3000 and 4500 feet. The composition of the forest in the Abies amabilis Zone varies widely, depending upon the particular stand's age, history, and locale (Franklin 1965a, 1965b); much of the variation in community composition is associated with differences in moisture (Franklin 1966). Typical forest trees found in this zone include Abies amabilis (Pacific silver fir), Tsuga heterophylla (western hemlock), Abies procera (noble fir), Pseudotsuga menziesii (Douglas fir), Thuja plicata (western redcedar) and Pinus monticola (western white pine). Abies grandis (grand fir), Picea engelmannii (Engelmann spruce), Pinus contorta (lodgepole pine), and Larix occidentalis (western larch) may also occur in this zone. Along the zone's upper altitudinal limits, Abies lasiocarpa (subalpine fir), Tsuga mertensiana (mountain hemlock) and Chamaecyparis nootkatnensis (Alaska cedar) appear.

The understory vegetation in the Abies amabilis Zone is usually dominated by Vaccinium (huckleberry), Menziesia (rustyleaf), Gaultheria (salal), Chimaphila (prince's pine), Rhododendron (rhododendron), and Pyrola (pyrola). Cornus canadensis (bunchberry dogwood), Clintonia uniflora (queencup beadi1y), Rubus lasiococcus (dwarf blackberry), Rubus pedatus (strawberry-leaf blackberry),
Linnaea borealis (twinflower), Xerophyllum tenax (common beargrass), and Viola sempervirens (evergreen violet) are also common species.

The Tsuga mertensiana Zone is the highest forested zone along the western slopes and crest of the Cascade Range, and generally occurs between elevations of 5000 and 6000 feet in the Oregon Cascades. This zone extends varying distances east of the Cascade crest until it is gradually replaced by the Abies lasiocarpa Zone more typical of interior subalpine environments. Franklin and Dyrness (1973:101) divide the Tsuga mertensiana Zone into two subzones: a lower subzone of "closed forest" and an upper parkland subzone. The lower subzone is characterized by an essentially continuous forest cover of Tsuga mertensiana (mountain hemlock) and its associates. The upper subzone, on the other hand, is composed of a mosaic of forest patches interspersed with shrubby or herbaceous subalpine communities.

The actual forest composition of the Tsuga mertensiana Zone varies considerably with locale. Tsuga mertensiana (mountain hemlock) is dominant in old-growth forests, but Abies lasiocarpa (subalpine fir) and Pinus contorta (lodgepole pine) are more common in drier portions of the zone. Abies amabilis (Pacific silver fir) and Chamaecyparis nootkatensis (Alaska-cedar) also occur in this zone.

There is a wide variety of understory species in the Tsuga mertensiana Zone, the most common of which include Vaccinium membranaceum (big huckleberry), Vaccinium scoparium (grouse huckleberry), Juniperus communis (mountain juniper), Phyllodoce empetriformis (red mountain heath), Chimaphila umbellata (western prince's pine), and Arctostaphylos nevadensis (pine-mat manzanita).

**WILDLIFE**

Wildlife in the Willamette National Forest includes a spectrum of big and small game, as well as non-game species. Big game animals include mule and white-tailed deer, elk, black bear and cougar. Small game species include grouse, quail, pigeons, squirrel, rabbit and several species of waterfowl. Major non-game species such as osprey, hawks, eagles, owls, and blue heron, as well as smaller birds and mammals, are also found in the forest.

Both native and anadromous salmonid species are found in the forest streams. There are resident populations of either native or planted trout in most lakes and streams; cutthroat trout is the most common species in the smaller streams, whereas rainbow trout is the major species in the larger streams. Runs of salmon and steelhead occur in the lower courses of several of the large streams in the forest.
The Willamette National Forest is located on the western slopes of the central Oregon Cascades. Elevations in the forest range from as low as 900 feet along the Santiam River to over 10,000 feet on the highest peaks. Most of the forest, however, lies within an elevation range of 2000 to 4000 feet above sea level. The forest experiences moderately warm summers and generally mild winters, with heavy snowfall occurring in the higher elevations during the winters.

Included within the forest are two natural physiographic regions, the High Cascades and the Western Cascades, each of which have distinctly different topographic and geological characteristics. The High Cascades province is located in the eastern one-third of the forest and consists of a high plateau occasionally broken by dormant volcanic peaks. The major peaks within the forest are located in the High Cascades. The High Cascades Province is geologically young, with some flows of lava only several hundred years old. The two-thirds of the forest immediately west of the High Cascades is located within the Western Cascades physiographic province. This region is geologically much older than the High Cascades, and has been deeply dissected by westward flowing streams.

Three major vegetation zones are found within the forest. The Tsuga heterophylla Zone is the most extensive; it occurs at elevations between 450 and 3000 feet and consists primarily of Tsuga heterophylla (western hemlock), Pseudotsuga menziesii (Douglas fir), and Thuja plicata (western redcedar). The Abies amabilis Zone occurs at elevations between 3000 and 4500 feet. The composition of the forest in this zone varies widely, but typically includes Abies amabilis (Pacific silverfir), Tsuga heterophylla (western hemlock), Abies procera (noble fir), Pseudotsuga menziesii (Douglas fir), Thuja plicata (western redcedar), and Pinus monticola (western white pine). The Tsuga mertensiana Zone is the highest forested zone along the western slopes and crest of the Cascade Range, generally occurring at elevations between 5000 and 6000 feet. The lower portion of this Zone is characterized by an almost continuous forest cover of Tsuga mertensiana (mountain hemlock), while the upper portion of Tsuga mertensiana Zone consists of a mosaic of forest patches interspersed with shrubby subalpine communities.

Wildlife in the forest is very abundant, and includes a broad spectrum of both large and small game animals, as well as many non-game species. Both native and anadromous species of fish are found in the forest's lakes, rivers, and streams.
Human use of the Willamette National Forest, by both the late-coming Euroamerican and the earlier Native American cultures, is and has been a function of the shape of the natural landscape and the distribution and abundance of its resources. Similarities and differences in the ways that these two distinct cultural traditions have impinged on the natural environment are made clear in the following narratives.
HISTORICAL OVERVIEW

The history of the Willamette National Forest is primarily a record of efforts to extract gold and timber from the steep slopes of the western Cascades, and to establish transportation routes over the mountain passes to link the fertile Willamette Valley of western Oregon to the rest of the nation. Gold seekers, stimulated by the discovery of gold in California, came north and left their scars on the Cascade landscape, but in general, the area of the forest is peripheral to the major historic themes of homesteading and later urban development and industrialism. No major battles were fought here during the Indian wars or the Civil War, although congress did authorize construction of military roads through the area as a direct response to the need for rapid troop transport. The basic diplomatic and political struggles of our developing nation had little impact on the forest. The later efforts of conservationists to keep some parts of our nation in wilderness, however, have made the Cascades an area of political interest, and tension between those who would conserve and those who would exploit the wilderness is still growing today. In recent years, the national turning of attention back to nature has produced a boom in the use of the forest for recreation and greatly increased public traffic in the area.

The following narrative outlines the major themes of importance in the history of the Willamette National Forest, showing the forest's relationships to the broader region of which it is a part.

EXPLORATION AND EARLY SETTLEMENT

The history of the Willamette National Forest largely reflects the history of the Willamette Valley. The first explorations of the valley were conducted in the early 1800's by fur traders of the Astor Company. In December of 1811, an Astorian party led by Robert Stuart headed up the Willamette River to ascertain the profitability of building a trading-post along its banks. In April 1812, Donald McKenzie led a party of hunters into the upper end of the valley, to the river which now bears his name. By the end of the same year, William Wallace established a trading-post called "Wallace House" near the present city of Salem and explored upstream to the source of the Willamette River. Explorers of the Santiam and Calapooia regions in the upper valley included Franchere, McKay and La Framboise (Clark 1927).

Important early historical sources for the region include the journals of Alexander Henry, 1814; David Douglas, 1825; Peter Skene Ogden, 1826; and John Work, 1834. These sources tell of the efforts made by the early fur traders of the North West Company and the
Hudson's Bay Company (which took over the region after merging with the North West Company in 1821) to explore the rivers of the region. The major explorations were up the Willamette and Umpqua Rivers, where brigades of Hudson's Bay Company personnel passed up and down the valley. These marches became an annual occurrence and were called the "Umpqua Brigades" (Clark 1927:357).

Actual settlement of the Willamette Valley first occurred after the North West Company bought out the Astor holdings in 1813. The French Canadians who had worked for Astor settled at French Prairie, on the banks of the Willamette River south of what is now Champoeg Park, up river from Portland. Included in this group of early settlers, who married native women and survived by hunting, fishing and trapping, were Baptiste Dorian, Jean Baptiste Durbreuil, Joseph Gervais, Louis LaBonte, Michel La Framboise and Etienne Lucier.

The 1840's were a period of immigration from the north, with people slowly filtering down the Willamette Valley from Astoria on the coast (Holtgrieve 1973). Early settlements which followed French Prairie included Mill Creek Bottom (Salem), Willamette Falls (Oregon City), Tualatin Plains, Scapoose Plains and Sauvie Island (Portland area). In 1838 there were 26 families in the Willamette Valley; by 1842, there were 83 (Corning 1956). The lower valley was fairly well filled by 1844, and in 1845 when 3,000 persons entered Oregon in a single year, the influx inevitably led to the movement of settlements up the rivers.

By 1846 settlement had begun near the confluence of the McKenzie and Willamette Rivers. Elijah Bristow settled at Pleasant Hill, and Eugene Skinner laid claim to the land which was to become Eugene City. After Applegate discovered a southern route from California and opened a road into the Willamette Valley, settlement of the upper valley increased, especially in the area of Lane County (Clark 1927:367).

The region now occupied by the Willamette National Forest, an area of difficult terrain, harsh winters, and thick timberlands, was exploited but not occupied. The primary objectives of the early pioneers were to find routes across the formidable Cascades and to extract the natural resources of the mountains and forests, without actually settling the area. Timber was harvested, minerals were extracted, and the abundant water of rivers heading in the Cascades was used by valley towns such as Eugene, Springfield, Salem and Albany. The forests were also used by the pioneers as camping, fishing and recreation areas.
The single most important theme in the history of the Willamette National Forest is the search for an easy passage through the Cascades. Settlers in the Willamette Valley had long desired routes which would eliminate the long circuitous journey up the Applegate Trail from the south, and the difficult struggle down the Columbia along the Oregon Trail to the north and east. This search resulted in the blazing of the Wiley Trail over Santiam Pass in 1859, and the Scott Trail over McKenzie Pass in 1862.

In general, the earliest pioneer transportation routes followed the rivers: the Willamette, McKenzie, and Santiam systems in the region of the Willamette National Forest. Towns sprang up along these rivers as settlers worked the fertile lowlands along their banks. A second period of transportation growth occurred from the 1880's to the 1920's when railroads were constructed, shooting out from Portland on the Columbia River. A third period followed in the 1930's depression years, when the Federal program for "putting America back to work" included the hiring of crews to build better roads. With the improvement of the highway system began the dominance of the roads as routes of transportation.

The development of towns reflects each of these phases in the growth of the transportation system. The rivers were not navigable to their upper reaches, and only during very wet years when the water was high could boats reach as far up the valley as Springfield. Eugene was the highest consistently attainable point for major river travel. During this period, farmers tried to acquire land near the rivers so they would not have to travel far along muddy roads to bring their goods to market. As railroads were built, farmers were able to move from these rivers and still ship goods to market. Railroads also opened up the highlands for timber extraction by the mid 1900's. Extension and improvement of the highway system, and the appearance of the automobile, vastly expanded the area open to settlement and exploitation, and fostered a proliferation of small towns.

Portland, Oregon's largest and most vital city, has always been the focus of the Willamette Valley's wagon roads, railroads and highways. Eugene and Springfield dominate the upper valley, for here the transportation routes join before funnelling into the narrow valleys and passes of the mountains to the east and south. Salem and Corvallis-Albany, the state's third and fourth largest urban areas today, were also transportation nodes and community centers in earlier times. The major transportation routes follow the north-south orientation of the valley, while east-west connections through the Willamette National Forest point toward the major urban centers.
Major highways which cut across the forest today include (from north to south) Highways 22, 20, 126 and 58. These roads are linked to the past because they follow routes blazed by early pioneers over the three major passes in the Willamette National Forest: the Santiam, the McKenzie and the Willamette.

The Wiley Expedition of 1859 got lost in the forest during a cattle drive and in the course of events Wiley became the first white man to see the Santiam Pass from the west side of the Cascades. It was at Lost Prairie (Fig. 3, site 13), where the expedition camped, that Wiley climbed a tree to get his bearings and saw the pass. He blazed a trail through it that partially followed an old Indian trail. The Willamette Valley and Cascade Mountain Military Wagon Road Company received a land grant in 1866 to build a road from Albany along this path but it never did so. The company was bought out in 1874 by T.E. Hogg, who planned, but never successfully completed, the building of a railroad along the route (Corning 1956:268). The pass itself was for a time known as Hogg Pass, named after this pioneer developer. Modern Highway 20 now runs along this "Old Santiam Road".

Several historic sites pertaining to the Old Santiam Road, recorded by S.D. Beckham (n.d.) and officially registered with the Oregon Historic Preservation Office, are located along Highway 20. Beckham comments: "Writing about its route in 1971, Roy Elliott remarked: 'The existing South Santiam Highway traverses approximately the original survey with the exceptions of the Sisters to Fish Lake, and the Foster to Moss Butte via Wiley Creek sections. From Sisters to Fish Lake the old right of way is located about one mile south of the Santiam Highway, and a short distance west of Cascadia it extends southwesterly around Moss Butte and down the Wiley Creek drainage to Foster.' It was along this route that the Oldsmobile Old Scout, driven by Dwight B. Huss and Welford Wigle, raced in June 1905 to win a transcontinental competition."

Near the Hogg Rock monolith (Fig. 4, site 15) in Santiam Pass, possibly in the Big Meadows area, T.E. Hogg built a short section of tracks over which a mule team pulled a single car to insure his franchise for a railroad route through this pass. (Elliott 1971:76-77). Hogg's dream was to link Yaquina Bay, Oregon, to Idaho via a railroad from the Pacific Coast over the Cascades. The railroad was never completed through the mountains, and the only remaining evidence of this attempt to cross the high Cascades is the road bed and piles of ties placed in the valley of the South Santiam River before Hogg went bankrupt in 1893. The U.S. Forest Service has marked the old grade with historical signs visible from the highway in Santiam Pass.

Other stations along the path of the Old Santiam Road include Upper Soda (Fig. 3, site 10), Mountain House (Fig. 3, site 11), and Indian Prairie. The latter subsequently came to be called Tombstone Prairie (Fig. 3, site 12) after James A. McKnight was accidentally shot there in 1871 and a tombstone was erected in his memory (Fig. 18). Fish Lake (Fig. 3, site 14), also along this road, is a multiple-use
site which was an old remount station (Fig. 16). It contains C.C. Hall's headquarters, Charity Ann Noble's gravesite, and a modern forest service warehouse.

The McKenzie Pass (Fig. 4, site 17) is another major route through the forest. It is crossed by the Old McKenzie Highway, still a functioning automobile road, which partially followed the Scott Trail of 1853. Craig's Monument (Fig. 4, site 18) is erected there in honor of J.T. Craig, one of the founders of the road over the pass, who died at the summit in December 1877 while carrying mail. He, along with other pioneers, encountered difficulties with the lava beds at the pass. It was in these lava beds that the Civilian Conservation Corps much later constructed the Dee Wright Observatory, a lava house that overlooks the rugged mountains surrounding the area. And it was here that in 1964 the Apollo astronauts trained in preparation for their trip to the moon (Fig. 32). The lava flows near Huckleberry Lake (Fig. 4, site 19) were regarded by Apollo Project scientists as similar to the terrain of the moon and so the McKenzie Pass was selected for a small role in the United States Space Program.

Willamette Pass (Fig. 7, site 36) is a third route of major importance. It was crossed by the Elliott party of 1853 when they became lost looking for a short cut through the mountains. In 1855, the army engineers H.L. Abbott and R.S. Williamson passed over the route while conducting surveys for a railroad right-of-way. By 1864-67, it was the route of the Oregon Central Military Wagon Road, and it was added to the State Highway system in 1922. Pengra Pass (Fig. 7, site 37), the route of the Southern Pacific railroad, lies south of Willamette Pass. Emigrant Pass, nearby, (Fig. 7, site 40) is on the route taken by a lost wagon train passing through the mountains, possibly the train of 1843-44.

A number of covered bridges are scattered throughout Oregon, with a few located along roads in the Willamette National Forest. The most important one is probably that at McKenzie Bridge, on a major crossing of the McKenzie River where J.T. Craig settled (Fig. 30). It was first called Craig's, or Craig's Pasture, after him, and it was from this point that he began a lifelong struggle to develop a road across the McKenzie Pass. Nearby is located Horse Creek covered bridge. The Finn Rock covered bridge, now owned by the Roseboro Lumber Company, once crossed the river near this location, and has since been moved. Belknap covered bridge is also within the forest (Coleman n.d.).

Oregon's first railroads reached outward from Portland. The Oregon and California Railroad began moving up the Willamette Valley in 1868, reached Roseburg by 1873, and crossed the Siskiyous to California in the 1880's. It was completed by 1884. The so-called Oregon and California Lands, granted to this company out of the public domain, cut a wide strip through the western Cascades. The grant gave
to the railroad company 20 one-square-mile sections of land for every mile of railroad built. This land was selected from odd-numbered sections within 20 miles on either side of the right-of-way, and it was provided that, if necessary, additional land could be taken from two additional 10-mile strips. The 1869 grant consisted of 2,500,000 acres of land, and the corridor affected was in some places 60 miles wide.

There was open competition for the federal grant, and it was stipulated that the first company to complete 20 miles of track would get the grant. Two companies raced for the award. The Oregon and California Company, which ran its track south from Portland along the east side of Willamette River, won the grant by out-distancing "The Westsiders", who ran their track along the west side of the river. The line was completed to Ashland and merged with the Southern Pacific in 1887, and the Southern Pacific is the only major railroad in the Willamette National Forest at the present time. It completed its branch line from Eugene over the Cascades in 1916, crossing the summit at Pengra Pass. In 1926 it finished the Natron Cut-off from Eugene to Weed via Oakridge and Klamath Falls (Fig. 19), which is now termed the Cascade Route (Winther 1952).

The Oregon and California Railroad lands ultimately were returned to public ownership. Three important stipulations of the original grant had been that: A) the company was to sell land to actual settlers, and no other groups; B) the sales were to be of tracts of 160 acres or less (the same amount of land designated in the Homestead Acts); and C) the sale price was to be $2.50 per acre, or $400 per 160-acre tract. If any of these requirements should not be met, the land would revert to the public domain. Since the company did, in fact, later try to sell the land for timber, it was returned to the public domain after Congress passed the Chamberlain-Ferris Acts in 1916.

Railroading sites in the Willamette National Forest are strung along the North Santiam River and the Middle Fork of the Willamette River. These sites include Idanha (Fig. 2, site 5), Oakridge (Fig. 7, site 32)—a favorite vacation resort which had been used by Indians prior to white settlement—and Cruzatte (Fig. 7, site 33), which is located deep in the forest. This site, named after Peter Cruzatte, a member of the Lewis and Clark Expedition, has a small check dam on it today.

A minor railroad site can be seen at Lookout Point (Fig. 6, site 28), where a railroad tunnel was constructed in 1910. There is a stone oven located nearby which was used by the workers. A similar oven (Fig. 26) is located on the North Santiam, near the Hogg Railroad right-of-way (Fig. 2, site 4).
White City (Fig. 3, site 9), also associated with railroads, was a promoter's dream that never materialized. Built in 1912 by Col. White, the site consists of 12 cabins on the South Santiam River. White had hoped that a railroad route would be constructed to this point and blamed World War I for its lack of construction. With similar hopes, Simon Klovdahl founded the Waldo Lake irrigation and power project and built a tunnel to divert water from Waldo Lake (Fig. 7, site 34). The area was not, however, in the line of railroad development and Klovdahl's dream, as White's, failed to materialize.

MINING

Gold has been a major force luring people into the Willamette National Forest (Figs. 23,24). The California Gold Rush of 1849 and the later discovery of gold near Jacksonville in 1851-52 attracted miners into every creek and drainage, and it seems likely that every major stream in the forest was probed for gold by men dreaming of easy wealth. Four mining districts were officially designated in mineral surveys of 1916 and 1938: the North Santiam District (Fig. 2, site 1), the Quartzville District (Fig. 3, site 8), the Blue River District (Fig. 5, site 23) and the Fall Creek District (Fig. 7, site 29).

The earliest activity was at Quartzville, where Jeremiah Driggs discovered gold in 1863. Other miners included C.S. Woodworth, A.L. Buckingham, S.L. Clarke, and David Wood and associates. The Quartzville mining district was organized July 29, 1864, flourished briefly, and declined, having ended by 1900. The most important mines of this area were the Lawler and the Albany. In the Blue River District, a strike at the Lucky Boy Mine (Fig. 25) turned attention to the south around 1887, when mining at Quartzville was dying down. The history of the Blue River District is largely a history of this one mine, although others existed, including the Cinderella, Durango and Lucky Girl. The North Santiam District was probably prospected prior to the discovery of gold by Indian Hirn in 1896, but according to Callaghan and Buddington (1938), the earlier records are lost. This district was and is an object of legal controversy between mining interests and the U.S. Forest Service. Fall Creek was a late starter in the gold rush, not getting into the act until gold was discovered in 1901. It was actively prospected in 1903 and the Ironsides and Blanket claims were established, but there are no records of production, and the area was of minor importance compared to the other three districts.
Production statistics recorded by Callaghan and Buddington (1938) for the North Santiam, Quartzville, and Blue River districts show the Blue River mines to have been the heaviest producers of gold and silver, and the North Santiam District to have been the major producer of copper, lead, and zinc.

Table 1. Early North Santiam District Mining Production

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<tr>
<td>1915</td>
<td>47</td>
<td>68.55</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1916</td>
<td>40</td>
<td>80.93</td>
<td>9</td>
<td>6,504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1917</td>
<td>5</td>
<td></td>
<td></td>
<td>1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1918</td>
<td>75</td>
<td>67.00</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1919</td>
<td>118</td>
<td>50.98</td>
<td>129</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1924</td>
<td>71</td>
<td>105</td>
<td></td>
<td>6,219</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1926</td>
<td>35</td>
<td>10.17</td>
<td>1,352</td>
<td>112</td>
<td>276</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>43</td>
<td>102</td>
<td></td>
<td>371</td>
<td>3,000</td>
<td>12,528</td>
</tr>
</tbody>
</table>

TOTALS 434  227.63   1,759   14,206   3,336   12,528

Some mining also went on in the Winberry drainage (Fig. 6, site 27) and the Portland Creek area (Fig. 6, site 26). The Blanket, Christie, Fletcher Ironside, and Jumbo mines were never very significant, but miners dreaming of wealth were not easily discouraged.

Lost mines supposedly in the Willamette National Forest include the Lost Frenchman Mine, the Lost Cattleman's Mine, and the Lost Indian Mine, as well as the famous Lost Blue Bucket Mine, supposedly discovered by an immigrant wagon train crossing the mountains in the fall of 1845.

A barite crystal mine located on U.S. Forest Service land in the Marcola area is now owned and worked by Les Paschelke. It is reported as the only barium crystal mine in Oregon and one of the few in the United States. It may also be the location of a cave used by the Indians (Kelso 1976).
Table 2. Early Mining Production, Marion and Linn Counties (probably most from Quartzville)

<table>
<thead>
<tr>
<th>Year</th>
<th>Marion County</th>
<th>Linn County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gold (oz.)</td>
<td>Silver (oz.)</td>
</tr>
<tr>
<td>1884</td>
<td>50.65</td>
<td>119</td>
</tr>
<tr>
<td>1887</td>
<td>725.63</td>
<td></td>
</tr>
<tr>
<td>1888</td>
<td>483.75</td>
<td></td>
</tr>
<tr>
<td>1890</td>
<td></td>
<td>314.44</td>
</tr>
<tr>
<td>1891</td>
<td></td>
<td>232.20</td>
</tr>
<tr>
<td>1892</td>
<td></td>
<td>661.77</td>
</tr>
<tr>
<td>1893</td>
<td></td>
<td>202.93</td>
</tr>
<tr>
<td>1894</td>
<td>47.69</td>
<td></td>
</tr>
<tr>
<td>1895</td>
<td>406.83</td>
<td>2,000</td>
</tr>
<tr>
<td>1896</td>
<td>749.81</td>
<td></td>
</tr>
<tr>
<td>1897</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1898</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTALS** 2,464.36 2,119 5,937.93 775

Table 3. Early Blue River Mining Production

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude Ore (tons)</th>
<th>Gold (oz.)</th>
<th>Silver (oz.)</th>
<th>Copper (oz.)</th>
<th>Concentration (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1896</td>
<td>2.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1902</td>
<td>10,350</td>
<td>2,247.12</td>
<td>1,007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1903</td>
<td>6,700</td>
<td>1,499.63</td>
<td>972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1904</td>
<td>10,000</td>
<td>241.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1905</td>
<td>19,983</td>
<td>2,162.65</td>
<td>1,160</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1906</td>
<td>28,275</td>
<td>1,427.00</td>
<td>12,784</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1907</td>
<td>1,000</td>
<td>28.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1909</td>
<td>1,000</td>
<td>50.02</td>
<td>1,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1911</td>
<td>14</td>
<td>.53</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1913</td>
<td>85</td>
<td>53.26</td>
<td>226</td>
<td>257</td>
<td>27</td>
</tr>
<tr>
<td>1918</td>
<td>8</td>
<td>4.98</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1924</td>
<td>sluice</td>
<td>9.44</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Totals** 77,415 7,727.89 17,162 257 27
HOMESTEADING AND SETTLEMENTS

The Portland Oregonian, in its newspaper of September 7, 1903, complained that Oregon was losing its land to forest preserves and that the Forestry Bureau was the "Spoiled Child" of Roosevelt. It was suggested that the reserves withheld from development by citizens were areas where Oregonians should be allowed to settle. However, up until this time, there had been little interest in homesteading the forest. The land was difficult to clear, the weather conditions in winter very harsh. A survey of the area titled "Forest Conditions in the Cascade Range Forest Reserve, Oregon" (U.S.D.I. 1903) described the nature and extent of settlement in the region:

In addition to the sawmills and cleared cultivated areas mentioned elsewhere in this report, the improvements within the forest reserve consist of 91 houses or cabins and 19 barns.

Three valleys contain settlements. On the north fork of the Santiam River, in T10S R5E, is the small town of Detroit, the terminus of the Corvallis and Eastern Railroad and the center of the present logging operations in this district. The settlers along McKenzie River in T16S R5 and 6E, consist of ranchers and stock raisers. Near the McKenzie bridge in section 14 is a summer hotel and store.

Prospectors, land claimants, and trappers have built many of the cabins in isolated places reached only by trails, and occupy them only a few months in the year. The sentiment of the people, so far as learned, was in favor of the forest reserve policy.

Very little agriculture is carried on within the confines of the territory examined, for the land is scattered in small tracts and is distant from the markets. If it were not for the few cattle that the settlers grazed upon the high mountains they could not possibly make an existence. The only settlement of any size is that on Big Prairie, at the junction of the North Fork and Middle Fork of the Willamette, and the settlers here rely principally upon cattle for a living, using the ground mostly for raising hay for their stock, although a few acres of oats and wheat had been planted and raised upon the prairie. There is another settlement at Hazel Dell post-office, and again at the mouth of Trout Creek, and 2 miles above it on the main river on Trout Creek there are two settlers, one of whom makes his living from the hot springs upon his place, which are generously patronized during the summer months.

There is another settler farther up the main river upon the ranch commonly called Rigdon's in Sec. 16, T24S R4E. The man makes his living by cutting hay and furnishing accommodations for passengers going from one side of the mountain to the other during the summer, but during the winter the place is deserted.

The next settlement of any note was made on Fall Creek in T18S R2E, but for some years has been abandoned, the improvements having all grown up with brush and the houses fallen down. These claims were evidently taken up for their timber in years past.
Land speculators manipulated acts which Congress had passed to encourage settlement, in order to defraud the government of forest land. Homesteaders filed claims that were visited briefly, if at all, and the land was then used for timber exploitation. The Timber and Stone Act was a popular means for timber men to get the land they wanted for a mere $2.50 an acre. Eastern Linn County was the focus of national attention in 1904 when the famous "11-7" case went to trial. Land in T11S R7E had been claimed under the Homestead Act by men hired by S.D. Puter. Puter evidently assumed that the area was too remote for any government investigations, but the scheme was discovered and Puter and his associates were convicted of fraud in December, 1904 (Puter 1908).

Since the Willamette National Forest was never a popular area for homesteading and since many of the recorded claims were fraudulent, homesteads were not intensively researched for this report. There are homesteads in the area, such as those at the hot springs of Breitenbush (Fig. 2, site 2) and Rigdon's ranch (Fig. 8, site 39), but given the limited time available, and the limited return to be expected from detailed research on this topic, further examination was deemed unprofitable.

**Sheep Herding**

Use of forest lands for sheep herding has always been a subject of controversy, the main contention being whether or not sheep cause permanent damage to the forest. F.V. Colville, of the U.S. Department of Agriculture, was sent out as early as the summer of 1897 to determine the results of sheep grazing. He found a few areas of damage, as at Bunch Grass Ridge near Mt. Washington, but on the whole felt that no permanent harm had been done.

Sheep had been in the Oregon territory as early as 1843, when they were brought with the wagon trains. They were herded in forest meadows and grasslands from this time on, though the most important and continuous period of sheep herding in the forest was from 1886 to 1948. Site 35 in the Oakridge District is one example of a shepherd's camp (Fig. 7).

In 1894, one year after the Cascade Forest Reserve was established, a regulation prohibiting sheep, cattle, and livestock from grazing there was issued. This was a source of complaint by people in the Willamette Valley, who used the forest for their animals. By 1897, arrests of violators of this regulation were stopped when it was concluded that the amount of moisture and rainfall in the area prevented much damage from being done there by grazing. Colville at that time recommended establishing closed areas and permits for grazing, and this method of
control was used until 1948, when grazing essentially stopped on National Forest lands.

Areas popular for grazing included the Three Sisters range; areas near Mt. Jefferson, Three Fingered Jack, Fish Lake, and Mt. Washington; Independence Prairie (Fig. 2, site 6); the McKenzie River; Horse Creek and the "Willamette Cow Pastures" in the present Rigdon Ranger District (Fig. 27); and Waldo Lake (Fig. 7, site 34).

Statistics on the number of sheep herded in the Willamette National Forest show an early high around the turn of the century, followed by a long decline.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>1898</td>
<td>79,330 head</td>
</tr>
<tr>
<td>1901</td>
<td>166,050 head</td>
</tr>
<tr>
<td>1909</td>
<td>44,600 head</td>
</tr>
<tr>
<td>1935</td>
<td>32,000 head</td>
</tr>
<tr>
<td>1942</td>
<td>20,000 head</td>
</tr>
<tr>
<td>1948</td>
<td>1,800 head</td>
</tr>
<tr>
<td>1949</td>
<td>1,050 head (special allotment near Blair Lake, Oakridge District)</td>
</tr>
</tbody>
</table>

Cessation of sheep grazing in the forest resulted from the fact that overgrazing did become a problem. Regardless of the amount of rainfall and rapid growth of vegetation, the forest is tree-country—not a natural grassland. And sheep herders found it more and more difficult to keep an eye on their herds as new timber stands replaced open meadows.

LUMBERING

The extraction of timber from the Willamette National Forest was and is a major industry. Lumbering began on the Pacific coast in the 1880's, having moved across the nation from the east. As early as the 1890's Douglas Fir was being shipped eastward.

Because speculators and railroad companies early gained control of the land on which timber stood, much of the private ownership is now held by large companies rather than individuals. Erickson (1966:14-15) states that

By means of generous railroad and wagon road grants and a number of land laws originally designed to hasten settlement of the West (i.e. the Homestead Act), the standing timber fell quickly into the hands of private owners. Although the higher, more inaccessible timberlands of the Cascade and Olympic mountains were set aside in Forest Reserves, virtually all of the remaining, more low-lying timberlands of western Oregon and Washington ...had come to be controlled by private capital. In the Cascades, the Southern Pacific Railroad owned the largest share, about 67 billion board feet.
Just as the earliest settlers had flowed down the Willamette Valley from north to south, so the lumber industry marched south from Washington into Oregon in the relentless search for trees. "In the 1920's, approximately two-thirds of lumber production on the Pacific slope was concentrated in Washington; by the late 1930's Washington's share had dwindled to about one-half; by 1950 Oregon produced two-thirds of the lumber in the area. In western Oregon itself, the same overall north-south dislocation of logging and lumber manufacturing has taken place (Erickson 1966:90)."

The lumber industry was warned that a policy of sustained yield management was necessary lest private timberlands become exhausted and National Forests become the target for new sources of lumber. The warnings were ignored, and by the 1920's, federally owned lands were contributing nearly half of the timber yield in Oregon (Oregon Commercial Forests 1922).

Although the lumber industry is of major importance to Oregon and has significantly affected the Willamette National Forest, few sawmills have been built within the forest boundaries. There seem to be three major reasons for this: first, the establishment of Forest Reserves between 1891 and 1909 made the land inaccessible to lumbermen just at the peak of railroad logging expansion in the Pacific Northwest; second, the lack of transcontinental railroads across the Cascades south of the Columbia until 1926 hampered development there; and third, by the time the lowlands and foothills had been logged off, the development of trucks and logging roads meant that logs could be cheaply transported from the higher country down to existing sawmills in the Willamette and lesser valleys.

When the Southern Pacific finally sent a spur up the North Santiam River, and later crossed the Cascades at the Willamette Pass, sawmilling sites in the Oregon Cascades were established near the western border of the present Willamette National Forest. In 1921, Oakridge (Fig. 7, site 31) had three small sawmills; and in 1923, the Western Lumber Company, anticipating the completion of the Southern Pacific line, built a large mill and company town at Westfir, near Oakridge, which is still operating as the Edward Hines Lumber Company. Farther north, Detroit (Fig. 2, site 3) was an early logging town which got its first post office in 1891, two years before the Forest Reserve was created. Now partly under the Detroit Reservoir, this early location is developing into a resort area (Maxwell 1956). Other small mill towns border the Willamette National Forest, Mill City on the North Santiam River has a Hammond Lumber Company plant which was served by a Southern Pacific spur until it closed in 1935; Sweet Home, also on the Santiam, is now the largest branch valley lumber town in the area (Erickson 1966).
DEPRESSION ERA WORK PROGRAMS

On March 31, 1933, Congress passed the Emergency Conservation Work Program, in response to the Great Depression. The popularly known Civilian Conservation Corps, or CCC, was established June 28, 1937 to find useful work for the young and unemployed. Conservation projects completed around the nation were numerous: 3,018 fire towers and lookouts, 85,548 miles of telephone lines, 122,169 miles of truck trails and forest roads, 72 emergency landing fields, and many miles of firebreaks were constructed by the CCC. In the forests, the men worked on insect control, tree disease control, and fire fighting. They established nurseries and planted over three billion trees. And they constructed or improved recreation facilities and campgrounds.

Headlines in the Eugene Register Guard for June 8, 1933 announced that men were expected to occupy 10 forest camps. Within the Willamette National Forest, the camps were located at Belknap in the McKenzie District; at Rigdon in the Oakridge District; and at Seven Mile in the South Santiam District. These camps each contained some 200 men. One CCC camp location is indicated in Fig. 6, site 25.

The Belknap camp was on the present site of the McKenzie Ranger Station, two miles east of McKenzie Bridge. The camp near Oakridge was first located at the old Rigdon Guard Station (Fig. 8, site 39), and relocated for the winter on Fall Creek, just west of the forest boundary. Although the populace of Oakridge resisted having the federal work project bring so many strangers into their town, Oakridge got a camp of its own later on, located at the present site of the Pope and Talbot mill.

Accomplishments of the work programs in the Willamette National Forest include the building of the Dee Wright Observatory in the Lava Beds at McKenzie Pass; construction of campgrounds on the South Fork of the McKenzie; construction of a three-mile trail from Trout Creek camp to Rooster Lookout; building of five shelters at House Rock and Fernview forest camps; establishment of a 25-acre demonstration forest between Trout Creek and Fernview; and tree planting above Westfir, which was part of a reforestation project in 1939.

RESERVOIRS AND RECREATIONAL FACILITIES

Reservoirs located within the forest totaled nine in 1975. The earliest construction was at Detroit in 1953, the latest at Blue River in 1968. Other reservoirs, with their dates of construction, include Lookout Point Lake, 1954; Hills Creek Lake, 1961; Trail Bridge Reservoir, 1963; Carmen Diversion Reservoir, 1963; Smith Reservoir, 1963; and Cougar Lake, 1963. The major communities receiving water
from the forest reservoirs are Eugene, Salem, Albany and Sweet Home. These reservoirs have led to recreational development in the areas around the dams, as in the case of current development at Detroit Reservoir.

Another recreational use of the forest includes hiking along the many trails built and maintained by the Forest Service. One of the major attractions is the Willamette National Forest section of the 2400 mile-long Pacific Crest Trail that extends the length of the Sierra-Cascades. This section, The Oregon Skyline Trail, was established in the 1930's.

Other uses of the Willamette National Forest include skiing at Hoodoo Ski Bowl, which was constructed in the 1930's and still is a popular downhill skiing area (Fig. 4, site 16); and fishing, swimming, and picnicking at designated sites, such as Waldo Lake, Fish Lake, Detroit Reservoir and other places.

Four wildernesses, totaling 254,744 acres, have been established within the boundaries of the Willamette National Forest (Willamette National Forest Fact Sheet 1975). Three Sisters Wilderness and Diamond Peak Wilderness were established in 1957; Mt. Washington Wilderness in 1964; and Mt. Jefferson Wilderness in 1968. These areas are set aside as part of the National Wilderness Preservation System, to remain in their natural state as much as possible and to serve as a reminder of the type of country which challenged the pioneers who crossed the Cascades from the east.

Hot springs located within the Willamette National Forest have long been a source of recreation. Indians from east of the Cascades used Breitenbush Hot Springs (Fig. 2, site 2) prior to its "discovery" by Peter Breitenbush in the 1840's, and it has since been used as a resort spa by the elderly of Portland and Salem and by various Scandinavian groups (Horowitz 1973). This area has recently been surveyed for geothermal development. Foley Springs (Fig. 4, site 22) was one of the most elegant resorts in western Oregon and was a well known spa with a reputation reaching as far away as Europe. It was homesteaded by a man named Alexander in 1865 and bought by Dr. Foley in 1870 when he renamed it Bethesda Hot Springs. Foley sold the site in 1879 to Henry Hill, who sold it to Peter Raney in 1882.

Kitson Springs (Fig. 8, site 38) was the first springs in the Upper Willamette Area to be inhabited by white settlers. It was homesteaded by Dave Kitson in 1865, after Charlie Tuft, a Molalla Indian, led him to the place. Upper Soda (Fig. 3, site 10) was also popular in the later 19th century. Belknap Springs (Fig. 4, site 20), named for R.S. Belknap who settled there in 1870, was discovered by George Millican and others, date unknown.
McCredie Springs (Fig. 7, site 32) once known as Salt Creek Mineral Springs, was frequented by Indians, perhaps from ancient times. It was leased from the U.S. Government in 1915 by James O. Hardin of Oakridge, who began development of the resort, which was later redeveloped by Louis Borde (Fig. 20). It was always troubled by flooding (Fig. 22).

A more recently developed hot springs is at Rider Creek (Fig. 5, site 24). This spring was made more accessible by the construction of Cougar Reservoir in the 1960's.

**THE U.S. FOREST SERVICE**

Although it is not one of the objectives of this overview to relate the history of the Forest Service itself, it should be noted that the U.S. Forest Service has played an important role in the history of the area of present concern. The Forest Service at first served a custodial function in which early rangers watched over the territory, but had little authority to make or enforce policies for its development and use. Since then, its function has evolved into a managerial one whereby multiple use of forest lands is maintained under national policies articulated in Washington D.C. and executed by personnel of Willamette National Forest. A fascinating anecdotal history of the Willamette National Forest establishment itself could no doubt be written, and probably should be written, by an insider. It would surely be of great interest to Forest Service personnel as well as others. But because such concerns are not central to the purposes of the present document, no account of Forest Service history has been attempted here.

**REPRISE**

The Willamette National Forest on the western slopes of the Cascades is an area lying in the path of history. It was a barrier to early pioneers, who sought routes over the mountains through passes which had been used by the Indians and which are still used as routes of modern highways. Although the area was never intensively homesteaded, it was the object of many fraudulent homestead claims (including the notorious "11-7" case) because the land was well timbered and hence valuable. Immigrants passed along its rivers, the Santiam, McKenzie and Willamette; miners sought precious minerals along its mountainsides and in its streams; and cattlemen and shepherds drove their animals through the passes for summer grazing in mountain meadows. But, the area is really tree country and lumbering has left the greatest mark. It was not so much the construction of town sites as the extraction of timber that spurred the development of railroads and modern highways in the area.
Current activity in the forest emphasizes the maintenance for public enjoyment, the construction of reservoirs to establish water supplies, lumbering, and maintenance of wildernesses for public recreational areas.

The history of the Willamette National Forest includes its evolution from part of a closed preserve, withdrawn from development by a Proclamation of President Cleveland on September 28, 1893, to its present status as a National Forest managed under a policy of sustained-yield and multiple-use. It is an area with a long history of struggle between conservationists and developers. In 1903, the Portland Oregonian called the Forest Reserves the "Spoiled Child" of Roosevelt and demanded the opening of the area for settlement, and as late as 1977, lumbermen are marching on Washington demanding the extraction of timber from French Pete Creek in the high Cascades.
Fig. 2 Distribution of Inventoried Historical Sites in the Detroit District. Key, Table 4.
Fig. 3. Distribution of Inventoried Historic Sites in the Sweet Home District. Key, Table 4.
Fig. 4. Distribution of Inventoried Historic Sites in the McKenzie District. Key, Table 4.
Fig. 5. Distribution of Inventoried Historic Sites in the Blue River District. Key, Table 4.
Fig. 6. Distribution of Inventoried Historic Sites in the Lowell District. Key, Table 4.
Fig. 7. Distribution of Inventoried Historic Sites in the Oakridge District. Key, Table 4.
Fig. 8. Distribution of Inventoried Historic Sites in the Rigdon District. Key, Table 4.
Fig. 9. McKenzie Highway in the Early 1900's. McKenzie District. U.S. Forest Service Photo.

Fig. 10. Trail in Bed of Old Santiam Wagon Road, near House Rock Campground, 1971. Sweet Home District. U.S. Forest Service Photo by S. Frear.
Fig. 11. Tower Probably Used for Water Tank, at Head of Incline Railroad West of Huckleberry Mountain. Oakridge District. U.S. Forest Service Photo by S. Frear.

Fig. 12 Bridge of Logging Railroad Crossing Eighth Creek, Huckleberry Flats. Oakridge District. U.S. Forest Service Photo.
Fig. 13. Breitenbush Reforestation Project Planting Camp, Spring 1921. Detroit District. U.S. Forest Service Photo.

Fig. 14. Planter's Cabin at Breitenbush Reforestation Project Planting Camp, Fall 1972. Detroit District. U.S. Forest Service Photo by S. Frear.
Fig. 15. Fish Lake about 1923, McKenzie District. U.S. Forest Service Photo by Gordon Short.

Fig. 16. Fish Lake Firehouse Shed at the Remount Station. McKenzie District. U.S. Forest Service Photo by S. Frear.
Fig. 17. Independence Prairie Ranger Station. Detroit District.  
U.S. Forest Service Photo.

Fig. 18. Grave Marker at Tombstone Prairie. Sweet Home District.  
U.S. Forest Service Photo.
Fig. 19. Pack Train Leaving McCredie Springs During Construction of the Natron Cutoff. Oakridge District. U.S. Forest Service Photo.

Fig. 20. Neet and Warner's Summer Hotel at Salt Creek, near Mineral Springs (McCredie Springs). Shows Accommodations prior to 1913. Oakridge District. U.S. Forest Service Photo by S. Frear.
Fig. 21. The City of Detroit, on the Corvallis and Eastern Railroad, had about 100 Residents in 1916. Detroit District. U.S. Forest Service Photo.

Fig. 22. Destruction of the Old McCredie Springs Resort and Swimming Pool by the 1964 Christmas Flood. Oakridge District. U.S. Forest Service Photo by David Falconer.
Fig. 23. Gold Mining Mill in the Little North Fork Country, 1970. Detroit District. U.S. Forest Service Photo by S. Frear.

Fig. 24. Construction at Mining Claim on Gold Creek, about 1916. Detroit District. U.S. Forest Service Photo.
Fig. 25. The Lucky Boy Mine, Active at the Time of This Picture in Early 1900's. Blue River District. U.S. Forest Service Photo.

Fig. 26. Stone Oven on Old Railroad Right-of-Way near Hogg Rock, on the North Santiam River, 1973. Santiam District, U.S. Forest Service Photo by S. Frear.
Fig. 27. Sheep Grazing in Beaver Marsh, Six Miles East of Rigdon Ranger Station, 1930. Rigdon District. U.S. Forest Service Photo.

Fig. 28. Skid Road and Pole Chute, Big Fall Creek, 1923. Lowell District. U.S. Forest Service Photo from Alfred Collier Collection.
Fig. 29. Stage, McKenzie at Blue River, 1905. McKenzie District. U.S. Forest Service Photo.

Fig. 30. McKenzie Bridge about 1907. McKenzie District. U.S. Forest Service Photo.
Fig. 31. Automobile Touring Party in the Lava Fields at McKenzie Pass, about 1924. McKenzie District. U.S. Forest Service Photo.

Fig. 32. Apollo Astronauts Practiced for Their Walk on the Moon in the Lava Fields at Huckleberry Lake, 1964. McKenzie District. U.S. Forest Service Photo.
Recommendations for the Management of Known Historic Sites

On the Willamette National Forest

This section lists and classifies according to type those sites revealed by the historical research just reported; establishes a system of priority levels for management action on these sites; recommends practical procedures for the identification and evaluation of sites yet to be discovered; and concludes with recommendations for the nomination of certain sites in the Willamette National Forest to the National Register of Historic Places.

In Table 4 the basic data and recommendations are summarized. Priority level ratings of A, B, or C have been established according to the significance of any given site in a historical context, and according to the nature and quality of physical remains at the location. Management recommendations are of several kinds and are cumulative in the sense that each higher level of recommended action automatically includes the preceding lower levels.

At the lowest level of recommended managerial action is documentation, recommended for sites of significance to local history, but not of such importance as to warrant strenuous efforts at preservation. Documentation would normally entail the completion of a detailed site record form, and the making of a systematic photographic record showing the important features of the site itself, and its relationship to its surroundings. Reminiscences of local people concerning the sites should also be transcribed, and maintained as part of the record. Further local documentation is recommended for all sites. It may well be that when more data are available, some of them will have to be raised in the scale of significance here outlined.

A second level of recommended managerial action is surveillance, recommended for sites of relatively minor historical importance, as in the case of White City, or for event sites such as passes, or essentially indestructible ones, such as Hogg Rock. In these cases the primary concern is to maintain awareness of use-patterns or major natural destructive processes which might threaten the sites.

A third level of management action, in the area of interpretation, would be the incorporation of certain documented sites into trail systems, in order to enhance the experience of forest visitors. The Forest Service develops and maintains trails throughout the forest, and since a major part of forest history involves the building of trails, roads and railroads, those sections of these old rights-of-way which are still visible could well be integrated into the trail system within the forest. Examples are Hogg's right-of-way, the Willamette Valley and Cascade Mountain Road, and the Oregon Central Military Wagon Road. Hogg's right-of-way is near the Pacific Crest Trail and could be linked to it.
with minimal cost. Huckleberry Trestle (Fig. 12), incorporated into a trail system, would show forest visitors how logging railroads were used in early times. Signs along such trails could indicate to hikers their passage along historic routes.

A fourth recommended level of action is the nomination of certain sites to the National Register of Historic Places. Fish Lake and Independence Prairie should be seriously considered for nomination for reasons mentioned below. The McKenzie Pass area, because of its multiple historical associations with transportation, the Civilian Conservation Corps, and the Apollo Astronauts, is another important possibility for consideration.

The highest level of action recommended is the preservation of certain sites which have played an important and continuing role in the history of the Willamette National Forest. Fish Lake and Independence Prairie (Figs. 15-17) are the two most important historic sites in the forest because of their long use and the fact that they exemplify patterns of later pioneer architecture. Fish Lake, still occupied by the U.S. Forest Service, is the best example of a long-term multiple use site on the forest. Both here and at Independence Prairie steps should be taken to arrest the decay of older structures, and consideration should be given to restoration of the architecturally most interesting buildings. Repairs at these sites, whether routine or part of a special attempt at preservation, should employ techniques and materials which harmonize with the historic character of the buildings. An architectural historian should be consulted for guidance in such a program.

It is to be expected that historical site locations other than those recorded in this report will be discovered in the forest. The existing policy of routine inspection for cultural resources of all areas to be subjected to ground-disturbing activity guarantees this. Because procedures in this area have already been spelled out in a detailed Region 6 Forest Service handbook for cultural resource managers, further discussion of these procedures would serve no purpose. It is enough to note here that newly located historic sites should be evaluated to determine the needed level of management action in the manner exemplified in the preceding pages. The historical narrative and bibliography provided in this volume will assist in evaluating the historic and architectural significance of such sites, and the testimony of local informants will also be particularly valuable.
Table 4. Classification and Management Recommendations for Known Historic Sites of the Willamette National Forest

<table>
<thead>
<tr>
<th>Site No., Name</th>
<th>Site Type</th>
<th>Map Reference</th>
<th>Priority Level</th>
<th>Management Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. North Santiam</td>
<td>Mining</td>
<td>Fig. 3, 1</td>
<td>C</td>
<td>documentation</td>
</tr>
<tr>
<td>Mining District</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>2. Breitenbush</td>
<td>Hot Springs</td>
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<td>B</td>
<td>documentation</td>
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<td>3. Detroit</td>
<td>Settlement</td>
<td>Fig. 2, 4</td>
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<td>documentation</td>
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<tr>
<td>4. Stone Oven</td>
<td>Unique (Railroad)</td>
<td>Fig. 2, 4</td>
<td>B</td>
<td>documentation</td>
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<td>5. Idanha</td>
<td>Settlement</td>
<td>Fig. 2, 5</td>
<td>C</td>
<td>documentation</td>
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<td>6. Independence</td>
<td>Multiple use</td>
<td>Fig. 2, 6</td>
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<td>National Register, preservation</td>
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<tr>
<td>Prairie</td>
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<td>7. Santiam Pass</td>
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<td>9. White City</td>
<td>Settlement</td>
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<td>12. Tombstone Prairie</td>
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<td>14. Fish Lake</td>
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<td>17. McKenzie Pass</td>
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<tr>
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<td>Hot Springs</td>
<td>Fig. 4, 20</td>
<td>C</td>
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Table 4. Classification and Management Recommendations for Known Historic Sites of the Willamette National Forest

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<th>Management Recommendation</th>
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<tr>
<td>21. McKenzie Bridge</td>
<td>Settlement</td>
<td>Fig. 4,21</td>
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<td>22. Foley Springs</td>
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<td>Fig. 4,22</td>
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<td>23. Blue River</td>
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<td>Fig. 4,23</td>
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<td>24. Rider Creek</td>
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<td>25. CCC Camp</td>
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<td>Fig. 6,26</td>
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<td>27. Winberry Drainage</td>
<td>Mining</td>
<td>Fig. 6,27</td>
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<td>28. Lookout point</td>
<td>Railroad</td>
<td>Fig. 6,28</td>
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<td>29. Fall Creek</td>
<td>Mining</td>
<td>Fig. 7,29</td>
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<tr>
<td>30. Huckleberry RR Trestle</td>
<td>Railroad</td>
<td>Fig. 7,30</td>
<td>B</td>
<td>incorporate into trail system</td>
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<td>31. Oakridge</td>
<td>Settlement</td>
<td>Fig. 7,31</td>
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<td>32. McCredie Springs</td>
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<td>33. Cruzatte</td>
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<td>35. Sheep Camp</td>
<td>Campsite</td>
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<td>36. Willamette Pass</td>
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<td>C</td>
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<td>37. Pengra Pass</td>
<td>Railroad</td>
<td>Fig. 7,37</td>
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<td>38. Kitson Springs</td>
<td>Hot Springs</td>
<td>Fig. 8,38</td>
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<td>39. Rigdon Gd. Station</td>
<td>Unique (Forest Ser.)</td>
<td>Fig. 8,39</td>
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<tr>
<td>40. Emigrant Pass</td>
<td>Transportation</td>
<td>Fig. 8,40</td>
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Aboriginal peoples who inhabited areas within or adjacent to the Willamette National Forest at the time of historic contact include the Kalapuya, Molala, Tenino, and Northern Paiute (Fig. 33). Each of these aboriginal peoples spoke different languages, with two major language phyla being represented—Penutian and Uto-Aztecan. The Penutian phylum includes the languages spoken by the Kalapuya, Molala, and Tenino. The Uto-Aztecan phylum is represented by the Northern Paiute language.

The placement of languages relative to one another has important cultural-historical implications which should be spelled out. The Uto-Aztecan and Penutian phyla each comprise a large group of related languages which have diverged from a single common ancestral language over a long period of time. The original proto-Penutian language probably existed as a single tongue sometime before 5000 years ago, and the separating out of all the many languages that now make up the Penutian phylum has taken place since that time. The case is the same with Uto-Aztecan.

At a level below the language phylum is the language family, comprising a grouping of rather closely related, yet distinct languages. The Kalapuya Indians of the Willamette Valley spoke three distinct languages which are grouped together as the Kalapuyan family of the Penutian phylum. The Tenino language is one of many languages of the Sahaptian family of the Penutian phylum. The Molala language is also a member of the Penutian phylum, but its specific relation to other members of the phylum are not known at present. These relationships indicate that Kalapuyan, Tenino, and Molala languages have a common ancestor far back in time, but have been separate from one another for a period of probably on the order of 3000 years. The Northern Paiute language, which belongs to an entirely different language phylum, is unrelated to all of these unless it be at a time level so remote as to be hardly traceable, back around 10,000 years ago.

The Kalapuya, Molala, Tenino, and Northern Paiute should not be thought of as tribes. The term "tribe" connotes a political body composed of several bands or villages united by a tribal chief or a council of chiefs (Service 1962), and such a connotation does not apply to these peoples. Rather, among the Kalapuya, Molala, Tenino and Northern Paiute the largest sociopolitical unit consisted of autonomous villages or bands. Tribal organization and tribal chiefs were absent; each village or band possessed its own leader or chief.
Fig. 33. Aboriginal Peoples of the Region in and Around the Willamette National Forest.
Precise definition of the territories occupied by each of these four peoples is difficult, because the areas they inhabited varied somewhat through time as a result of historic white contact. The most profound effect of historic contact was the introduction of European diseases, which decimated the aboriginal people because of their lack of immunity. As much as 80 per cent of the native population of western Oregon may have died as a result of these diseases (Scott 1928:144). The first great epidemic was smallpox, which in 1781-1782 swept from the Upper Missouri River to the Pacific Ocean. Just as the native populations were beginning to recover, a second great epidemic, usually referred to as "fever and ague" or "intermittent fever," ravaged the natives of the area from 1830-1833 (see Cook 1955; Taylor and Hoaglin 1962; Boyd 1975). The drastic reduction in the population of many native groups led to a decrease in the territory they occupied and in some cases resulted in the merging of formerly separate bands or villages. Other native peoples who were not as drastically affected by the diseases sometimes expanded to occupy territory abandoned or no longer defended by others. The best known example of such an expansion occurred during the 1830's, when the Klickitat Indians from Washington invaded the Willamette Valley and occupied most of the area as far south as the Umpqua River before the federal government forced them to return to their aboriginal home north of the Columbia River (Clark 1927:40).

In addition to disease, other factors may have affected the distribution of aboriginal peoples in north-central Oregon during the period immediately following historic contact. According to Teit (1928), during the period from 1800-1830 the Northern Paiute expanded north and northwest from their traditional territory in southeastern Oregon. This movement was said to have had the effect of driving the Molala west from their former territory on the Deschutes River to the Willamette Valley, and driving the Tenino and related peoples from a former territory in central Oregon north to the Columbia River. The Tenino and their linguistic relatives then are postulated to have ousted Salish-speaking peoples from their homes along the Columbia River, and assumed occupancy of its shores. Teit's (1928) ideas about post-contact population movements were adopted by Berreman (1937) in his important monograph on the distribution of aboriginal peoples in Oregon, and this idea of a Northern Paiute expansion with its attendant repercussions is commonly referred to as the "Teit-Berreman Hypothesis." Objections to this theory have been raised by a number of investigators on various linguistic and ethnographic grounds (e.g., Jacobs 1937; Murdock 1938; Ray 1938), and these objections will be discussed in detail in the sections concerning each aboriginal group.

In keeping with the primary land-management focus of this study, the following ethnographic summaries will emphasize those aspects of aboriginal culture specifically concerned with subsistence patterns, land use, concepts of ownership as applied to land, and sociopolitical organization.
THE KALAPUYA

The name Kalapuya refers to aboriginal peoples who spoke various dialects of the Kalapuyan languages, which comprise a separate family within the Penutian language phylum. Kalapuya territory included the greater portion of the Willamette Valley along with a portion of the Umpqua River drainage immediately to the south of the upper Willamette Valley. The only non-Kalapuyan peoples within the Willamette River drainage were the Chinookans, who occupied the area below the falls of the Willamette River at modern Oregon City, and the Molala who inhabited the mountains of the Cascades from the vicinity of the Molala River southward (Fig. 33).

Anthropological research among the Kalapuya began relatively early, with the work of Gatschet (1877, 1899) and Frachtenberg (1918). Unpublished ethnographic data collected by Gatschet and Frachtenberg was reworked and published by Jacobs (Jacobs et al. 1945). Much of the ethnographic and linguistic information concerning the Kalapuya collected by these and other investigators, however, remains unpublished (see Zenk n.d.). Attempts to summarize the ethnographic information available on the Kalapuya have been made by Collins (1951), Peterson (1975), and Zenk (n.d.), and a number of ethnohistorical references to the Kalapuya have been published by Mackey (1974).

The Kalapuya were divided into a number of groups or bands, each of which consisted of several dialectically and culturally related villages (Hodge 1907, 1910; Berreman 1937:21-23; Jacobs et al. 1945:154; Zenk n.d.). The various divisions of the Kalapuya are mapped in Fig. 33. The better documented groups include the Tualatin, Yamhill, Pudding River, Luckiamute, Santiam, Mary's River, and Yoncalla bands. Incompletely identified groups include the Kalapuya proper, Muddy Creek Tsankupt, Long Tom, Chafan, Mohawk, and Winefelly. These various Kalapuyan groups spoke three more or less unintelligible languages: a northern language, Tualatin-Yamhill; a central language, sometimes referred to as Santiam, which included an undetermined number of only slightly varying dialects; and a southern language, Yoncalla, which consisted of at least two dialects (Frachtenberg 1918:181-182; Jacobs et al. 1945:145-146).

In aboriginal times the Willamette Valley contained a diverse environment characterized by prairie and oak savannas, oak and Douglas fir groves and forests, and many marshes and lakes, (Habeck 1961; Thilenius 1968). The area was reputedly exceptionally rich in game and vegetal resources. The presence of large areas of open country in the Willamette Valley was the result of extensive land fires set by the Kalapuya in order to drive game, improve seed production, and reduce the amount of brush (Johannessen et al. 1971:288-292). Ethnographic sources suggest that vegetal foods
formed the major portion of the Kalapuya diet. Camas, which was remarkably abundant in the valley, was probably the single most important vegetal food. Also of major importance were wapato, acorns, tarweed seeds, hazel nuts, and various kinds of berries. Among the animals hunted by the Kalapuya were deer, elk, black bear, and various species of waterfowl. Deer were obtained using the surround hunting technique; elk were sometimes trapped in pitfalls. Smaller game were obtained through the use of snares and traps.

A major factor affecting the subsistence practices of the Kalapuya was the presence of falls in the Willamette River at modern Oregon City. These falls formed a substantial barrier to the upstream migration of anadromous fish; a limited number of salmon were able to surmount this barrier and continue up the Willamette River into its larger tributaries, but all except the northernmost Kalapuyan groups were largely denied access to the salmon runs so important in the economics of other native peoples in the Pacific Northwest.

The Kalapuya seem to have confined their subsistence activities primarily to the floor of the Willamette Valley, although expeditions were no doubt occasionally made into the uplands of the Cascades during the summer in order to hunt large game and collect berries. The Kalapuya maintained permanent winter settlements but occupied temporary camps for the balance of the year, when subsistence activities required greater mobility. Large winter houses, sometimes intended for several families, were built. The basic type seems to have been rectangular, constructed of bark laid upon a shed or gable framework, with dirt banking outside. The floors of these houses were sometimes excavated to a depth of two or three feet and there was usually a central fireplace. During the summer, windbreak shelters of fir branches were constructed at temporary camps. The Kalapuya also built sweathouses, formed by thrusting soft green hazel sticks into the ground in a circle, then bending over and tying the tops. This frame was then covered with white fir boughs and dirt. The sweathouse was sometimes used for sleeping quarters for boys and girls.

The exact nature of Kalapuya sociopolitical organization is unclear. The Kalapuya recognized political entities larger than the village, but it is uncertain whether these units reflect the aboriginal situation or are the result of white influence, for example, treaty negotiations. Kalapuya mythology assigns a "chief" to each individual village. Chiefs were usually succeeded by their own sons, although leadership in general largely depended on wealth rather than being strictly hereditary. The Kalapuya apparently practiced village exogamy (marrying outside the local group) and patrilocal residence (on marriage the couple resides with the husband's family). Plural marriage was practiced, mainly by men of high social standing. The most distinct social stratum in Kalapuya society consisted of slaves. Slaves were mostly captives or descendants of captives, originally taken from distant groups and often traded widely throughout the area. Shamans held an important position in Kalapuya
culture; both men and women could be shamans.

The guardian spirit quest was a major event in Kalapuya life; any individual could obtain a spirit. Guardian spirits were sought by individuals who went out alone, generally at the time of puberty, on quests which consisted of five-day visits to certain locations and purifying activities such as swimming, fasting, and rock piling. The quality and strength of the spirit powers obtained determined the social position of the individual—chief, shaman, or commoner (Jacobs et al. 1945:180). Important events in the life cycle of individuals, such as the initiation of a shaman or the naming of a child, were accompanied by elaborate ceremonies. Such ceremonial occasions often included the distribution of presents to those attending.

The northernmost Kalapuyan groups flattened the heads of all free-born infants; head flattening has also been reported among the central groups, but the practice apparently was not universal. The Kalapuya customarily buried their dead, although cremation and above-ground disposal are also reported. Personal items of the deceased were usually destroyed; a deceased person's house was ritually purified if not destroyed; slaves and "money" (dentalium shells, valuable beads) were divided among the nearest relatives.

The Kalapuya population underwent catastrophic declines during early historic times. The greatest decrease probably occurred during the period from 1830-1833, when the "fever and ague" or "intermittent fever" (probably malaria) swept the Willamette and lower Columbia Valleys (Cook 1955; Taylor and Hoaglin 1962; Boyd 1975). There is very little information on how large the population of the Kalapuya was before this disastrous event. Mooney (1928:18) suggested a population of 3000 for all of the Kalapuyan groups prior to historic contact. More recently, Boyd (1975:135) has revised this figure upwards and suggested a population of approximately 10,000 for all of the Kalapuya. By the late 1830's the original population had declined to around 600 persons (Wilkes 1845:141).

Attempts to negotiate treaties with the surviving Kalapuya began in 1851, engendering strong native opposition to the federal government's intentions of removing the native peoples in western Oregon to lands east of the Cascade Range (Mackey 1974:82-127). Treaties encompassing all of the Kalapuya were finally ratified in 1855, and removal of the remaining Kalapuya to the Grand Ronde Reservation followed in 1856. The Kalapuya population is now presumed extinct.
The Molala were a small aboriginal group about whom little ethnohistorical or ethnographic information is available. The exact territory occupied by the Molala is uncertain, but they seem to have been primarily an upland people who inhabited the mountains of the central Cascades. West of the Molala, in the Willamette and Umpqua Valleys, lived the Kalapuya and Upper Umpqua. To the north the Chinookan-speaking Clackamas occupied the river valley which bears their name. East of the Molala lived the Sahaptin-speaking Tenino and the Northern Paiute. The Klamath and Upper Takelma resided to the south (Fig. 33).

It is common to distinguish Northern and Southern Molala subgroups and to assign them non-contiguous territories, the former concentrated around the Molalla River drainage and the latter to the south in Douglas County (e.g., Berreman 1937:57, Fig. 2). The Northern Molala subgroup was first described by Horatio Hale (1846), who collected a vocabulary from some Molalas living near Oregon City in 1841:

The residence of the Molele is (or was) in broken and wooded country about Mts. Hood and Vancouver (Jefferson). They were never very numerous, and have suffered much of late from various diseases, particularly the ague-fever. In 1841 they numbered but twenty individuals; several deaths took place while we were in the country, and the tribe is probably, at present, nearly or quite extinct (Hale 1846:214).

An early account of the Southern Molala subgroup who lived in what today is Douglas County is provided by Joel Palmer, the first U.S. Indian Agent for the Willamette Valley, who wrote in 1853:

While on my late expedition I came to the knowledge of a tribe of Indians inhabiting the country on the upper waters of the North and South forks of the Umpqua and the headwaters of the Rogue River called the wild Mo-lal-la-las. The name so nearly resembles that of the Mol-al-las of the Willamette that they have been confounded with that tribe; but the information I have obtained satisfies me that they are a distinct tribe, speaking an entirely different language, and having no intercourse with the whites, being located in a mountainous region off the line of travel from Oregon to California. They roam sometimes as far east and southeast, as the headwaters of the Deschutes and the Klamath Lake. Their subsistence is chiefly wild game with which their country abounds, while numerous mountain streams and lakes afford a rich supply of fish (Palmer quoted in Coan 1922:34).
It is now clear that Palmer was wrong and that these Indians were in fact related to the Molalas living in the Willamette Valley during the post-contact period. A few years after Palmer's encounter with them, Albert S. Gatschet, an early ethnographer and linguist, again referred to the Southern Molala subgroup when he wrote: "Some Molele or Molale, renegades of the Cayuse tribe, have recently become mixed with Rogue Rivers [Takelma] and Klamaths, and have adopted the Klamath language in consequence" (Gatschet 1877:165). One of Gatschet's Northern Molala informants told ethnographer Leo Frachtenberg in 1910-1911 that "in Douglas County there lived people who understood his language but named everything different" (quoted in Rigsby 1965:72). This fact suggested to Rigsby (1965:74) that there was probably a slight difference in the linguistic dialects spoken by the Northern and Southern Molala subgroups.

Rigsby (n.d.) summarizes some unpublished ethnographic information on the Northern Molala subgroup collected by Frachtenberg in 1910-1911. The Molalas wintered at sites located along streams in the lower elevations, usually west of the Cascade divide, and at other times of the year they exploited the higher elevations for roots, berries, and large game animals, including deer, elk, and bear. Fishing for salmon, steelhead, trout, eels, and other species in suitable streams and lakes was also an important aspect of their subsistence pattern. The Molala lacked tribal or village organization, as the basic social unit consisted of small family groups which followed the seasonal economic round and occupied common winter houses together. One of Rigsby's (1969:80) elderly informants on the Warm Springs Reservation recalled being told by her father that the Molala lived in "underground houses," probably a reference to the semi-subterranean earth lodge commonly inhabited by aboriginal peoples of the Columbia Plateau.

Leadership among the Molalas was flexible, with leaders deriving their authority from personal reputation and family status. The Molala commonly bought slaves from the Klamath Indians, but their numbers and economic significance are unknown. The Molala themselves were raided for slaves by the Cayuse and Nez Perce during the early historic period (Rigsby 1965:240). The Molala kinship ties were bilateral (kindship ties were traced through both parents); exogamy (marrying outside the local group) was the norm; and the levirate (a widow marries her deceased husband's brother) was practiced. The Molala also occasionally intermarried with their Chinookan, Sahaptin, Klamath, and Kalapuyan neighbors. The heads of all female infants were artificially flattened, but not those of all males. Both males and females had the nasal septum pierced and were tattooed on the arms. The Molala usually cremated the dead.
For over a century, ethnologists and linguists have believed that the Molala and the Cayuse of northeastern Oregon shared a recent common historical origin that was supposedly indicated by their speaking mutually intelligible dialects of the same language. This idea was initially proposed when Horatio Hale (1846) published the first Molala and Cayuse vocabularies and established the two languages as the sole members of the so-called "Waiilatpuan" language family. Some writers (Clarke 1905:133-135; Curtis 1911:8-80; Minto 1900:241) have stated that their separation resulted from a recent westward migration of the Molalas, while others spoke of the eastward movement of the Cayuse (Boas recorded in Rigsby 1967:77; Garth 1964:45). More recently, Rigsby (1965, 1969) has re-examined the linguistic evidence for Molala-Cayuse relationships and concluded that the two languages do not appear to be closely related. This conclusion has important implications for determining the original territory occupied by the Molala.

According to the Teit-Berreman hypothesis mentioned earlier, the original territory of the Molala was located in the middle of the Deschutes and Warm Springs country and on the eastern slopes of the Cascades. Berreman (1937:44) believed that the Molala occupied territory west of the Cascades only at a late date and as a result of pressure from Northern Paiute raids. Berreman (1937:46) also suggested that the former territory of the Molala extended continuously as far south as the Klamath region. With such a distribution, a wedge of Northern Paiute invaders might easily have divided the Molala into northern and southern subgroups, as first mapped by Hale (1846).

This idea that the Molala were originally located east of the Cascades and moved west only during the early historic period is repeated in a number of early historic and ethnographic accounts. For example, Gatschet (1877:256) states that the tribal name of the Santiam Kalapuya was Ahalpam, which means "uplanders," and that they had been driven out of their upland homes by the Molala, who intruded from the east. Gatschet (1877:167) also states that the Chinookan-speaking Clackamas residing in the river valley of the same name were driven from their homes by the same movement. Hodge (1907:930) writes that the Molala drove some former inhabitants out of the valley of Molala Creek to occupy their land, but when first known to the Whites they occupied only the mountainous areas between Mount Hood and Mount Scott and the west slopes of the Cascades. Hale (1846) and Powell (1891) mapped the Molala only on the high mountain slopes, and both considered their territory to extend continuously from Mount Hood to the Klamath country. On the basis of this evidence, Berreman (1937) concluded that prior to 1750 the Molala occupied the greater part of the Deschutes River drainage and the eastern slopes of the Cascades, and that their chief occupation of the Willamette Valley area occurred only after that date.
Another account of Molala origins which also infers that they are recent immigrants from the east has been presented by Murdock (1938). According to Murdock (1938:397-398), at the beginning of the nineteenth century the Molala occupied a winter village at modern Tygh Valley east of the Cascades and moved every spring to a summer fishing village at modern Sherar's Bridge on the Deschutes River. The Molala were also said to have gathered berries on the eastern slopes of Mount Hood. Then, it is inferred, sometime during the period 1810-1820 a party of Sahaptin-Tenino from the Columbia River expelled the Molala from their eastern territory and drove them west of the Cascades. The Tenino invaders are then thought to have settled at the former Molala villages, and eventually have become the Tygh subgroup of the Tenino.

More recently, Rigsby (1965, 1969) has reviewed the available information concerning the postulated westward movement of the Molala across the Cascades and concluded that there is no solid evidence that the Northern and Southern Molala had not occupied their historic locations for some length of time before the historic period. Rigsby (1969:80-81) discussed the subject with a number of Sahaptin-speaking informants on the Warm Springs Reservation and none recalled any history of recent movement from the Columbia River into the Tygh Valley nor of conflict with the Molala. One informant referred to the Molala as people who formerly lived along the Blue River, east of Eugene, and just west of the Cascade divide. Other Sahaptin informants provided good descriptions of the territories utilized by their ancestors in the nineteenth century; these included most of the eastern slopes of the Cascades and the Deschutes River drainage as far south as Crane Prairie and La Pine. Another ethnographer, David French, who has worked with informants from the Warm Springs Reservation, states it as his understanding that there were Sahaptins living in Tygh Valley during the eighteenth century and that they were then utilizing parts of the Deschutes drainage system for their subsistence activities. French obtained no information on the occurrence of Molala in this region (French, personal communication recorded in Rigsby 1969:81).

On the basis of this evidence, Rigsby (1969:82) suggests that Sahaptin-speaking peoples were utilizing the Tygh Valley and Deschutes territories earlier than the nineteenth century. He also notes that there are slight linguistic differences between the Tygh Valley dialect and those of the Sahaptin groups on the Columbia River, a fact which indicates a small period of separation. Rigsby concludes that the available ethnohistoric and ethnographic evidence does not support the idea that the Molala lived east of the Cascades early in the nineteenth century, although they may have at some earlier time, and may have visited to the east during the nineteenth century. Rather, the available information seems to indicate that Molala territory in the past century lay in the uplands along the western slopes of the Cascades with a continuous distribution from the upper Rogue River in the south to the Clackamas River and the Mount Hood area in the north (Rigsby n.d.).
In 1847, the same year that the Cayuse attacked the Waiilatpu mission and killed the missionaries (the Whitmans, of historical fame) and a number of their party, the Molala became the central participants in a brief uprising against the Whites that has come to be known as the Molala War (for accounts of this war, see Bancroft 1886(1):746-751; Clark 1927(1):550-552; Stern 1956:238-239). At that time the Molala leader Crooked Finger visited the Umpqua, Rogue River (Takelma), Pit River (Achomawi and Atsugewi), Modoc, and Klamath Indians, seeking recruits for an uprising. He succeeded in assembling about 150 followers, including men, women, and children; over half of this force was Klamath (Stern 1966:26). The plan was said to have been to attack the Whites during the winter of 1848, when many settlers would be absent in the militia fighting against the Cayuse. Indeed, emissaries from the Cayuse visited Crooked Finger's camp, and there is little doubt that the Cayuse uprising was intended to be a diversionary tactic, part of a major offensive against the settlements in the Willamette Valley (Stern 1956:238).

The outcome of the Molala War was disastrous for the Indians. The settlers were forewarned; some of the local Indians joined the Whites; and the combined force ambushed the hostiles on Butte Creek. The Whites routed the Indians, following them up the creek where they made another stand, and defeated them again. The Indians then tried to withdraw downstream, in order to lead the Whites away from their women and children encamped on nearby Abiqua Creek. The Whites, however, also found and attacked this camp and massacred its occupants. The victorious Whites gave the survivors of Crooked Finger's band three days to leave, and they departed southward along the Klamath Trail, bearing their dead with them. According to Stern (1956:239): "The entire engagement was long suppressed by the participant whites, for shame of the slaughter of women and children, for which a frontier ruffian seems to have been responsible."

Together with the Kalapuya, the Molala signed the Dayton Treaty of 1855 and relinquished claim to any land holdings; shortly thereafter, most of the Molala were removed to the Grande Ronde Reservation in eastern Oregon. Almost four decades later, Powell (1891:128) wrote: "There are 31 Molala now on the Grand Ronde Reservation, Oregon, and a few others live in the mountains west of Klamath Lake." According to Spier (1927:361), descendants of the Southern Molala subgroup still live among the Klamath Indians.
The Tenino are a Sahaptin-speaking people who in aboriginal times occupied villages along the Columbia River between Ten Mile Rapids on the west and the John Day River on the east, as well as along the lower reaches of the Deschutes and John Day Rivers. South of the Tenino, around Tygh Valley and beyond, lived the Molala. To the southeast, in central Oregon, lived bands of the Northern Paiute. To the east, along the Columbia River, resided the Umatilla, also a Sahaptin-speaking people. To the west lived two Chinookan-speaking groups, the Wasco on the south bank of the Columbia River near The Dalles, and the Wishram on the north bank in Washington.

Ethnographic material on the Tenino is not abundant. Most of the available information on these people was obtained by ethnographer George Peter Murdock, 1938, 1958, 1965), who interviewed Tenino informants living on the Warm Springs Reservation during the summers of 1934 and 1935. Additional information on Tenino culture can be gleaned from two works by Ray (1939, 1942), who incorporated unpublished data on the Tenino supplied by Murdock into his comprehensive studies of the aboriginal people of the Columbia Plateau. Most recently, the socio-political organization and land use patterns of the Tenino have been studied by Suphan (1974) in connection with a legal case before the Indian Claims Commission.

The population of the Tenino is estimated to have been around 1200 people in aboriginal times (Murdock 1958:299). According to Murdock, the Tenino were divided into four local groups, all very closely related culturally and linguistically. Each group typically inhabited two villages, occupying them at different times of the year. One village, containing only temporary dwellings, was located along the Columbia River and inhabited for the duration of the fishing season during the warmer months of the year. The second village, containing substantial permanent houses, was located several miles from the summer village, usually away from the river at a suitable location which provided water, fuel, and shelter from the weather during the colder months.

The four subdivisions of the Tenino are identified as:
1) The Tenino proper, who occupied a village on the Columbia River about four miles east of The Dalles during the summer and wintered at a village six miles inland on Fifteen Mile Creek.
2) The Wayam or Lower Deschutes, who occupied a summer village at the modern town of Celilo and wintered at a village on the Deschutes River not far from its confluence with the Columbia River.
3) The John Day, whose summer and winter villages were both located on the lower John Day River within a few miles of the Columbia River.
4) The Tygh or Upper Deschutes, who were an offshoot from the Tenino proper. The summer village of the Tygh was at the fishing
site at modern Sherar's Bridge on the Deschutes River, and they wintered at a village located in modern Tygh Valley.

Detailed information on the foods eaten by the Tenino is provided by Ray (1939). The Tenino depended most heavily on fishing for their subsistence, but hunting and gathering were also important supplementary food sources. Salmon was the staple food, with the heaviest runs occurring from May to October when the chinook, blueback, and silver salmon migrate up the Columbia to spawn in its headwaters and tributaries. In addition, the presence of steelhead trout, lamprey eels, dog salmon, sturgeon, suckers, chubs, and smelt provided fishing opportunities throughout the year. Fish were taken by a wide variety of techniques, including dams, weirs, seines, traps, spears, and hooks. The Tenino also utilized freshwater clams; these were boiled or roasted in earth ovens.

Hunting seems to have been less important than fishing among the Tenino; the most important species hunted were deer, elk, antelope, brown bear, grizzly bear, rabbit, mountain sheep, and mountain goats. The Tenino are known to have employed the surround hunting technique, with animals being driven into a natural enclosure. Hunting blinds were also constructed for the taking of big game and waterfowl. Roots were extensively utilized; camas, kouse, and lupine were the principal species used, but numerous others were also eaten. Fruits were also very important, especially serviceberry, huckleberry, chokecherry, and strawberry. Seeds were less important, but pine nuts, sunflower seeds, and acorns were all eaten.

The annual runs of the several species of salmon which ascend the Columbia River and its tributaries largely determined the scheduling of the economic round. Murdock (1958:300-301) provides a detailed description of the Tenino settlement-subistence system.

From November to March, the Tenino inhabited their winter villages, where each family possessed two houses: an oval or elliptical semi-subterranean earth-covered lodge which was used for sleeping, and a rectangular frame dwelling with mat-covered walls and roof which was used for cooking and daytime activities. The winter was spent manufacturing artifacts, gathering fuel, fishing, and hunting and trapping.

Late in March the Tenino dismantled their winter houses and moved to their summer villages, where each household erected a rectangular dwelling consisting of poles and mats. Half of this structure was used for drying salmon, while the other half served as living quarters. During this time, special parties ritually gathered roots and caught salmon for an important first-fruits ceremony that took place in early April. Neither salmon nor roots could be eaten until after this ceremony had been performed.
Following this festival, about half the families in the village departed for a series of hunting and gathering expeditions into the interior. During these trips the Tenino lived in temporary camps with dwellings consisting of mat-covered tipis. The rest of the population remained at the summer village, catching and drying salmon. In July all the Tenino returned to the summer village for a second first-fruits ceremony, this one featuring berries and venison ritually obtained by a special party of six men and six women.

After the summer ceremony, the Tenino again divided, part remaining in the summer village to continue salmon fishing, while the rest visited the mountains in order to hunt and to gather berries and nuts. At the conclusion of the berry season in September, small groups set out on long hunting trips up the Deschutes or John Day Rivers, camping in tipis. In October the Tenino dismantled their summer dwellings and moved back to their winter villages, reconditioning their semi-subterranean houses to initiate a new settlement-subsistence round.

In addition to their regular subsistence activities, a major economic preoccupation of the Tenino was with trade. The vicinity of The Dalles was one of the major foci of trade in aboriginal North America. Here the Tenino, together with the Wasco and Wishram, acted as middlemen in a network of trade relations which extended westward down the Columbia River to the Pacific Ocean, northward into the heart of the Columbia Plateau, eastward to the edges of the Great Plains, and southward into northern California. Although parties of Tenino occasionally undertook trading expeditions in all directions, for the most part the neighboring peoples themselves brought their goods to the summer villages on the Columbia to exchange them for native products and imports from elsewhere. The main trading season was from August to October, when the runs of salmon had somewhat slackened. According to Murdock (1958:302):

To this trade the Tenino contributed chiefly dried salmon, fish oil, and furs. The principal imports were dentalia and other shells from the west; coiled baskets from the north; horses, buffalo hides and parfleches from the east; and slaves, California baskets and beads, eagle feathers, and Achomawi-Atsugewi bows from the south. The Molala brought tanned elk hides to exchange for fur bedding, and the Paiute, during periods of peace, brought deer skins to trade for horses, of which they had very few. Most of the commerce with the south, however, was mediated by the Klamath, who obtained dried salmon, dentalia, and horses in return for products brought from California. The Chinookan traders from the lower Columbia exchanged their shells for woven bags, bows, and skins. Trade with the north was mediated by the Wishram, who brought baskets and some horses in return for slaves, fish, and shells. Furs, hides, dentalia, bows, and dried fish were traded with the Umatilla for products obtained by the latter from tribes farther to the east.
The chief consequence of this extensive trade was widespread peace throughout the area. The Northern Paiute, who significantly had very little to trade, were often raided by the Tenino and other groups for slaves, but the Tenino appear to have maintained friendly relations with all groups. In the case of the Wasco, this friendship was even carried so far that each group allowed members of the other free access to its own hunting and gathering territories (Murdock 1958:302).

Each Tenino village was an autonomous political unit, ruled by a chief who was usually succeeded by his eldest son. A chief was always a wealthy man and usually had several wives. In the winter village the chief occupied a special semi-subterranean house larger than those of other men. He was usually assisted by two sub-chiefs, who acted as his counselors, messengers, and deputies. The village chief usually advised in the planning of military operations, but rarely led or even accompanied a war party. Village chiefs enjoyed great prestige, even among peoples inhabiting other Tenino villages. The present institution of a single chief for all of the Tenino is clearly a development of the post-contact period (Murdock 1958:314).

As might be expected among so mercantile a people as the Tenino, wealth distinction were recognized, but they had not developed into formal social classes as among other aboriginal peoples in the Pacific Northwest. Although most marriages did in fact occur between families of comparable means, unions between rich and poor were neither prohibited nor particularly uncommon. The most distinct social stratum among the Tenino consisted of slaves. The Tenino practiced slavery only to a limited extent; it was disapproved but tolerated (Ray 1939:32). Slaves were mainly captured in war, almost exclusively with the Northern Paiute (Murdock 1938:388). In late years the Klamath encouraged the Tenino to act as intermediaries in the slave trade between themselves and The Dalles (Ray 1939:32). Slaves obtained from the Klamath were mainly of Achomawi-Atsugewi, but sometimes of Modoc, origin. Most slaves, wherever they were from, were passed on in trade to the north, through the Wishram, and only a few were retained. Murdock's (1958:313-314) informants estimated the number of slaves kept by the Tenino themselves in the immediate pre-contact period at about twenty-five, three being the most held by a single owner. Captured slaves were exclusively women and children, as male war captives were always killed. Adult female slaves were neither married nor kept as mistresses. Children were accepted as members of the household; when they grew up they could marry Tenino and become free, but they never fully lost the stigma of their slave origin.

Economic factors were clearly reflected in the composition of Tenino households, which typically consisted of the families of two adult men. The two families slept on opposite sides of the winter semi-subterranean lodge and shared the adjacent rectangular frame dwelling where they maintained a single common fire and cooked and ate together. The two families also occupied the same dwelling in the summer village, but
ordinarily only one family was resident there throughout the season. The other was away from the village most of the time on hunting and gathering expeditions, living in mat-covered tipis in temporary camps. The two families shared the summer dwelling during the two annual first-fruits ceremonies and for brief intervals between trips. Sometimes the two families would alternate on expeditions away from home, but especially when one man was much older or less active than the other, his family would remain at the fishing village throughout the summer. During the winter months the two families shared equally the salmon, game, roots, and berries accumulated during the preceding summer.

The owner of the dwelling, usually the oldest male occupant, was the head of the household. The other adult male was usually his married son or younger brother. A son, when he married, usually continued to reside with his father, at least for a time. If the house became overcrowded, he joined with a brother or other relative to build a new dwelling and establish an independent household. On the death of the owner, the dwelling was inherited by his household partner if a near relative, otherwise by his eldest son or next younger son living in the community (Murdock 1958:302-303).

Weddings ranked with the two annual first-fruits festivals as major ceremonial occasions in Tenino life. They involved an elaborate exchange of presents between the families of the bride and groom (for a detailed description of this exchange, see Murdock 1958:304-306). Local exogamy was preferred and most common, but marriages within the village were not positively prohibited. Marriages also occurred fairly frequently with members of neighboring tribes with whom the Tenino maintained friendly trade relations. Polygamy was permitted and seems to have occurred with moderate frequency and to have been by no means confined exclusively to chiefs or wealthy men. Five wives was the most ever remembered. Co-wives lived in the same dwelling and shared household tasks, but the first wife enjoyed a somewhat higher status. Both the levirate (a widow marries her deceased husband's brother) and the sororate (a man marries his deceased wife's sister) were practiced by the Tenino, as forms of social security.

Another major occasion in Tenino ceremonial life was the Winter Spirit Dance. Guardian spirit songs and accompanying dances formed the core of this ceremony (for a discussion of this ceremony among the aboriginal peoples of the Columbia Plateau, see Ray 1939). The quest for a guardian spirit among the Tenino has been well described in the following account by Murdock (1965:166):

At the age of six or a little older, every child, male or female, was sent out alone at night into the wilderness in search of a guardian spirit, and this procedure was repeated from time to time until the child had accumulated five such spirits as lifelong helpers. For the most part these tutelary beings were
animals or birds, but occasionally a plant, an inert object, or a natural phenomenon would reveal itself to the seeker as a supernatural guardian. The child did not go out unprepared. He was instructed by an experienced old man or woman where to go, how to behave (e.g., to keep awake by erecting piles of rocks), and what to expect. Moreover, through attendance at the winter dances he had become familiar with the distinctive cries, movements, and songs of most of the spirits he was likely to encounter.

Shamans also received their spirit powers in the same manner (see Murdock 1965).

The Tenino practiced inhumation of the dead. Sites were preferred that were some distance from the village. The dead were covered with rocks on talus slopes, or buried in the earth on river banks or on islands.

According to the Teit-Berreman hypothesis, in early historic times the Tenino and other Sahaptin-speaking peoples were driven north by the Northern Paiute to the Columbia River from a former central Oregon home, but Murdock (1938) has proposed an alternative interpretation of their history.

According to Murdock, historical sources indicate that prior to 1820 the Northern Paiute were well south of the modern city of Prineville, and there is no indication that the Tenino and their allies were under pressure from them. In fact, Lewis and Clark's account suggests that the initiative may have rested with the Tenino (Thwaites 1905).

During the period from 1810 to 1820, Murdock believes, the Tenino proper expanded southward from the Columbia and drove the Molala out of their villages at Tygh Valley and Sherar's Bridge. The Molala supposedly fled westward over the Cascades into the Willamette Valley at this time, with the Tenino colonizing their villages and eventually becoming the Tygh subgroup. As previously mentioned, Rigsby's (1965:1969) more recent examination of the historic and linguistic data cast doubt on the idea of a recent displacement of the Molala, and he suggests that the Tenino occupation of this area began at a much earlier time.

Murdock believes that after 1820 the Tenino continued to expand southward so that:

By the time of the establishment of the Warm Springs Reservation [1855] they had expelled the Paiute from the berrying grounds near Ollalie Butte and Mt. Jefferson, from the wintering places at Hot Springs, Warmsprings, and siksi'kwi, from the root-gathering grounds around Shaniko, and from the entire John Day Valley almost as far as the great bend of that river. Hunting expeditions ranged still deeper into Paiute territory (Murdock 1938:399).
This expansion southward was undoubtedly made possible primarily because of the arms and ammunition which the Tenino obtained from Whites at the several trading posts along the Columbia River. More recently, Suphan (1974:50-53) has suggested that the Tenino did not entirely expel the Northern Paiute from these localities, and that the Paiute still maintained camps along several streams within the region. The area lying south of the Metolius River and west of the Deschutes was still considered Paiute territory, although historical sources indicate that the Tenino did occasionally venture "south to the Metolius River for fishing, to Green Ridge for deer, to Black Butte for roots, berries, and nuts, and to Three Sisters for game and berries (Suphan 1974:54)." Small parties of Cayuse and Nez Perce also appear to have utilized these areas (Suphan 1974:55-56).

After the Middle Oregon Treaty of June 25, 1855, many Tenino, as well as Chinookan-speaking Wasco, settled on the Warm Springs Reservation which, according to Murdock (1938:399), had been carved out of Northern Paiute territory. The early post-treaty period was marked by almost continual Northern Paiute raids, for by this time many Northern Paiute in the region were mounted and armed with rifles. The scattered homesteads of Sahaptin and Chinookan peoples on the Reservation with their herds of horses and cattle were tempting targets for mounted piracy and plunder. As Murdock (1938:399-400) points out, the record of almost continual Paiute raids during the early reservation period is noteworthy for two reasons. First, it is the only period of successful Paiute aggression of which the Tenino have any recollection. Second, it probably bequeathed to the next generation an exaggerated impression of the danger which the Paiute constituted to the more settled groups of the Columbia River region at an earlier date. It seems reasonable to suggest that this apprehension felt by the Tenino toward the Paiute may have been conveyed to ethnographer James Teit (1928), who misinterpreted it in his hypothesis concerning recent aboriginal history in the area.

THE NORTHERN PAIUTE

The Northern Paiute occupied the northwestern part of the Great Basin in California, Nevada, Oregon and Idaho. Included under the name Northern Paiute are aboriginal peoples formerly referred to in historical and ethnographic accounts as Oregon Snakes, Western Bannock, and Paviotso. The language is very similar throughout the area, varying only slightly from locality to locality. Dialectic differences do not appear to coincide with political divisions (Steward 1937:626). Northern Paiute territory in Oregon was bounded on the west by Modoc, Klamath, and Molala lands. To the north of the Northern Paiute along the Columbia River were the Tenino, Umatilla, Cayuse, and Nez Perce (Fig. 33).
Ethnographic material concerning the Northern Paiute is primarily derived from fieldwork by Omer C. Stewart (1938, 1939, 1941). Supplementary sources primarily concerned with the location of the Northern Paiute in relation to other aboriginal peoples include Blyth (1938), Murdock (1938), and Suphan (1974). Additional ethnographic material on related Paiute peoples living elsewhere in the Great Basin can be found in the works of Julian Steward (1937, 1938, 1939).

The northern and western boundaries of the Northern Paiute coincide closely with the edges of the Great Basin physiographic province and the desert sagebrush vegetation zone. The habitat of the Northern Paiute, then, was desert, modified to some extent by streams carrying water into the region from the surrounding mountain ranges.

In the inhospitable environment of the Great Basin, the available food supply was so meager that the Northern Paiute had learned to eat nearly everything which could support life. Ray (1941:366-376) provides an extensive list of the foods eaten. Vegetal foods constituted a major portion of the diet for most groups. Acorns, grass seeds, roots, berries, and sunflower were the most important items, although numerous others were also utilized. Small game, principally rabbits, squirrels, and chipmunks were taken with traps, nets, and snares, and were the chief source of meat. Larger game, including deer, antelope, and mountain sheep were also important, and were hunted both by individuals and by communal hunting groups, using surrounds and corrals. Contrary to what might be expected in such a desert region, fish and waterfowl were extremely important dietary items for nearly all Northern Paiute; salmon, trout, suckers, and minnows were the primary species of fish obtained. Many insects, including caterpillars, ants, crickets, and grasshoppers were also eaten.

Northern Paiute sociopolitical organization is usually described as being of the band type (Steward 1937; Blyth 1938; Stewart 1939). Each band consisted of several families whose main connection with one another was proximity in certain areas of settlement or food resources. In other words, the main bond between families in a band was their association with more or less the same geographic area (Steward 1939:261). Northern Paiute social organization was very fluid, with no rigid prescriptions for residence or marriage. Polygamy was permitted, and both the levirate (a widow marries her deceased husband's brother) and the sororate (a man marries his deceased wife's sister) were common. Personal property was either destroyed at death, or passed on to any relatives who could use it, preferably to offspring. Each local band had its own chief, who ruled only with the approval of the community; the position was not inherited (Steward 1939:130). Occasionally, several bands of Northern Paiute gathered in temporary large organizations in order to conduct antelope or rabbit drives and the annual dance. On these occasions special chiefs directed the activities. As among the other aboriginal peoples discussed in this volume, shamanism and the quest for guardian spirits were important aspects of Northern Paiute
life. The Northern Paiute practiced both cremation and inhumation of the dead.

According to Stewart (1939), the Northern Paiute were divided into 21 bands. The basic unity of all the Northern Paiute appears from the fact that they pictured exact boundaries dividing themselves from surrounding peoples, but interband divisions were vague and indefinite (Stewart 1939:130). The lifeways of each band differed slightly in aspects of the food quest and material culture. The bands in the north and northwest made much use of bark and juniper berries. The bands on the Snake River had access to larger quantities of fish, possessed dugout canoes, and practiced elaborate fishing techniques. Intermarriage between these groups and those to the south in Nevada and California was common, and the population was fluid, with families of one band often becoming affiliated with neighboring groups (Blyth 1938:405).

The territory of each Northern Paiute band consisted of a relatively productive area and its environs; the large, sterile, dry stretches surrounding the more valuable spots were not extensively utilized. Each band tended to frequent the same campsites within its territory from year to year. For winter dwellings, the Northern Paiute constructed domed wickiups consisting of arched willows covered with layers of grass or brush. Summer camps usually featured only brush windbreaks as shelters. Each Northern Paiute band possessed recognized rights to the favorable hunting grounds, gathering tracts, and fishing streams within its territory. Other Paiute could obtain food there without asking permission, but always with an understanding that they were visitors. Seldom did claimed lands overlap, except where two adjacent bands recognized mutual use of an area. Bands in more arid regions tended to travel more, and spent several months each year as visitors in the more productive territories of their friends (Stewart 1939:130).

The name of each Northern Paiute band was usually derived from some characteristic of the area which it inhabited. The band was most often named after a local food which was considered remarkable either for its abundance or for some peculiarity. Thus the Northern Paiute bands in southeastern Oregon included, among others, the Wada'iṭika (seed eaters), Hu'nipwi'iṭika (root eaters), and the Goya'iṭika (crawfish eaters) (Blyth 1938:403-404). The emphasis in the naming of Northern Paiute bands, then, is clearly upon the territory rather than upon the group inhabiting it (Steward 1939:262).

The Northern Paiute band of most importance to this discussion was the most northwesterly located group, the Wa'dihichi'iṭika (juniper-deer eaters). This is the Northern Paiute band located immediately south and southeast of the Molala and Tenino Indians. According to Blyth (1938:403), the northernmost place inhabited by this group was Gateway, and the southernmost, Bend. Prineville was the most easterly
locale visited, and Mount Jefferson to the west was used as a hunting ground.

Further information on the Wa'dihichi'tika use of this area was obtained by Suphan (1974:52) from a "Deer-Eater Paiute informant":

The Deer Eater band of Paiutes had winter camps at Bend and along the northern side of the Metolius River. They customarily established summer camps all over the [Warm Springs] reservation until the Tenino were brought in after the treaty [1855]. Prior to that event the Deer Eaters utilized the country north to the Mutton Mountains, west to the Cascades, south through Bend and Prineville, and east to Shaniko and the John Day River. Berries were gathered at Mt. Jefferson and Ollalie Butte, while Mt. Jefferson was also a principal hunting ground. The Paiute took many rabbits at Madras. Their fishing sites were strung along the Deschutes as far as Sherar's Bridge, on the Metolius, and along the John Day upstream from Clarno. The Paiute traded regularly with the Tenino living at Sherar's Bridge, giving buckskin and roots for salmon and horses. The entire reservation was properly Paiute country.

Murdock (1938:398) writes that the Northern Paiute occupied at least three winter sites in this region; a site called siksi'kwi on Seekseekwa Creek, and sites at modern Hot Springs and Warm Springs. Between the Northern Paiute camps on Seekseekwa Creek and the southernmost Tenino villages at Tygh Valley and Sherar's Bridge was a zone which both Northern Paiute and Tenino considered to belong to the Northern Paiute, since they were its primary exploiters. The Cascades in the Mt. Jefferson-Ollalie Butte area seem to have been jointly exploited for game and berries (Suphan 1974:53).

Stewart's (1939) study of the Northern Paiute disproves the Teit-Berreman hypothesis that the Oregon bands were responsible for northward movements of a Sahaptin-speaking peoples during the early post-contact period. Both the earliest historical accounts and the testimony of native informants indicate that the Northern Paiute were without horses and arms until after 1850. Prior to that time the military advantage had rested with the Sahaptins, who were able to obtain arms and ammunition from Whites at several trading posts along the Columbia River. It was only after the creation of the Warm Springs Reservation in 1855 that the Northern Paiute gained access to these supplies and were on an equal military footing. Except for occasional raids, there is no evidence which indicates expansion of the Northern Paiute at the expense of Sahaptin groups in the first half of the nineteenth century (Blyth 1938:405).
SUMMARY

Four different aboriginal peoples—the Kalapuya, Molala, Tenino, and Northern Paiute—occupied areas within or adjacent to the Willamette National Forest at the time of historic contact. The Molala, who appear from the scanty ethnographic information to have been oriented generally toward an upland way of life, were probably the primary inhabitants of the area in and around the forest. But there is also ample ethnographic evidence documenting the use of the eastern slopes of the Cascades by Tenino and Northern Paiute. Although there are no specific ethnographic references to use of the upland areas by the Kalapuya of the Willamette Valley, it seems likely that they too, at least occasionally, also made hunting and gathering forays into the Cascades.

The preceding ethnographic summaries have shown that all of the native peoples had much in common, especially in terms of subsistence techniques. All gathered roots, seeds, and berries, fished, and hunted game animals. The relative emphasis placed on these subsistence activities, however, varied from group to group. The Kalapuya and Molala emphasized roots and berries, the Tenino emphasized fish, and the Northern Paiute emphasized seeds and small game. These patterns, of course, reflect the nature of the country they occupied. The economic interests of all these peoples converged during the summer, however, when forays were made into the Cascades in order to hunt game and gather berries.

The idea of an early post-contact expansion of Northern Paiute territory resulting in related movements by the Molala and Sahaptins—popularly known as the Teit-Berreman hypothesis—has been shown to lack support. Instead, the available ethnographic and ethnohistoric evidence suggests that there were no major population movements in north-central Oregon until the Reservation Period began in the 1850's. The aboriginal people encountered in the area at the time of historic contact are the final representatives of local cultural traditions that extend back hundreds or thousands of years, into the prehistoric period.

The ethnographic evidence suggests much about past human use of the Willamette National Forest region, and provides a basis for interpretation of the archaeological remains to be found there. At the same time, it poses questions about development of that lifeway, about how far back human occupation can be traced, and about what changes there may have been in the human adaptation to the region over thousands of years. These concerns are addressed in the following section.
ARCHAEOLOGICAL OVERVIEW

Interest in the manifestations of prehistoric man in the Pacific Northwest has a long history which can be traced back to the period of early Euroamerican exploration and settlement (see Sprague 1973: 253-255). A number of early historical accounts, notably those of Lewis and Clark (Thwaites 1905), describe the remains of old Indian camps and villages.

Most archaeological research, especially in recent years, has been conducted in connection with the construction of reservoirs and dams along major rivers. This preoccupation with archaeological sites located on the floodplains of major river valleys has resulted in a strong bias in our knowledge of the archaeological record, with the effect that there is very little information available on prehistoric utilization of upland mountain areas surrounding the major river valleys, such as the Willamette National Forest. Because of this situation, the following discussion focuses for the most part on the results of archaeological work in areas marginal to the forest. Specifically, these include the Willamette Valley, the Lower Columbia Valley, the Deschutes Valley, and the Umpqua Valley (Fig. 34). Through a discussion of the archaeological record in these surrounding areas, however, it will be possible to place the Willamette National Forest in the broader context of Oregon prehistory.

WEST OF THE FOREST--THE WILLAMETTE VALLEY

The Willamette Valley is a distinct physiographic province, bounded on the north by the Columbia River, on the south by the Calapooya Mountains, on the east by the Cascades, and on the west by the Coast Range. Topographically, the floor of the valley is characterized by broad alluvial flats, broken occasionally by groups of low hills and scattered buttes. The Willamette River, the principal hydrographic feature, flows northward in a braided meandering channel. Many abandoned channels, oxbows, and other floodplain features have formed on the lands immediately adjacent to the river. A major factor influencing the development of aboriginal cultures in the Willamette Valley was the presence of steep falls in the Willamette River at Oregon City. These falls formed a substantial barrier to the upstream migration of anadromous fish, and consequently most of the aboriginal peoples of the Willamette Valley were denied access to the salmon runs so important in the economies of other natives in the Pacific Northwest.
Fig. 34. Locations of Archaeological Studies Conducted in Areas Flanking the Willamette National Forest.
Fig. 35. Archaeologic Sites of the Willamette Valley.
Until the mid-1960's, archaeological investigations in the Willamette Valley (Fig. 35) took place only at sporadic intervals. The first archaeological research was conducted in the mid-1920's by Strong, Schenck and Steward (1930), who excavated a number of sites at the confluence of the Calapooya and Willamette Rivers near Albany. The next archaeological work was conducted in 1933 when Cressman, Berreman and Stafford excavated two sites, the Virgin Ranch (sometimes known as the Franklin Site) and Smithfield (sometimes known as the Alvadore Site) middens, along the Long Tom River near Franklin (Collins 1951:58-59).

During the 1940's the tempo of archaeological research in the Willamette Valley increased. In 1941 a report was published describing excavations at four sites; the Harrisburg (sometimes known as the Spurland Mound) and Miller Mounds on Little Muddy Creek near Harrisburg, and the Halsey and Shedd Mounds on the Calapooya River near the towns of Halsey and Shedd (Laughlin 1941). Also in the same year, Cressman and Laughlin (1941) described a possible association of artifacts with mammoth remains at a site near Lebanon. Two years later, the results of excavations at the Fuller and Fanning Mounds on the Yamhill River near McMinnville were reported (Laughlin 1943; see also Murdy and Wentz 1975; Woodward et al. 1975). In 1947 Cressman described another possible association of artifacts and mammoth remains, this time at a site near Templeton. In 1949 limited excavations were made at a site on Perkin's Peninsula in the area of the reservoir created by Fern Ridge Dam on the Long Tom River (Collins 1951:62). In 1949-1950 further excavations were conducted at the Harrisburg Mound by Laughlin and Collins (Collins 1951:61). Two years later, Collins (1951) presented the first synthesis of Willamette Valley prehistory in which he re-examined and summarized all the archaeological evidence from the valley that had been collected up to that time.

After Collins's work, there was a 13-year hiatus in archaeological research in the Willamette Valley. This ended in 1964 when archaeological salvage work was conducted for the National Park Service in the area to be flooded by the Cascadia Dam on the South Santiam River; this work included the excavation of Cascadia Cave, which was discovered to be one of the earliest sites in the Willamette Valley region (Newman 1966). In 1964 and 1965 archaeological salvage work was also conducted for the National Park Service in the area to be inundated by the Fall Creek Dam (Cole 1968). In 1970 and 1971 salvage excavations were again conducted under a contract with the National Park Service, this time at sites along Little Muddy Creek north of Harrisburg (Davis 1970a; Oman and Reagan 1971). A description and comparison of two of the more extensively excavated sites on Little Muddy Creek, the Davidson and Lynch Sites, was presented by Davis et al. (1973).
In 1965 the University of Oregon began an ongoing archaeological field school program in the Upper Willamette Valley. To date, excavations have been conducted at seven sites; the Lingo Site (Cordell 1967, 1975), two Benjamin Sites (Miller 1970, 1975), the Hurd Site (White 1975b, the Lynch Site (Davis et al. 1973; Sanford 1975), the Beebe Site (Follansbee 1975), and the Flanagan Site (fieldwork in progress).

Additional archaeological research conducted in the Willamette Valley in recent years includes an archaeological survey and test excavations at sites along Scoggin Creek north of McMinnville (Davis 1970b); an early radiocarbon date obtained from an aboriginal hearth found on the Luckiamute River (Reckendorf and Parsons 1971); an early upland hunting camp southeast of Portland (Woodward 1972); and a description and comparison of two sites, the Simons Site located in the extreme upper Willamette Valley and the Siuslaw Falls Site in the coast range to the west (Pettigrew 1975). Most recently, archaeological salvage excavations were conducted at an early floodplain site (35MA9) near Salem (Richard M. Pettigrew, personal communication).

The Archaeological Sequence

As a result of the large number of archaeological projects that have been conducted in the Willamette Valley, the general outlines of the area's prehistory are relatively well known. A tentative chronology consisting of five major periods of occupation was proposed by White (1974a). In the synthesis presented here, this same sequence of periods, with only minor temporal adjustments to incorporate more recently obtained information is used to describe the archaeological record in the Willamette Valley. Each period will be briefly described in terms of its cultural content and its chronology. The relationship of these periods to established climatic and floral sequences is shown in Fig. 36.

Period I (11,500 TO 8000 Years Before the Present)

The earliest suggestions of human presence in the Willamette Valley have been found at the Lebanon Site (Cressman and Laughlin 1941), the Templeton Site (Cressman 1947), and two localities where isolated surface finds of early artifacts were made (Alleley 1975). The evidence, some of which is highly controversial, suggests that people were present in the Willamette Valley between 11,500 and 8000 years ago.
Fig. 36. Willamette Valley Archaeological Periods and Environmental Sequences.
<table>
<thead>
<tr>
<th>YEARS B.P.</th>
<th>PERIOD</th>
<th>CLIMATIC SEQUENCE</th>
<th>FLORAL SEQUENCE</th>
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<tr>
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<td>PERIOD V</td>
<td>LATE POST GLACIAL</td>
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<tr>
<td>1000</td>
<td>PERIOD IV</td>
<td>cool and moist</td>
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<td>western hemlock</td>
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<td>3000</td>
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<tr>
<td>4000</td>
<td>PERIOD III</td>
<td>HYPSITHERMAL</td>
<td>oak maximum</td>
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<td>6000</td>
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<tr>
<td>8000</td>
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<td>EARLY POST GLACIAL</td>
<td>lodge pole pine</td>
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<td>9000</td>
<td></td>
<td>cool and moist</td>
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<td>10000</td>
<td>PERIOD I</td>
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<td>douglas fir</td>
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<td>spruce fir</td>
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At the Lebanon Site, Cressman and Laughlin (1941) reported the recovery of a bone artifact in association with fossilized mammoth bones. Since mammoth became extinct in the New World some 10,000 or more years ago, the finding of artifacts with their bones is an indication of great age for the human presence. However, subsequent thin-section analysis of the artifact, conducted in order to determine the nature of the soil deposited in its exposed cellular structure, indicated that the tool came from the top brown bed (upper 48 centimeters) of the deposit, while the mammoth remains were confined to an underlying bluish clay stratum. Thus, the artifacts are probably not as ancient as the bones themselves. A stone specimen, described as a chisel, was also reported to have been found with the mammoth bones, but the object is very crude and problematical at best. It may not be an artifact at all.

Association of artifacts with mammoth remains was also reported just 18 miles away at the Templeton Site (Cressman 1941). In this case two large lanceolate projectile points were found in the sidewall of a drainage slough along with several mammoth vertebrae, a tooth, and part of a tusk. Unfortunately, the association of these artifacts with the mammoth remains is hearsay, since they were originally discovered in 1895 by an amateur fossil hunter but not reported until a half-century later. Again, the projectile points may not be of the same ages as the bones, but they do appear to be of early types. They are large lanceolate spear points which resemble the Eden and Scottsbluff types, Carbon-14 dated in the Great Plains to the period between 9000 and 7000 B.P. (Wormington 1964:106).

In 1959 a classic Clovis fluted point was recovered from the surface of gravels deposited by the Mohawk River (a tributary of the McKenzie) approximately five miles northeast of Springfield in the Upper Willamette Valley (Alleley 1975). The specimen had been rolled and abraded, apparently as a result of stream action. Another Clovis point is said to have been found in the vicinity of Cottage Grove in 1935. This specimen has been donated to the Museum of Natural History, University of Oregon (David L. Cole, personal communication). Clovis points have previously been found in the Pacific Northwest (Osborne 1956), but always, as in this case, in undatable surface contexts. These finds are nevertheless important because Clovis fluted points from Carbon-14 dated sites on the Great Plains and in the Southwest all range in age between 11,000 and 11,500 years B.P. (Haynes 1971), and when found in buried contexts, quite often occur in association with the bones of extinct megafauna, usually mammoth. In the absence of more direct dating information on the age of Clovis points in the Pacific Northwest, this same time bracket may be reasonably applied to the northwestern specimens as well.

The actual dates of this early period in Willamette Valley prehistory obviously are not well defined. White (1975a:56) originally suggested a date of 10,000 B.P. for the beginning of this period. In view of the finding of Clovis fluted points in the Willamette Valley,
however, an initial date of 11,500 B.P., the earliest date for Clovis points on the Great Plains and in the Southwest is more reasonable. From an analysis of pollen types associated with mammoth remains found near Silverton (no artifacts were associated), Hansen and Packard (1949:467) have shown that mammoths were present in the Willamette Valley when environmental conditions were cooler and moister than they are at present, probably about 10,000 years ago, near the end of the last glacial age. A lower limiting date of 8000 B.P. for this earliest period of human occupation is suggested on the basis of correlations between the archaeological complexes of the following period in the Willamette Valley with archaeological complexes observed elsewhere in the Pacific Northwest.

Period II (8000 to 6000 Years Before the Present)

Period II in Willamette Valley prehistory is presently defined on the basis of components at only two sites: Cascadia Cave (Newman 1966) and the Geertz Site (Woodward 1972). Both of these sites are located on the eastern edge of the valley, in the foothills of the Western Cascades.

The initial occupation at Cascadia Cave is Carbon-14 dated to 7910 B.P. (Newman 1966:23). The upper levels of the cave were badly disturbed, and detailed stratigraphic data on the distribution of the approximately 400 artifacts recovered are not published. The report does indicate, however, that large leaf-shaped projectile points (sometimes referred to as "Cascade points") were the only type represented in the lower 90 centimeters of the deposit. In the upper levels, thick side-notched points of a type referred to as Northern Side-notched or Cold Springs Side-notched also are found with the leaf-shaped points. The age of the earliest large side-notched points in the Pacific Northwest is placed between 6000 and 7000 B.P. based on their Carbon-14 dated occurrence at Cascadia Cave and elsewhere (Newman 1966:25; Nelson 1969:26-27). Large ovate knives, end and side scrapers, and modified flakes were also found in large numbers in Cascadia Cave. Also included in the assemblage are drills, manos and metates, and edge-ground cobbles. No modified bone tools were found, but two antler tines were apparently used as flakers.

Animals hunted by the inhabitants of Cascadia Cave include deer, elk, marmots, rabbits, weasel, and an unidentified species of bird (possibly grouse). Nearly all of the long bones from deer and elk exhibit splintered ends, probably the result of attempts to extract marrow. The only floral remains recovered at Cascadia Cave were fragments of hazelnuts, which were found in the upper half of the deposit. Judging from the faunal and floral remains, Newman suggests that Cascadia Cave was occupied on a seasonal basis, probably during
the spring and summer. The utilization of Cascadia Cave as a base for hunting and gathering activities is believed to have continued until approximately 3000 B.P. (Newman 1966:31).

A second locality occupied during Period II is the Geertz Site, located in the foothills of the Cascade Range some 20 miles southeast of Portland (Woodward 1972). Stone flaking debris and artifacts are scattered over an area some five acres in extent; the cultural deposit is very shallow, less than 20 inches in depth. Several hundred artifacts were recovered during fieldwork at the Geertz Site, including 54 projectile points. Thirty-seven points were sufficiently complete to classify, and all were of the large leaf-shaped Cascade type. An age between 8000 and 6000 B.P. seems justified for the site, based on Newman's (1966:25) observation that at Cascadia Cave, large leaf-shaped points were the only type represented until around 6000 years ago. The Geertz Site appears to have been a locus for hunting activities, as a large amount of stone-working debris and numerous incising, perforating and scraping tools were found. Notably absent at the Geertz site were milling stones, which are commonly associated elsewhere with the utilization of hard seeds and nuts.

The assemblages from the two archaeological sites in the Willamette Valley occupied during Period II compare closely with those from contemporary early cultures found elsewhere in the Pacific Northwest which have been assigned to a "Cascade Phase" (Leonhardy and Rice 1970). These assemblages seem to indicate a subsistence pattern with a primary emphasis on the hunting of large game animals, supplemented by some seasonal plant collecting and hunting of smaller mammals and fowl. The Period II assemblages from the Willamette Valley, however, lack a number of traits found at contemporary sites elsewhere. For example, atlatl weights and Olivella shell beads have not been found, and bone artifacts, plentiful in assemblages elsewhere dating from this time span, are very rare in Willamette Valley sites. Subsistence practices also appear to have been slightly different, in that there is no evidence for the utilization of river mussels or fish by the inhabitants of the Willamette Valley during this period.

Period III (6000 to 2200 Years Before the Present

Currently, Period III in the Willamette Valley is known from components at six archaeological sites on the Willamette River floodplain: the Lingo Site (Cordell 1967, 1975), the two Benjamin Sites (Miller 1970, 1975), the Hurd Site (White 1975b), the Flanagan Site (excavation in progress), and 35MA9 (Pettigrew, personal communication). Sites located in the area of the Fall Creek Dam Reservoir, while not Carbon-14 dated, were also probably occupied during this period (Cole 1968).
During Period III, the large leaf-shaped and side-notched projectile points characteristic of the preceding period are largely replaced by a variety of smaller, corner-, side-, and base-notched points. The large leaf-shaped and side-notched points do, however, persist in small quantities and continue to occur as a minor part of the artifact assemblage. Ground stone implements--mortars and pestles--appear for the first time in assemblages from this period. Also characteristic are large basalt knives and crude scrapers and chopping tools. In general, the lithic technology observed in these assemblages is not refined. Basalt is the predominant lithic material used and most chipped stone artifacts are poorly executed on easily produced primary flakes.

Luckiamute Hearth, with a Carbon-14 date of 5250 B.P., is the earliest dated cultural feature from a locality on the Willamette Valley floodplain (Reckendorf and Parsons 1966). The hearth, exposed by soil scientists in the cutbank of the Luckiamute River a few miles from its confluence with the Willamette, had no associated artifacts, but five charred acorns were found. Not too surprisingly, this early evidence for the utilization of acorns coincides with the period of warmer and drier climatic conditions known as the Hypsithermal (Heusser 1960), during which time oak trees were at their maximum distribution in the Willamette Valley (Hansen 1947; Detling 1960).

Information on the kind of dwelling constructed by the inhabitants of the Willamette Valley during this period was found at the Hurd Site, where a single large pithouse and associated features--postholes, a central hearth, and a possible cache pit--were discovered (White 1975b:148-151). No artifacts were found within the housepit, but the earliest Carbon-14 dates from the Hurd Site, approximately 2800 B.P., were associated with this structure.

This is the earliest period in Willamette Valley prehistory for which there is some information available on mortuary practices. Five burials recovered from the lower levels of the Lingo Site can be attributed to this period. All five burials were flexed inhumations, with heads oriented to the west, occurring in simple pits. Only one of the burials possessed accompanying grave goods, a pestle and a beaver mandible found near the pelvic regions and a fragment of a marine shell pendant near the ribs (Cordell 1975:284). A Carbon-14 date of 4130 B.P. was obtained from a firepit in one of the lowermost levels at the Lingo Site (Cordell 1975:278), providing a rough estimate of the age of the burials found there.

Near the end of Period III there was a transition from the warmer and drier Hypsithermal interval to the cooler and moister climate currently characteristic of the Willamette Valley. Coinciding with this change in climate was a diminution of the extent of oak forest in the valley, and some resurgence of coniferous trees, leading to the vegetation patterns observed in early historic times. The
earliest evidence for utilization of camas, known to be a staple of the Kalapuya Indians of the area, is found during this period. A Carbon-14 date of 2320 B.P. was obtained from carbonized camas bulbs found in a firepit in the lower levels of one of the Benjamin Sites (Miller 1975:321). With the addition of acorns and camas to their diets, the inhabitants of archaeological sites occupied during Period III apparently had begun to utilize the most important of the economic resources observed in the ethnographic period.

Period IV (2000 to 200 Years Before the Present)

This is the best known period in Willamette Valley prehistory; most of the sites in the valley that have been excavated so far contain components that were occupied after approximately 2000 years ago. This period is at present defined on the basis of components at some 25 archaeological sites; these include the upper levels at six sites; all occupation levels at 14 sites; and the pre-contact aspects at five sites.

The artifacts most diagnostic of this period are a variety of small, delicately-made projectile points. Both stemmed and unstemmed forms occur; many of the specimens are deeply serrated. The small size of these points indicates that the bow and arrow had replaced the atlatl and dart as the basic hunting weapon. Spokeshaves, reamers, denticulates, a variety of scraper types, and mortars and pestles are also highly characteristic of artifact assemblages of this period. Large unifacial and bifacial chopping tools continue to be common. For the first time, artifacts made of bone and antler are present in large numbers. Antler artifacts include digging stick handles, flakers, ear plugs, and fleshing tools. Artifacts made from bone include harpoon heads, projectile points, whalebone clubs, tubular beads, disc beads, poniards, and ear and nose plugs.

Animals known to have been hunted during this period include deer, elk, squirrel, beaver, and rabbit. The abundance of ground stone tools--mortars and pestles--indicates a heavy reliance on floral resources such as nuts and seeds. For the first time there is evidence of fishing by the prehistoric inhabitants of the Willamette Valley. The presence of fish vertebra and grooved pebbles believed to be weights or sinkers at the Fuller and Fanning Sites on the Yamhill River (Laughlin 1943:220) is consistent with the ethnographic reference that the Yamhill band of the Kalapuya Indians caught salmon in large numbers and prepared them for storage by drying (Coues 1897:811). This suggests that at least some salmon were making it over the falls at Oregon City and into the tributaries of the Willamette River. There is also evidence for the first time--though it is scanty--of the utilization of freshwater mussel as a food source (Laughlin 1941:151; 1943:225; Davis et al. 1973:13).
The basic mortuary pattern observed in Period III, of flexed inhumations in simple pits, continues to be the usual method of interment; this general mortuary pattern is seen throughout the Columbia Plateau at this time (Sprague 1971). The inclusion of grave goods becomes more common and elaborate; of the 73 burials attributable to this period, twenty-four (34%) possessed accompanying grave goods. The most common items occurring with burials were marine shell beads, especially those made from Dentalium, Olivella, and Glycymeris shells, and antler wedges, bone awls, and antler digging stick handles. Less frequent were projectile points, mortars and pestles. At the Fuller Site, animals (birds and dogs) were occasionally interred with the human burials; at the Fanning Site a "killed" mortar was found in association with a male burial (Laughlin 1943). A single burial at each of the Fuller and Fanning Sites exhibited fronto-occipital deformation of the cranium, a practice derived from the neighboring Chinook Indians on the lower Columbia River in relatively recent times (Collins 1951:99-100). It is possible that these two burials are post-contact in age, but the grave goods accompanying the skeletons did not include historic materials. Two instances of atypical mortuary practices deserve mention. At the Lynch Site a mass burial consisting of one primary and three secondary interments was discovered in a bell-shaped pit (Sanford 1975:251), and at the Fuller Site, Laughlin (1943:221) recovered a burned fragment of a human skull. Although Laughlin warns against accepting this as evidence of cremation, the practice was ethnographically documented among the Santiam band of the historic Kalapuya Indians (Jacobs et al. 1945:74).

Coast-interior trade becomes intensive during Period IV, most of it probably via the Columbia River. Ornaments manufactured from marine shells traded inland from the coast are almost nonexistent prior to this time, the single marine shell pendant from a burial at the Lingo Site being the only earlier specimen known (Cordell 1975:284). The most common items involved in the coast-interior trade were marine shells, including Dentalium, Olivella, Littorina, Glycymeris, Pelecypod, Acmae, Paphia staminea, Haliotis, Lpitonium, and Turitella. The shells usually occur in the form of necklaces, bracelets, and anklets. Other items associated with the coast-interior trade were whalebone clubs and composite harpoon points. Waisted obsidian blades, a single example of which has been found at both the Shedd (Laughlin 1941) and Fuller Sites (Laughlin 1943), may represent either further evidence of trade with the Oregon Coast, or alternatively, contact with aboriginal groups in northern California. These blades are very similar to specimens found at the Gold Hill burial site in southern Oregon (Cressman 1933), and were common among the Hupa, Yurok, Karok, and Wiyot Indians of northern California, as well as among the Indians of the southern Oregon Coast (Collins 1951:115-117). The increase in coastal trade which occurs during Period IV may be due to the expansion of Chinook commercial activity up the Columbia River to the vicinity of the
Wishram Indians at The Dalles. In this respect it should be noted that the Fuller and Fanning sites in the lower Willamette Valley exhibit much stronger extra-valley affinities than do sites located elsewhere in the valley. On the other hand, White (1975a:97-98) suggests that this late spread of Columbia River and coastal traits into the Willamette Valley may have been connected in some way with the influx of European goods into the lower Columbia River region within the last 300 years. Unfortunately, the archaeological record in its present form is not adequately dated to resolve the questions raised by these suggestions.

Evidence of possible contact with aboriginal peoples in the Great Basin to the east of the Willamette Valley exists in the form of a few Great Basin projectile point types found in archaeological sites west of the Cascades. Desert Side-notched projectile points, which appear sometime after A.D. 1100-1200 in the Great Basin (Hester and Helzer 1973:10), have been found at several late prehistoric sites in the Willamette Valley (White 1975a:95-96), as well as at Baby Rock Shelter (Olsen 1975:478). A single specimen resembling the Great Basin point type known as Surprise Valley split-stem has also been recovered in the Willamette Valley (White 1975a:95).

Period IV can be seen as the culmination of a gradual development of aboriginal culture within the Willamette Valley. There is a more or less continuous occupation of several sites on the Willamette Valley floodplains from Period III to Period IV, although the later components at these sites differ considerably from the earlier ones. Most notably, the later occupations are characterized by a greater frequency of artifacts, and by a wider range of artifact types, than the earlier components. The assemblages from Period IV also contain a higher proportion of specialized tools, such as gravers, reamers, and spokeshaves, than the occupations dating from the previous period. In general, then, the artifact assemblages from Period IV are more elaborate and contain more exotic traits than those from Period III; and this distinction seems to be most evident in those sites occupied just prior to European contact.

Greatly expanded trade, reflected in the introduction of new commodities and the abundance of trade goods, is one of the most fundamental characteristics of Period IV. The evidence for increased intersocietal exchange of products from distant sources appears primarily in the form of mortuary offerings of shell ornaments. It is possible to infer some status differences between members of the aboriginal communities from observed variations in the grave goods accompanying burials. Also during Period IV, more specialized tool kits suggest an elaboration of the people's adaptation to the local environment, resulting in the emergence of a distinguishable regional tradition.
Period V (Ethnographic Times)

This period includes protohistoric and early historic times in the Willamette Valley. It encompasses the archaeological manifestations of the culture of the Kalapuya Indians from the time of the first European contact until their relegation to reservations in the late 1800's. Collins (1951:103-112) has established a date of approximately 200 B.P. (A.D. 1750) for the first diffusion of European trade goods into the Willamette Valley.

Period V occupations are only demonstrated in the uppermost levels of five sites: the Fuller and Fanning mounds (Laughlin 1943), the Harrisburg Site (Laughlin 1941), Site 35LA118 (White 1975a:73,107), and the Gettings Creek sites (White 1975a:71,105). The low number of sites occupied at this time is consistent with the brief interval of time involved, and the known decimation of the aboriginal inhabitants of the valley as a result of European diseases.

Artifacts specifically diagnostic of Period V include European trade goods such as copper ornaments and bracelets, copper trombac buttons, glass trade beads, iron nose plugs, and iron knives. This list includes only items actually found in archaeological sites.

Seven burials from two Willamette Valley archaeological sites can be assigned to Period V because of the presence of historic artifacts among the grave goods. Six of these burials are from the Fuller Site (Laughlin 1943) and the other is from the Harrisburg Site (Laughlin 1941). Five of these burials follow the traditional mortuary pattern, with the skeleton flexed and the head oriented to the west. One of the burials, also flexed, has the head oriented to the east; another burial had been disturbed and its position could not be evaluated. All the burials were of adults with the exception of a single adolescent female. Four of the seven skeletons (two male and two female) exhibited cranial deformation, a trait usually associated with a preferred social position (Collins 1951:100). It should be noted that historic materials were associated with only six of the 40 burials recovered from the Fuller Site, and Laughlin (1943:225) suggests that these burials were intrusive into a midden occupied prior to historic contact. This seems possible, although an alternative explanation may be that during the initial period of contact with Europeans (via the Columbia River), rare and prized items of iron, copper, brass, and glass constituted wealth or prestige goods that were concentrated in the hands of a relatively few individuals of high status (Woodward et al. 1975:402). Stratigraphic data from the Fuller Site which would resolve this question were, unfortunately, not recovered.
The Upper Willamette Valley Settlement-Subsistence System

In 1970 an extensive archaeological reconnaissance of the Upper Willamette Valley resulted in the recording of 96 sites. Information from these sites, as well as others already known, was used by White (1974, 1975a) to develop a tentative settlement-subsistence model for aboriginal land-use in the Upper Willamette Valley. He delineated four broad environmental zones within the valley and suggested that sites located in each zone would have been the locus of different subsistence activities and would have been occupied at different times of the year (Fig. 37).

Valley edge sites are located above 500 feet in elevation on slopes and ridges bordering tributary valleys. They are commonly adjacent to small springs or spring-fed streams in Douglas-fir areas. These were probably task-specific sites occupied during late spring through the summer. Activities at these sites probably included the hunting of large and small game, hide preparation and processing, tool manufacturing and food grinding.

Narrow valley plain sites are generally located on leading edges of low terraces above narrow floodplains bordering high-gradient tributaries. Oak savannas and marshes are the predominant setting. Assemblages from these sites also suggest task-specific use. Primary activities at these sites were probably food grinding, small game hunting, and wood working.

Primary floodplain sites are located on broad flat floodplains of the Willamette River and most are subject to periodic flooding. Prairie grasslands and marshes were the predominant setting. Most of these were probably also task-specific sites, occupied during the late spring and early summer. Some of these sites may also have been base camps occupied more or less throughout the year. The wide variety of activities that may have been performed at these sites include large and small game hunting, hide preparation and processing, camas gathering and processing, tool manufacture and wood working.

Riparian sites are adjacent to large perennial tributary streams and are characterized by considerable mound build-up. Vegetation around these sites includes cottonwood, willow and maple trees. These sites were used as base camps and were occupied more or less throughout the year. The primary activities performed at these sites appear to have been small game hunting and tool manufacture.

The functional and spatial relationships between sites of the various types are depicted in Fig. 37. A subsistence-settlement pattern consisting of a central base camp surrounded by a series of task-specific sites is suggested. The possibility also exists that some aboriginal groups in the Willamette Valley may not have maintained
Archaeological research in the Lower Columbia Valley—that area along the Columbia River extending from The Dalles to the Pacific Ocean—has a long history. Most of the research has been conducted in salvage situations, however, and much of the information remains unpublished, except in the form of preliminary reports to federal and state agencies. In the following review of archaeological research in the Lower Columbia Valley, the emphasis will be primarily, though not exclusively, on a review of published literature that is available to the general public. Additional references are supplied by Pettigrew (1977). Four distinct periods in the conduct of archaeological research in the Lower Columbia Valley have recently been recognized (Cole and Pettigrew 1976: Pettigrew 1977).

The Early Amateur Period (before 1923) began with the entry of Euroamericans into the area and continued into the mid-1920's. A number of early historical accounts, notably those of Lewis and Clark (Thwaites 1905), mention the remains of old Indian camps and villages. Many of the descendants of early White settlers in the area still have collections of aboriginal artifacts obtained by their ancestors. The first reports describing artifact collections from the Lower Columbia Valley were published during this period (Eels 1889: Smith 1906).

The Early Professional Period (1924-1950) began with the first investigations in the Lower Columbia Valley by professional archaeologists. Archaeological research during this period was primarily concentrated around The Dalles and the Columbia Gorge area. Serious research began with a study of petroglyphs near The Dalles (Strong and Schenck 1925), and shortly thereafter, an ambitious excavation project was undertaken near The Dalles by the University of California (Strong, Schenck and Steward 1930). Other publications resulting from this early work include articles containing the Lower Columbia art style (Steward 1927) and a new type of artifact found at The Dalles (Steward 1928).

During the construction of Bonneville Dam in the Columbia Gorge during the 1930's, Herbert Krieger of the Smithsonian Institution investigated some of the sites that were to be affected by the project and, in addition, acquired collections from local relic collectors in the area for study (Krieger 1927, 1928, 1935; Phebus 1974). In addition to Krieger's work, L.S. Cressman of the University of Oregon conducted limited fieldwork in the Bonneville Dam area in 1935 (Cole and Southward 1971). Cressman also conducted salvage excavations at Site WS 1 near the downstream end of the Long Narrows of the Columbia
Fig. 37. Postulated Upper Willamette Valley Subsistence-Settlement System (Period IV). from White (1975a).
TYPE I
VALLEY EDGE
Hunting - Spring - Summer
Grinding - Spring - Summer

TYPE II
NARROW VALLEY PLAIN
Grinding - Spring - Summer

TYPE III
PRIMARY FLOOD PLAIN
Camas - Spring - Summer
Hunting - Fall - Winter

TYPE IV
RIPARIAN
Hunting - Fall - Winter
Grinding - Spring - Summer
Fishing - Year Around
River at The Dalles in the 1930's, when highway construction threatened a portion of the site (Drews 1938). This site figured prominently in investigations during the following period.

The Reservoir Survey Period (1951-1965) was initiated by archaeological salvage work associated with the construction of The Dalles Dam. The first reports, describing the results of a survey and preliminary excavations, were prepared by Joel Shiner of the Smithsonian Institution River Basin Surveys (Shiner 1951, 1952, 1953). In 1952, the University of Oregon, under contract with the National Park Service, began an archaeological salvage program directed by L.S. Cressman, excavating threatened sites on the Oregon side of the Columbia River in The Dalles Dam Reservoir area. This program continued until 1957 and provided the basis for several reports (Cressman and Emmons 1953; Cole 1954; Cressman et al. 1960). The most important result of this work was the discovery and excavation of the Five Mile Rapids Site (WS 4), which contained an archaeological sequence extending back to around 10,000 years ago. At the same time, the University of Washington also maintained a contract with the National Park Service to salvage archaeological sites on the Washington side of The Dalles Dam Reservoir area. This work, directed by Douglas Osborne, extended over three field seasons, and resulted in numerous articles and reports (Caldwell 1956, 1957; Butler 1955, 1957a, 1957b, 1959, 1960, 1961, 1962, 1963, 1964, 1965; Weld 1959; Garner 1963). The most intensive excavations were conducted at Wakemap Mound, a major village site containing an archaeological record extending from historic times back to around A.D. 800.

During this same period, the University of Washington also conducted a number of archaeological projects on the Lower Columbia River downstream from The Dalles (Bryan 1957, 1958; Tuohy and Bryan 1958-59; Warren 1958-59, 1960); and Brown (1960) analyzed a collection of projectile points obtained from sites in the area around the mouth of the Columbia River. An amateur archaeologist also published two articles on the archaeology of the Lower Columbia Valley during this period (Strong 1959, 1961).

The Recent Period of archaeological research in the Lower Columbia Valley began in the late 1960's after almost a decade of inactivity. Most of the recent research has been concentrated in the Portland-Vancouver area and in the Columbia River Gorge. The University of Washington has conducted a number of surveys and salvage excavations which have led to the discovery and documentation of several sites in the Vancouver area (Dunnell et al. 1973; Jermann et al. 1975). At the most important of these, the Kersting Site, two and possibly three rectangular house structures were found, one of which yielded a Carbon-14 date of 2115 B.P.
The Oregon Archaeological Society has reported the results of several survey and excavation projects in the Portland-Vancouver area (Slocum and Matsen 1968; Warner and Warner 1975; Hibbs and Starkey 1974; Starkey 1976). A book by a member of the Oregon Archaeological Society summarizes other activities of the Society in the area (Jones 1972).

Other archaeological research in the Portland-Vancouver area includes a report on the Geertz Site, an early upland hunting camp (Woodward 1972); a doctoral dissertation dealing with the Clackamas River drainage (Woodward 1974); and a doctoral dissertation by Pettigrew (1977) in which a cultural sequence for the Lower Columbia Valley is proposed.

University of Washington archaeologists have also been excavating sites to be affected by the remodeling of Bonneville Dam (Dunnell and Lewarch 1974a, 1974b; Lewarch and Reynolds 1975; Dunnell et al. 1976a, 1976b). Also as part of the Bonneville Dam alteration project, the University of Oregon excavated at several sites that would be affected by raising the Bonneville pool (Cole and Southard 1971; Cole 1974).

Archaeological research in the area around the mouth of the Columbia River has lagged considerably behind that in other portions of the valley, as there is only one published report on investigations in that area (Kidd 1967).

The long history of archaeological research in the Lower Columbia Valley has resulted in the realization that there was a very long, continuous, and intensive aboriginal occupation of the area. Two culture-historical frameworks have been proposed for ordering archaeological manifestations in the Lower Columbia Valley. The first sequence, developed by Cressman et al. (1960), is most significant for the information it provides concerning early Columbia River cultures. More recently, Pettigrew (1977) has proposed a sequence covering the last 2600 years of Lower Columbia Valley prehistory.

Cultural Sequence at The Dalles

The first culture-historical sequence for the Lower Columbia was based primarily on the results of excavations at the Five Mile Rapids Site (NS 4), at The Dalles (Cressman et al. 1960). This sequence consists of three main stages: Early, Transitional and Late (see Table 5).

The Early Stage has three subdivisions. The Initial Early is characterized by a limited artifact inventory, both in numbers and variety of artifacts found. Blades, scrapers, and a few bone tools
comprise the entire assemblage. The Full Early is characterized by a rich bone and antler industry, burins, bolas, blades, enormous numbers of salmon vertebrae, bird and animal bones, and projectile points representative of early styles. The Final Early sees a gradual decline and disappearance of the bone and antler industry, the disappearance of the bird, animal and fish bones, burins and bolas. A Carbon-14 date of 9785 B.P. was obtained from charcoal gathered from throughout the earliest stratum of the cultural deposit, and this provides a general idea of the age of the Early Stage at the site.

The Transitional Stage is characterized by an assemblage consisting of only a few projectile points and some non-diagnostic artifacts such as choppers and scrapers. This stage appears to be a time of light occupation in comparison with the Full Early. The Transitional Stage is bracketed by Carbon-14 dates of 6090 B.P. and 7875 B.P.

The Late Stage begins after 6090 B.P. and extends into historic times; this stage also has three subdivisions. The Initial Protohistoric is characterized by an increased use of the site and the appearance of new projectile point styles. The Full Protohistoric is characterized by a wide variety of projectile points, carved stone, some carved bone, pipes, ornaments and other items. The Contact-Historic is characterized by the inventory of the Full Protohistoric plus trade materials, especially copper in the form of beads, iron knives, firearms, hatchets, and fishhooks, strike-a-lights, gun flints and other items.

The Five Mile Rapids Site (WS 4) offers the best known record of early Columbia River cultures, demonstrating that a riverine adaptation complete with salmon fishing began very early at The Dalles. It has been suggested that the Initial Early occupation of the site may date from as early as 11,000 years ago. The Transitional stage and the beginning of the Late stage are considered to be contemporary with the Altithermal climatic interval (referred to as the Hypsithermal in this study), a period of drying and warming climate which may have caused population movements out of more arid regions toward stabilized water and food supplies. The cultural efflorescence which occurred during the Late stage, as seen in the increased use of the site and the proliferation of artifact types, is attributed to stimulation from outside influences, the result of either contact with or in-migration of new aboriginal populations (Cressman et al. 1960:65-70).
Table 5. Cultural Sequence at The Dalles (after Cressman et al. 1960).

<table>
<thead>
<tr>
<th>Stage/Substage</th>
<th>Major Diagnostic Features</th>
<th>Temporal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Late Stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact-Historic</td>
<td>Historic trade materials</td>
<td></td>
</tr>
<tr>
<td>Full Protohistoric</td>
<td>Wide variety of point styles, carved mortars, carved pestles, bone carving, charm stones,</td>
<td>6090 B.P. - Historic</td>
</tr>
<tr>
<td></td>
<td>choppers, concave scrapers, beads, drills, notched sinkers, stone sculpture</td>
<td>Contact</td>
</tr>
<tr>
<td>Initial Protohistoric</td>
<td>Increased use of site; Appearance of new projectile point styles</td>
<td></td>
</tr>
<tr>
<td>Transitional Stage</td>
<td>Light occupation of site, small artifact assemblage, projectile points, choppers, scrapers</td>
<td>7875 B.P. - 6090 B.P.</td>
</tr>
<tr>
<td><strong>Early Stage</strong></td>
<td></td>
<td></td>
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<tr>
<td>Final Early</td>
<td>Decline and disappearance of bone and antler industry, disappearance of bird, animal and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fish bones, burins, and bolas</td>
<td></td>
</tr>
<tr>
<td>Full Early</td>
<td>Rich bone and antler industry, burins, bolas, blades, enormous numbers of salmon vertebra,</td>
<td>9785 B.P.* - 7875 B.P.</td>
</tr>
<tr>
<td></td>
<td>bird and animal bones, red ochre, early projectile point styles (non-stemmed or constricted, tapering stem varieties)</td>
<td></td>
</tr>
<tr>
<td>Initial Early</td>
<td>Limited artifact inventory, blades, scrapers, and bone tools</td>
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</tbody>
</table>

*First occupation estimated to be as early as 11,000 B.P. (Cressman et al. 1960:66).
Cultural Sequence on the Lower Columbia

The cultural sequence proposed by Pettigrew (1977) is based on limited excavations at seven sites in the Portland-Vancouver area. The sequence consists of two main phases, the later of which is divided into three subphases (see Table 6). The chronology is supported by a series of Carbon-14 dates.

The Merrybell Phase, estimated to date from 600 B.C. to A.D. 200, contains the following diagnostic artifacts: large, broad-necked projectile points, stemmed drills, flaked cylindrical bipoints, flaked crescents, graphite, perforated ground stone pendants, peripherally flaked pebbles, and atlatl weights.

The Multnomah Phase, estimated to date from A.D. 200 to 1835, is characterized by a low proportion of broad-necked projectile points and a high proportion of narrow-necked points. Artifacts diagnostic of this phase include mule-ear knives, self-handled heavy percussors, clay figurines, and incised clay tablets. The Multnomah Phase is divided into three sub-phases, designated Multnomah 1 through 3, which are distinguished from one another primarily on the basis of the relative frequencies of certain attributes.

The Multnomah 1 sub-phase is characterized by a large proportion of narrow-necked, stemmed projectile points. Of particular importance is the ratio between the frequencies of Type 7 and Type 9 points; in this sub-phase Type 7 is more frequent than Type 9. The relative proportion of notched netsinkers to perforated netsinkers is also diagnostic, as perforated specimens are quite rare and notched netsinkers are quite common in this sub-phase.

The Multnomah 2 sub-phase is characterized by the same types of projectile points as in the previous sub-phase, plus the addition of Types 12, 13, and 15. Also, the relative proportions of Type 7 and Type 9 points are reversed from Multnomah 1: now Type 9 becomes more frequent than Type 7. In this sub-phase, perforated netsinkers become much more frequent than previously, and notched netsinkers become very rare.

The Multnomah 3 sub-phase is distinguishable from the previous sub-phase only by the presence of copper tubes and historic trade goods. This sub-phase represents the period of contact between the aboriginal and Euroamerican cultures, and the sub-phase ends with the abandonment of the aboriginal way of life.

A detailed comparison of artifacts from The Dalles and the Portland-Vancouver locality indicates a strong similarity in the material culture of the two areas (Pettigrew 1977:341-351). The evidence so far available seems to support the idea that culture change took place in both areas at
Table 6. Cultural Sequence on the Lower Columbia. (After Pettigrew 1977.)

<table>
<thead>
<tr>
<th>Phase/Sub-phase</th>
<th>Major Diagnostic Features</th>
<th>Estimated Temporal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multnomah Phase</td>
<td>Smaller, narrow-necked point Types 7-16 predominate</td>
<td>A.D. 200-1835</td>
</tr>
<tr>
<td></td>
<td>Chord length of Type 5 uniface edge ('end scrapers') more frequently in smaller mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mule-ear knives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self-handled heavy percussors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clay figurines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incised clay tablets</td>
<td></td>
</tr>
<tr>
<td>Multnomah 3 Sub-phase</td>
<td>Historic trade goods Copper Tubes</td>
<td>A.D. 1750-1835</td>
</tr>
<tr>
<td>Multnomah 2 Sub-phase</td>
<td>Presence of point Types 12, 13 and 15 Point type 9 more frequent than Type 7 Perforated netsinkers</td>
<td>A.D. 1250-1750</td>
</tr>
<tr>
<td>Multnomah 1 Sub-phase</td>
<td>Point types 7-10 predominate Point type 7 more frequent than Type 9 Notched netsinkers</td>
<td>A.D. 200-1250</td>
</tr>
<tr>
<td>Merrybell Phase</td>
<td>Larger, broad-necked point types 1-5 predominate</td>
<td>600 B.C. - A.D. 200</td>
</tr>
<tr>
<td></td>
<td>Chord length of Type 5 uniface edge ('end scrapers') more frequently in larger mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stemmed grills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flaked cylindrical bi-points</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flaked crescents</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Graphite</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perforated ground stone pendants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peripherally flaked pebbles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlatl weights</td>
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</tbody>
</table>
approximately the same time. While the correlation of the two proposed sequences clearly needs further substantiation, together the sequences developed by Cressman et al. (1960) and Pettigrew (1977) provide a culture-historical framework for ordering the last 11,000 years or so of Lower Columbia Valley prehistory.

Most archaeological investigations conducted in the Lower Columbia Valley in the past have tended to concentrate on the larger sites. More recently, however, some efforts have been made toward identifying and understanding variability in the aboriginal settlement-subsistence systems. Using data compiled during their own survey as well as information accumulated by other archaeologists, Dunnell et al. (1973) were able to identify five basic functionally differentiated types of "activity clusters" on the Lower Columbia River floodplain. Briefly, these clusters (settlement/activity loci) can be described as follows (Dunnell et al. 1973:51-57):

1) Winter Domestic Clusters: large clusters which exhibit a considerable variety of functional tool types in their assemblages, suggesting that they represent domestic or residential units in which a diverse number of activities were performed. Rectangular housepits are typically associated with this cluster type. Such structures are ethnographically known to have provided shelter during the winter months (Ray 1938).

2) Secondary Domestic Clusters: large, functionally diverse assemblages lacking evidence of rectangular house depressions. The tool assemblage is in marked contrast to that of the winter domestic clusters, in that it contains an abundance of projectile points and small cutting tools and a lack of core tools. These clusters probably represent a type of domestic site occupied at some season other than winter when only small, temporary surface structures were erected.

3) Activity Area Type A: small clusters of cultural material containing a very narrow range of functional types. Projectile points, net sinkers, and other manufactured/formed tools are conspicuously absent. A single activity or set of closely related activities is hypothesized.

4) Activity Area Type B: small clusters of cultural material lacking any artifacts other than fire-broken rock. Again, a single activity or set of closely related activities is suggested.

5) Activity Area X: a small cluster of culturally modified material which, for lack of material, cannot be assigned to either of the two activity types noted above.
Based upon the spatial distributions of the various types of clusters within their study area, the authors suggest the existence of a "seasonal round" settlement/subsistence pattern in which the aboriginal population seasonally relocated itself in that microenvironment which offered the greatest availability of food resources at any given time. They conclude that the settlement/subsistence pattern they have defined was probably maintained over at least the last 2000 years (Dunnell et al. 1973).

The long history of archaeological research in the Lower Columbia Valley has resulted in the accumulation of a considerable amount of information on the prehistory of the area. Two culture-historical sequences have been proposed, which together provide a fairly sound framework for ordering archaeological complexes found in the area. The first substantive steps toward developing a subsistence/settlement model have also been made. Future research in the area will provide a more complete description as well as a better understanding of the aboriginal lifeways of the prehistoric inhabitants of the Lower Columbia Valley.

EAST OF THE FOREST--THE DESCHUTES RIVER VALLEY

The Deschutes River Valley is the first major drainage feature east of the Cascade Mountain Range. The Deschutes is a swift-flowing stream broken by many rapids and cascades; in many areas steep canyons and gorges have been cut into the basalt and andesite bedrock. Archaeological research conducted in this area indicates that the sandy floodplain and terraces of the Deschutes River Valley were used as locations for aboriginal settlements from a very early period.

The first archaeological research in the Deschutes River Valley was conducted in response to a report of artifacts discovered in a depositional context suggesting considerable antiquity (Cressman 1937a). During construction activities at Wickiup Dam Site No. 1 on the upper Deschutes River, two stone knives or scrapers were recovered from below deposits of volcanic pumice and water-laid soil and gravel. The pumice was believed to be derived from the climactic eruption of Mount Mazama which formed the Crater Lake caldera in the Cascade Range. At the time of the discovery, the eruption of Mount Mazama was believed to have taken place between 10,000 and 14,000 years ago, but it is now Carbon-14 dated to approximately 7000 B.P. (Kittleman 1973). Although additional excavations were conducted in the area where the knives were discovered, no additional specimens were found. One of the knives was made of obsidian, the other of fine-grained basalt. Both were thin ovate forms shaped by the removal of large shallow flakes; the edges of the specimens were only minimally retouched. These knives exhibited notably less skillful workmanship than do specimens which date from more recent times.
A few years later, artifacts were found in a similar depositional context—beneath volcanic pumice attributed to Mount Mazama—at a site located on the south end of Odell Lake in the Deschutes National Forest (Cressman 1948). Construction workers excavating the foundation and basement of a resort lodge found several projectile points beneath a bed of pumice. Additional excavations by archaeologists resulted in the recovery of several more projectile points, some scrapers, a hammerstone, a large number of flakes, and charcoal. Several types of projectile points are represented in the collection, most of which exhibit a generalized leaf-shaped form. Cressman (1948:58) interpreted the archaeological remains as those of a summer hunting camp.

The next archaeological research in the Deschutes River Valley was conducted by the Smithsonian Institute River Basin Survey program, Columbia Basin Project. The results of an archaeological survey in the area around the proposed Benham Falls Reservoir, some 18 miles south of Bend, were reported by Osborne (1950). A total of 31 sites were recorded, all of which were surface manifestations; no sites with midden deposits, and no rockshelters or petroglyphs, were found. Almost without exception the sites throughout the reservoir were located on the first gravelly terrace above the floodplain, or on remnants within the floodplain. Only a few were on the second terrace above the floodplain. A small collection of 138 artifacts was obtained by surface-collecting these sites. The majority of the artifacts recovered were projectile points, knives or blades; other specimens included scrapers, choppers, a few ground stone tools; and lithic debitage. Obsidian was by far the preferred lithic material, but artifacts made of chalcedony and basalt were also found.

The artifacts from the Benham Falls Reservoir area included specimens similar to those recovered from below Mount Mazama pumice at the Wickiup Dam Site (Cressman 1937a) and Odell Lake (Cressman 1948); similarities were also noted with artifacts from nearby sites on Lower Klamath Lake (Cressman 1942) and in the northern Great Basin (Cressman 1936; Cressman et al. 1940). Osborne (1950:115) concluded that the Benham Falls Reservoir area was inhabited only sparsely, presumably by small hunting and gathering bands. He suggested that these bands may have followed a seasonal transhumance subsistence pattern, ranging from the semi-desert east of the Deschutes River to the mountains of the Cascade Range to the west.

During the 1960 and 1961 summer field seasons, an archaeological survey was conducted along the route of a proposed natural gas pipeline right-of-way which passed through the Deschutes River Valley (Daugherty and Maljory 1960; Combes 1961). Three sites were recorded in Deschutes County and three in Jefferson County. Limited test excavations were conducted at all six sites; four were primarily surface manifestations, but the other two contained substantial midden deposits. The relatively few artifacts recovered during the test excavations were generally similar to those obtained from the nearby Benham Falls
Reservoir area and from archaeological sites in the northern Great Basin.

Archaeological salvage excavations were conducted during the summer of 1961 at the Lava Butte Site (35PE33), about 10 miles south of Bend. This site featured a deep midden deposit which extended to a depth of approximately three feet. It was stratified, consisting of three layers of unconsolidated wind-blown sediment overlying basalt bedrock. A total of 1742 artifacts were recovered from the deposit. Most of the specimens comprising the assemblage are projectile points, scrapers, knives and drills; but milling stones, abrading stones, choppers and hammerstones were also recovered. Bone tools found include awls and a flesher. The artifacts from the Lava Butte Site are said to most closely resemble those from the Columbia Plateau, but similarities are also noted with specimens from the northern Great Basin. No radiocarbon dates were obtained, but the author suggests a period from A.D. 1500 to A.D. 1800 for the occupation of the site (Ice 1962:50). The preponderance of projectile points and scrapers in the artifact assemblage suggests that the site was primarily a hunting camp, although the collecting and processing of seeds, berries and other plant foods also took place there, as indicated by the presence of several milling stones.

The results of an archaeological survey and salvage program conducted in the Round Butte Dam Reservoir area in Jefferson County are summarized by Cressman (1963). The reservoir is located at the confluence of the Metolius and Crooked Rivers with the Deschutes River, approximately fifteen miles west of Madras. Forty-eight sites were located and examined during the field seasons of 1961 and 1962. A detailed description of the subsequent fieldwork at these sites is provided by Ross (1963).

Surface collections and/or excavations were conducted at 32 of the 48 sites recorded. Three types of sites occurred: rockshelters (12), lava tubes (4), and open sites (16). Twenty-one sites occurred near the river while the remaining 11 were situated anywhere from 500 feet above the river up to the rim rock above. One of the open sites featured rock walls which had been formed into four small rooms. Another open site was situated around a boulder bearing a set of petroglyphs. A third site consisted only of three rock cairns, believed to have been made in conjunction with aboriginal vision quest rites. A Carbon-14 date of 7990 B.P. from a large rockshelter (35JE41) indicates that the Deschutes River Valley has a long history of aboriginal occupation. Dates of 2675 B.P. from one small rockshelter (35JE1) and 2650 B.P. from another (35JE2) are associated with more recent occupations of the area. The oldest Carbon-14 date confirms the presence of man in the Deschutes River Valley at a very early period as first suggested by the Wickiup Dam and Odell Lake Sites.
Based on the fieldwork in the Round Butte area, Ross (1963) hypothesizes that in prehistoric times the Deschutes River served as a geographical or territorial boundary. The sites on the west side of the river, he feels, seem to be affiliated with the Great Basin culture area, especially in their strong emphasis on the use of obsidian for projectile points. Ross suggests that the area on the west side of the Deschutes was inhabited by aboriginal peoples with a Great Basin way of life who ranged the Cascade foothills to the west. A comparison of projectile points found at the Round Butte sites with specimens from the Willamette Valley revealed very few similarities, leading Ross (1963:117) to conclude that there was little reason to suspect significant connections across the Cascade Range between the two areas.

Sites on the east side of the Deschutes River, on the other hand, seemed to be most closely affiliated with the culture of the Columbia Plateau, although some resemblances were also noted with Columbia River and Great Basin cultures. Ross therefore suggested that the east bank of the river saw intermittent use by Plateau peoples who occasionally utilized the area for hunting and gathering, including occasional collecting of river foods.

Shells recovered during the Round Butte excavations were analyzed by Roscoe (1967). Shell fragments were found at 11 of the 13 excavated sites near the river, and at one of the three sites situated near the canyon rim. The bulk of the molluscan material recovered consisted of specimens of the bivalve Margaritifera. As shown by Spier (1930) and Cressman (1956), Margaritifera was one of the most important sources of food for the Indians of the nearby Klamath Lake area, and it seems probable that the presence of edible molluscs in the Deschutes River was one of the main factors that attracted aboriginal people there.

The next archaeological research to be conducted in the area consisted of an archaeological survey along the route of a Bonneville Power Administration transmission line (Schoenberg 1976). This survey recorded eight sites in Wasco County, three sites in Jefferson County, two sites in Crook County, and two sites in Deschutes County. Most of the sites were sparse lithic scatters, but three consisted of lithic material distributed over more sizable areas. No artifacts were collected during the survey, but the range of specimen types observed in the field indicates that the survey area has been occupied on a fairly continuous basis for at least the last 10,000 years (Schoenberg 1976:6).

Another project recently carried out in the Deschutes River Valley was a cultural resource inventory survey of lands administered by the Bureau of Land Management (Hibbs et al. 1976). The project area was located along the lower portions of the Deschutes, extending from the vicinity of Warm Springs to the Columbia River. A total of 135 sites were recorded. The wide variety of sites found in the area includes villages, rockshelters, open camps, shell middens, quarries, flaking
stations, talus depressions, rock cairns, pictographs, and petroglyphs. Over 75 per cent of the sites are located within 200 meters of the river, with most of the remainder located in tributary canyons. The sites tend to cluster in three distinct geographic zones, each of which contains a major village site near its center. Based on limited ethnohistorical information, Hibbs et al. (1976) hypothesize that the three geographic zones observed in the archaeological survey correlate with geographic areas occupied by different historically-known aboriginal groups: from north to south, the Tenino, Molala and Paiute peoples, respectively. A similar tendency for archaeological sites in the Deschutes River Valley to cluster in distinct geographic areas was noted by Osborne (1950:115), and whether or not these concentrations can actually be convincingly linked to separate aboriginal peoples is an interesting problem that certainly deserves further examination in the future.

Most recently, Cole (1977) has re-examined an archaeological site (35DS39) in the vicinity of Sun River in Deschutes County which had been previously recorded (Cole 1955). A large flake scatter several hundred meters in extent was surface collected and two test pits were excavated. Twenty-one artifacts, including projectile points, scrapers, and utilized flakes, were recovered. Two of the artifacts were made of chert, the remainder of obsidian. From the small collection of artifacts recovered, Cole (1977) suggests that the site had a Great Basin cultural affiliation.

In sum, the archaeological evidence suggests that the Deschutes River Valley was an area of transition where the aboriginal cultures of the Columbia Plateau and the northern Great Basin met and blended. Most archaeologists who have examined artifact collections from the Deschutes River Valley have suggested comparisons with assemblages from archaeological sites in both these areas. Judging from the large number of sites that have been recorded, the Deschutes River and the food resources it provided were a major attraction for aboriginal peoples.

SOUTH OF THE FOREST—THE UMPQUA VALLEY

The mountainous region immediately south of the Willamette National Forest is dissected by the Umpqua River and its extensive system of tributaries. This region has been the locus of very little archaeological research. Until very recently, only a few archaeological projects had been conducted in the area, and none of these had been very extensive.

The first serious archaeological research conducted in the area was an analysis of a private collection of artifacts obtained from
sites in the Upper Umpqua drainage (Marchiando 1965). The artifacts had been recovered from some 31 sites located along a 25-mile stretch of the South Umpqua River above the town of Tiller. The collection consisted of 337 stone tools, including projectile points, scrapers, knives, drills and other tool fragments, plus many cores and thousands of flakes. Adequate information on the site-by-site provenience of the artifacts was not available, and the study focused primarily on the attributes of the specimens themselves. Marchiando (1965:58) concludes that the "finds represent an isolated, culturally simple, homogeneous group of settlements. Technological variation among sites is not evident, the repertory of knapping techniques is narrow, and the number of artifact types is limited." The lack of any information on the age of these sites limits the usefulness of this study for understanding Umpqua Valley prehistory.

An archaeological survey of three proposed dam project areas in the South Umpqua River drainage was reported by Newman and Scheans (1966). These were the Tiller and Days Creek Projects, both on the South Umpqua River, and the Galesville Project on Cow Creek, a tributary of that river. The survey, conducted over a five day period in mid-winter, was greatly hampered by inclement weather and information on site locations was obtained solely through interviews with local informants. A total of 18 sites was recorded. The majority of these were located within a short distance of either the South Umpqua River or its tributary streams; most were situated on the first or second terraces above these streams. The fact that a relatively large number of sites was found during this brief survey, despite the unsystematic manner in which it was carried out, suggests that this portion of the Umpqua Valley must have maintained a fairly high density of aboriginal settlement.

More recently, Brauner and Honey (1977) conducted an evaluation of cultural resources in the Steamboat Creek Drainage. The archaeological aspect of the evaluation involved test excavations at four archaeological sites. Two sites, DOX2 and DOX4, consisted of sparse scatters of obsidian and cryptocrystalline flakes, and contained only very shallow cultural deposits. The diffuse scatter of cultural debris suggests that these were only temporary campsites, perhaps visited on a regular basis during the late prehistoric period.

A third site, DOX3, also consisted of a scatter of lithic flakes, and the initial assumption was that the site was relatively shallow. Test excavations, however, indicated that cultural deposits more than a meter deep and possibly encompassing thousands of years of prehistory were present. Nearly 200 artifacts were recovered, including projectile points, scrapers, knives, drills, gravers, hammerstones, and utilized flakes. Chipping debris, fire-cracked rocks, charcoal, and bone were also abundant in the deposit. A comparison of the artifacts from this site with dated southern Willamette Valley specimens suggests an age ranging from 4000 to 6000 years ago. High frequencies of scraping
tools and projectile points, which remained constant throughout the site deposits, suggest that the site functioned as a regularly visited hunting camp throughout its occupancy.

The excavations at Site DOX3 are very important, in that they destroy some common conceptions held by archaeologists about the nature of upland archaeological sites. These sites are usually thought to contain only very shallow cultural deposits which often are badly disturbed by previous logging activities. Preservation at these sites is usually presumed to be poor and artifact frequencies low. The excavations conducted at Site DOX3, however, indicate that localities containing deep cultural deposits do exist in the uplands, and that these sites contain valuable information about the human use of such country, extending back several thousand years into prehistory.

The fourth site tested by Brauner and Honey (1977), DOX5, also contained significant cultural materials. The cultural deposit at this site extended only to a depth of 60 centimeters, and tools and chipping were sparse. But the amount of cultural debris at Site DOX5 is not as important as the uniqueness of the data found there. Side-notched projectile points were found on the surface and in the upper 20 centimeters of the deposit, and below this depth only lanceolate point forms were found. One lanceolate specimen is unlike any form reported in the literature from southwestern Oregon; it does, however, exhibit close similarities to forms represented in the Great Basin which are thought to be approximately 6000 years old. This site is situated near a spring and may have functioned as an upland hunting camp.

Recent archaeological surveys in the Umpqua Valley by Hanes (1976, 1977) have added considerably to our knowledge of the prehistoric settlement patterns in the area. More than 80 sites have so far been recorded, and some notable differences in the nature and distribution of lowland and upland sites have been discerned. In the lowlands of the Umpqua Valley, 10 sites containing housepit features have been found. These sites are associated with major water courses and have yielded a variety of both chipped and ground stone tools. In addition, shell mounds with associated chipped stone lithic scatters were reported to have been previously located at two major river rapids, but these have since been destroyed by catastrophic flooding. Also associated with major water courses in the lowlands are numerous small open sites consisting of lithic scatters of various sizes and densities.

In upland areas around the periphery of the Umpqua Valley, the most common sites found are small open lithic scatters. These sites most characteristically occur on benches above tributary streams, at locations above falls, on prominent ridgetops near springs, and on intermediate benches along ridge lines. Other sites often encountered in the uplands are rock cairns and rockshelters.
Hanes (1977) suggests that the distribution of food resources available in the fall and winter corresponds well with the known distribution of housepit sites in the lowlands. As in other parts of the Pacific Northwest, pithouse villages were probably occupied during the fall, winter, and spring months, and as base camps for activities conducted elsewhere during the remainder of the year. Other sites, especially those in the uplands, probably represent seasonal camps. These sites would most likely have been utilized as short-term hunting, gathering or fishing stations.

As can be seen from this brief review, the Umpqua Valley seems to contain a high density and a wide variety of archaeological remains. As yet, however, there is very little information available on the chronology of the prehistoric cultures of the area. One piece of evidence indicating an early occupation of the Umpqua Valley is the basal portion of a Folsom-like projectile point, found on the surface of a site along the North Umpqua River. Folsom points are an early form most commonly found on the Great Plains and in the Southwest, where they occur in archaeological contexts dating between 11,000 and 9,000 years ago (Haynes 1969:710). The majority of the artifacts observed at Umpqua Valley sites, however, appear to closely resemble specimens from Willamette Valley assemblages, most of which have been occupied within the last few thousand years (Hanes 1977:3).

ARCHAEOLOGICAL RESOURCES OF THE WILLAMETTE NATIONAL FOREST

Some 44 archaeological sites have been recorded within the forest boundaries at the time of writing. Some are reported in published accounts or formal manuscript reports, but most are as yet on record are only in archival form. The research programs which have developed the present inventory are described briefly below, after which a summary of the inventory is presented using maps and tables. Also identified are aboriginal and Euroamerican trails, and museum resources pertaining to forest history and prehistory. The concluding portion of this section summarizes the archaeological implications of the data.

Survey and Excavation Projects

The first archaeological surveys in the Willamette National Forest were conducted in connection with the Smithsonian Institution's River Basin Surveys Program, Columbia Basin Project. The purpose of these surveys was to locate archaeological sites which might be destroyed or inundated as a result of the construction of dams and reservoirs by the U.S. Army Corps of Engineers. Surveys were conducted in the Detroit, Hills Creek, Cougar, and Blue River reservoir areas (Fenenga 1947;
In addition to the actual field surveys, interviews were conducted with local residents in an attempt to locate archaeological sites. The results of these efforts, however, were entirely negative. Most of the areas covered were in the smaller tributary canyons off the main rivers. These areas contained steep terrain with dense stands of timber, and no archaeological sites were found.

Two general surveys in the Western Cascades, one directed by Donald K. Grayson and the other by Thomas L. Olsen, were conducted by the Department of Anthropology, University of Oregon, within portions of the Lowell and Oakridge Districts (Grayson 1970, 1975). The fieldwork involved four weeks of survey divided equally between the 1969 and 1971 summer field seasons. The goal of these surveys was the location of a temporally and spatially representative sample of the aboriginal occupation sites within the region, and the survey methods consisted of extensive searching in selected areas (Grayson 1970:10). The investigators also relied heavily upon local informants for information concerning the location of archaeological sites. In all, 20 archaeological sites were recorded in the Western Cascades, 13 of which are located within the Willamette National Forest.

Another archaeological survey was conducted in the Breitenbush Known Geothermal Resource Area by a team from the Department of Anthropology, University of Oregon, under the direction of Sharilyn Reyna (1975a). The research design consisted of a combination of linear transects supplemented by spot checks at localities thought to have been preferred for aboriginal occupation. The survey was intended to cover approximately five per cent of the project area. Eleven archaeological sites were recorded within the Detroit District.

The Department of Anthropology, University of Oregon, has also conducted a survey in the McCredie Springs Known Geothermal Resource Area, again under the direction of Sharilyn Reyna (1975b). The fieldwork for this survey took place from October 4 to October 13, 1975, and again the research design consisted of a combination of linear transects and spot checks, with five per cent of the project area surveyed. Eight archaeological sites were recorded, six in the Oakridge District and two in the Rigdon District.

Most recently, the Museum of Natural History, University of Oregon, conducted an archaeological survey of two proposed escape ramps on Highway 58 within the Oakridge District (Cole and Pettigrew 1976). The fieldwork was undertaken by Richard M. Pettigrew on April 27, 1976. No archaeological sites were found.
Archaeological excavations have been conducted at several localities in the Cascades. Excavations at Baby Rock Shelter in the Oakridge District have been reported by Olsen (1975). The shelter is an east-facing overhang at the base of Baby Rock, located at an elevation of approximately 2400 feet. Archaeological evidence indicated that it was used by aboriginal people as a temporary hunting camp, from some time prior to the eruption of Mount Mazama about 7000 years ago, as indicated by Mazama pumice bands in the lower deposits, to fairly recent historical times, as indicated by pictograph figures of horsemen on the shelter's wall (see cover photo).

Excavations at the Indian Ridge Site, in the McKenzie District, are reported by Henn (1975). This is an open site situated at an altitude of 4800 feet on the headwaters of Penny Creek, a tributary of the McKenzie River. It reportedly was in use as late as the 1920's by Indians from the Warm Springs Reservation in eastern Oregon, who occupied the site in autumn while collecting huckleberries and hunting deer. The artifacts recovered, particularly the projectile points, flake scrapers, and manos, are consistent with the use of Indian Ridge for these activities during the late prehistoric period as well.

Two additional archaeological sites in the Cascades—a vision quest locality and a small open lithic scatter—are described by Minor (1976). Both were originally recorded during an archaeological survey of a proposed timber sale area in the Umpqua National Forest (Mack 1975). Though not within the Willamette National Forest, and not recorded in the accompanying inventory sheets, they are of importance as examples of the kinds of sites to be expected in the forest, and are mentioned here for that reason. The vision quest site (35D013) consisted of 26 rock cairns distributed along a high ridgetop over a distance of approximately 200 meters. Test excavations indicated that there were no cultural deposits at the site, the only cultural materials observed being two large chunks of jasper, a kind of material that was highly favored by aboriginal peoples for the making of stone tools. Ethnographic accounts indicate that rock cairns were made in conjunction with aboriginal vision quest rites. The rock structures represented physical evidence of an individual's readiness for gaining a vision (for an account of this practice among the Klamath Indians, see Spier 1930).

Fieldwork conducted at the small open site (35D012) consisted of limited test excavations and the collection of lithic specimens from the surface of the site. Lithic debris was confined to a very small area, and the test excavations indicated that the cultural deposit was less than 20 centimeters deep. The few specimens recovered—a single projectile point, a retouched flake, and some chipping detritus—suggests that the site was a campsite or small knapping station where aboriginal peoples prepared their weapons for hunting.
The Archaeological Inventory

Through an examination of published and archival sources, an inventory of the cultural resource sites of the Willamette National Forest has been compiled. This inventory indicates the nature and variety of the cultural resources to be found within the forest, and will be of value for guiding land use planning decisions. In this section the contents of the inventory are only summarized; a more comprehensive description of the cultural resources of the forest is presented in a separate inventory volume intended for purely administrative use (Minor and Pecor 1977).

An examination of the Oregon statewide archaeological survey site files at the Museum of Natural History, University of Oregon, as well as published accounts, resulted in the compilation of information on 44 archaeological sites located within the Willamette National Forest. A check of the records of the Oregon State Historic Preservation Office, Salem, indicated that at present there are no sites within the forest boundaries listed on the National Register of Historic Places. Most of the archaeological sites listed in this inventory were recorded during the formal archaeological surveys mentioned earlier, the remainder having been reported by interested individuals with varying experience in archaeological site recording. A list of published or formally reported survey and excavation projects so far conducted in the Willamette National Forest is presented in Table 7, and the locations of these projects are shown in Fig. 38.

The actual inventory of currently known archaeological sites within the forest is presented in tabular form, with sites listed by Ranger District (Table 8). A series of maps is also provided, in order to show the approximate locations of the sites (Figs. 39 – 45).
Table 7. Major Archaeological Surveys and Excavations Conducted in the Willamette National Forest (see Fig. 38 for Project Locations).

<table>
<thead>
<tr>
<th>No.</th>
<th>Location</th>
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<td>2</td>
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<td>Indian Ridge Site</td>
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<td>8</td>
<td>Baby Rock Shelter</td>
<td>Olsen 1975</td>
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Fig. 38. (Opposite) Locations of Major Archaeological Survey and Excavation Projects in the Willamette National Forest.
Willamette National Forest

Source: WNF Map
1:125,000 1976
Table 8. Inventory of Archaeological Sites in the Willamette National Forest.

<table>
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Table 8. Inventory of Archaeological Sites in the Willamette National Forest (continued).

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Fig. 39. Distribution of Inventoried Archaeological Sites in the Detroit District. Key, Table 8.
Fig. 40. Distribution of Inventoried Archaeological Sites in the Sweet Home District. Key, Table 8.
Fig. 41. Distribution of Inventoried Archaeological Sites in the McKenzie District. Key, Table 8.
Fig. 42. Distribution of inventoried archaeological sites in the Blue River District. Key, Table 8.
Fig. 43. Distribution of Inventoried Archaeological Sites in the Lowell District. Key, Table 8.
Fig. 44. Distribution of Inventoried Archaeological Sites in the Oakridge District. Key, Table 8.
Fig. 45. Distribution of Inventoried Archaeological Sites in the Rigdon District. Key, Table 8.
Inventory of Aboriginal and Historic Trails

There is evidence, both artifactual and documentary, to indicate that aboriginal routes of travel and trade passed through the Willamette National Forest, connecting the Willamette Valley with areas east of the Cascade Range.

The best evidence for prehistoric contacts between the two areas is the presence of Great Basin projectile point types in archaeological sites west of the Cascades. Desert Side-notched projectile points, which appear sometime after A.D. 1100 in the Great Basin (Hester and Heizer 1973:10), have been found at several late prehistoric sites in the Willamette Valley (White 1975a: 95-96), as well as at Baby Rock Shelter in the Willamette National Forest (Olsen 1975:478). A single specimen resembling the Great Basin point type known as Surprise Valley split-stem also has been recovered in the Willamette Valley (White 1975a:95).

Ethnographic accounts contain information about historic trade and contact between aboriginal people on both sides of the Cascades. For example, Jacobs et al. (1945:28) report that the Santiam band of the Kalapuya acquired buffalo hide blankets from people to the east. This may indicate trade with the Molala Indians, who in turn probably acquired them from other aboriginal people living still further to the east. Likewise, Spier (1930:24) writes that after the introduction of the horse, Klamath Indians sometimes ventured into the Willamette Valley in order to trade with the Kalapuya.

There is documentary information available concerning two major aboriginal trails which passed through the Willamette National Forest (Fig. 46). A map showing the approximate location of these trails can be found in Farmer and Holmes (1973:9). The Molala Trail begins a few miles north of Crater Lake, runs northward along the western slopes of the Cascade Range, and ends at Oregon City. The Klamath Trail begins in the territory of the Klamath Indians east of Crater Lake and continues north along the eastern side of the Cascades to the vicinity of Mount Jefferson, where it forks. One branch continues northward, probably down the Deschutes River Valley to the Columbia River. The other branch turns west by way of the north fork of the Santiam River, crossing the Cascades to the settlements of the Northern Molala on the river of the same name; there it merges with the Molala Trail and terminates at Oregon City (Stern 1956:233-234). Additional aboriginal trails, all very short, within the area of the Willamette National Forest are also mapped by Farmer and Holmes (1973:9), but documentary information seems to be lacking for them.

Four routes of major importance in the history of early White travel across the Cascades were the Scott Trail, the Wiley Trail, Minto's Trail, and Craig's Trail (Fig. 47).
The Scott Trail is said to have followed an old Indian trail around the lava beds at the summit of the McKenzie Pass. Part of this original trail, blazed by Felix Scott, Jr. in 1862, is now the Clear Lake Cutoff connecting the McKenzie and Santiam routes. The route crosses the McKenzie River, and runs between the North Sister and Belknap Crater.

The Wiley Trail is associated with an Indian legend of a battle between the Molalas from the western side of the Cascades and the Paiutes from the eastern side. After a battle fought along the trail, the Indians are said to have carved out new trails which by-passed the Santiam route in order to avoid the souls of the dead warriors. Andrew Wiley, a pioneer settler in the Willamette Valley region, used one of these trails in 1859 and was the first white man to view the Santiam Pass from the western side of the mountains. The trail discovered by Wiley became the route of the Willamette Valley and Cascade Mountain Military Wagon Road in 1866-67.

A desire to carve out a road that would link the pioneers of Marion County to eastern Oregon led to scouting expeditions in the Cascades as early as 1845. John Minto, of Salem, wanted to find a route south of Mt. Jefferson. Minto's route follows the North Santiam River, and probably included portions of the western branch of the aboriginal Klamath Trail. Various localities along the way bear his name, such as Minto Mountain and Minto Pass. His route, which became the North Santiam Highway, joins the Wiley Trail route (the South Santiam) just before crossing the Cascades at Hogg Rock.

The three routes above, the McKenzie (Scott Trail), the South Santiam (Wiley Trail) and the North Santiam (Minto's Trail) all cross the mountains at the Santiam Pass. All remained seasonal routes over the Cascades, closed to winter traffic, until the re-routing of the highways by the opening of the Clear Lake Cutoff in 1962.

The final pioneer route, which remains an alternative route for summer travelers, is the Craig Trail or the pioneer McKenzie Road. Craig's route begins at Park's Point, crosses the McKenzie Bridge, continues through Lost Creek Canyon, and runs directly across the lava beds at McKenzie Pass, not skirting them as did the old Indian trails and Scott's Trail. This pathway was opened as a toll road in the fall of 1872.

Development of better roads, always an interest of the pioneers, was aided by federal interest in road construction in 1864 when the first public road grant was given to the Oregon Central Wagon Road Company. It was the ninth such grant made by Congress. According to Bruce (1936), there were three major objectives in the construction of the Oregon Central Wagon road: to connect the Willamette Valley to the mines east of the mountains, to connect a stageline with the Pacific Railway,
Fig. 46. Documented Aboriginal Trails within the Willamette National Forest.
Fig. 47. Documented Historic Trails within the Willamette National Forest.
and to encourage settlement of eastern Oregon. It was also a military road built to aid the movement of soldiers into areas where Indian groups resisted encroachment by the settlers. The route started at Eugene, followed the Willamette River to its headwaters near the summit of the Cascades, crossed the summit near Crescent Lake, and turned south, crossing the Klamath Indian Reservation. From there it followed the Sprague River to its headwaters, passed through Goose Lake Valley and over Warner Lake, crossed Steen's Mountain to White Horse Creek, and by way of Crooked Creek and Jordan Valley, continued to the Idaho line (U.S. Senate Document, Serial #2510, Dec. #124, pp. 27-31, McNamee Report).

In sum, ever since the earliest explorers and pioneers discovered the winding, barely visible trails used by the Indians as trade routes, the White population has been widening them, re-routing them, and integrating them into an expanding network of transportation routes over the Cascades.

Museum Collections

During the course of inventorying the cultural resources of the Willamette National Forest, visits were made to local museums for the purpose of determining the nature and extent of museum holdings relevant to the cultural heritage of the Willamette National Forest. These remarks will serve as guides to the cultural resources they contain.

Pioneer Museum in Oakridge. A collection of old tools and equipment used by the Forest Service, and some photographs of early Forest Service personnel, can be found at this museum. Documents on file include a number of diaries of early residents of the area, including two by individuals who journeyed across the Oregon Trail. Also on file are a few interviews with early residents of the Oakridge area which contain some information on local history. No archaeological collections from the region around the Willamette National Forest are stored at this museum. Informants: Stanley Gray and Robert McFetridge.

Cottage Grove Historical Museum. This museum features a collection of items brought to Oregon by early pioneers. There are also a number of photographs of early logging and mining operations, especially in the area around the Bohemia Mines. There are no manuscripts on file, but the museum does have a map showing the location of lands settled by early pioneers in the Cottage Grove area. Also of interest is the land grant title given to Jake Fearn, a full-blood Kalapuya Indian, date 1906. The Museum has only a small collection of aboriginal artifacts from the area.
Lane County Pioneer Museum in Eugene. A major archival collection of documents on the early pioneers in Lane County is located in the museum library. Pioneer diaries, maps and photographs are available on early emigrations, transportation and lumbering. Pioneer furniture, toys and a covered wagon are on display along with quilts made by Nancy Whiteaker and brought to Oregon in 1852, and a trunk of Susannah Bristow's possessions carried across the plains in 1848. There is only a very small collection of aboriginal artifacts stored here. Informants: Glen Mason and Philip Tobias.

Museum of Natural History, University of Oregon, Eugene. The Museum houses important collections in the fields of anthropology, archaeology, botany, geology, invertebrate paleontology, malacology, mammalogy, ornithology, paleobotany, palynology, and vertebrate paleontology. The Museum has outstanding collections of fossil and modern pollen and a large collection of aboriginal artifacts from the interior of the Pacific Northwest. The Museum is the official depository for antiquities found on federal and state lands in Oregon, and is the seat of the Oregon Archaeological Survey.

Brownsville Historic Pioneer Museum. This museum features a collection of early farming and blacksmithing equipment. One section of the museum is designed to represent a country store dating from the turn of the century. A large collection of pictures of early farming, logging, and railroad activities in the area is also found at this museum. No historical manuscripts are stored here. Aboriginal materials include a collection of approximately 80 projectile points, knives, and drills found along the Calapooya River by Ray Kirk. The museum also contains a small collection of pestles and, importantly, a couple of scarce aboriginal baskets from the Willamette Valley, including one made by Liza, one of the last of the Kalapuya Indians. A map titled "The Mounds of the Calapooya," included in Collin's (1951) thesis, is also found at this Museum. Informant: Mattie B. Eggleston.

East Linn Museum in Sweet Home. This museum contains a collection of early logging tools and equipment, as well as some photographs of early loggers in action. There also is an exhibition of the kinds of possessions owned by early homesteading families in the area. No historical manuscripts are on file here, but some information on early deeds and land grants, and a map showing the locations of early cemeteries in Linn County, can be found at this museum. A small collection of aboriginal artifacts (mostly projectile points) from the area, collected by Justin Philpott over the past 50 years, is stored here. Some of these artifacts may be from archaeological sites in the Willamette National Forest. Informants: Mary Mealey Simons, Carmen Hyde, and Martha Steinbacher.
As the foregoing discussions have shown, the Willamette National Forest is surrounded by regions having long cultural chronologies. To the north on the Columbia River there is evidence that aboriginal people utilized the natural salmon fisheries at The Dalles as early as 10,000 years ago (Cressman et al. 1960). To the east in the Deschutes River drainage an early radiocarbon date of 7990 B.P. has been obtained from a site in the Round Butte area (Ross 1963:59). In the Willamette Valley to the west, two possible associations of man and mammoth (Cressman and Laughlin 1941; Cressman 1947), as well as surface finds of very early Clovis fluted projectile points, have been reported. That the forested Cascades were also inhabited at an early time is indicated by the recovery of artifacts from below 7000 year-old deposits of Mount Mazama pumice at the Odell Lake Site (Cressman 1948) and at Baby Rock Shelter (Olsen 1975).

The archaeological inventory just reviewed gives evidence for the presence of aboriginal people in the Cascades over a very long period, but owing to a lack of detailed research, the origins and cultural affiliations of these people are still largely unknown. Several alternative interpretations of the cultural relationships of archaeological complexes found in the Cascades can be suggested. One alternative is that they represent summer season high altitude manifestations of Plateau and/or Great Basin cultures. This view seems to be advocated by Newman (1966:28-31), who sees at least the earlier cultural materials from Cascadia Cave as being most similar to artifacts from sites in the Plateau and Great Basin. Additional support for this alternative is found in the presence of Great Basin projectile point types at Baby Rock Shelter (Olsen 1975:491), and in Henn's statement that the Indian Ridge Site was occupied in historic times by Indians from eastern Oregon while collecting huckleberries and hunting deer (Henn 1975:457).

A second possible alternative is that the archaeological complexes found in the Cascades represent high altitude manifestations of prehistoric Willamette Valley cultures. It seems quite likely that aboriginal people followed large game animals, such as deer and elk, from their winter range in the Willamette Valley into their summer range in the Cascades (White 1975a:53). The fact that projectile points from the upper levels of Cascadia Cave in the Cascade foothills are stylistically similar to those found in sites located on the Willamette Valley floodplain seems to support this idea (Davis et al. 1973:7), at least in later periods.

A third alternative is that the archaeological complexes of the Cascades are indigenous to the region and not strongly related to cultures on either side of the Cascade Range. This view is advocated by Grayson (1970, 1975), who notes stylistic similarity among artifacts found along the west slope of the Cascades, and dissimilarity between the artifacts found in this area and those found in Willamette Valley sites. On this
basis he proposes that the Western Cascades formed a distinct cultural subarea, separate from the Willamette Valley. Because of heavy snowfall during the winter, however, it seems doubtful that aboriginal hunting and gathering people would have stayed in the Western Cascades throughout the year; a move to lower elevations, either to the east or to the west of the Cascade Range, would seem to have been necessary.

A fourth alternative, which seems the most acceptable one, on the basis of present evidence, is that both the first and second possibilities discussed above are involved: that the archaeological complexes in the Cascades are high altitude manifestations of both Plateau/Great Basin and Willamette Valley cultures, perhaps according to whether the occupations occur predominantly on the eastern or western flank of the Cascades. This alternative has the advantage of not imposing an "either Plateau/Great Basin, or Willamette Valley" identification which would clearly be incongruent with the ethnographically known utilization of the Cascades by aboriginal people on both sides of the Cascade range. But it must be admitted that this interpretation is founded largely on logic and on evidence from surrounding regions, and gains only equivocal support from actual archaeological evidence within the region of concern itself. The idea remains to be tested archaeologically.

Examination of the above questions of origins and cultural affiliation is one of the most immediate archaeological research needs in the Willamette National Forest region at the present time. Closely related, but identified for the sake of clarity as a second major problem, is the need for development of a detailed understanding of human occupation patterns throughout the region, as they may have varied in different environmental subzones, fluctuated with seasonal and climatic changes, and shifted through time with the sequential progression of people through the area. These needs are addressed in passing in the following specific management recommendations, and more directly in the final chapter of this document, which offers general recommendations for the maintenance of an adequate archaeological data base within the region, and for a further development of the forest's cultural resource program, which will make that possible.

RECOMMENDATIONS FOR THE MANAGEMENT OF ARCHAEOLOGICAL SITES ON THE WILLAMETTE NATIONAL FOREST

Despite the very limited amount of archaeological research conducted within the boundaries of the Willamette National Forest, a relatively large number of sites has been recorded. Indeed, considering the sparsity of survey coverage, the quantity of known sites would seem
to indicate that the forest is potentially rich in archaeological resources.

The present inventory, though limited, allows the identification of several kinds of sites, and several kinds of topographic situations in which sites are highly likely to occur. Such information is, of course, crucial to the making of management planning decisions concerning ground-disturbing projects which are potentially harmful to archaeological sites.

It must be stressed, however, that the data base is very small, and undoubtedly not representative of the full range of archaeological and topographic variation that actually occurs within the forest. Thus, though the existing inventory can serve as a guide to where sites are likely to occur, it cannot with any assurance be used as a guide to situations where sites are unlikely to occur. This problem is addressed further below, and in the final chapter of this overview.

Site Types and Characteristic Locations

The 44 archaeological sites so far recorded within the Willamette National Forest can be classified into six types, each with clearly definable attributes of location (see also Table 9).

Type I. Open sites consisting of relatively large amounts of lithic debris distributed over extensive areas. Eleven sites can be included in this category. Three of these (35LA52, 35LA65, and 35LA186) are located near small lakes; another (35LIN64) is located near a large river. Two sites (35LA183 and 35LA226) are situated near mountain meadows. One site (35LA172), located near Obsidian Cliffs, may have been the scene of extensive quarrying activity. In general, these sites appear to represent especially favorable camps visited repeatedly by mobile groups over the long run of occupation in the region. Some may have served as base camps from which smaller groups ranged out to more task-specific sites.

Type II. Open sites characterized by relatively thin scatters of lithic debris distributed over restricted areas. Four sites can be included in this category. These sites are not found near sizable bodies of water, but instead are located on terraces or ridgetops above or adjacent to small streams. They probably represent short-term task-specific sites, such as camps used by hunting parties, or knapping stations.

Type III. Open sites of undetermined area. Twenty-three sites can be included in this category. Information on the size of these sites is lacking in the archaeological site survey records. Most of them are located along watercourses. These sites can probably be merged into the previously defined site types when more information becomes available.
Type IV. Rockshelters. Five rockshelters have been recorded. One, Baby Rock Shelter (35LA53) is relatively small, two more (35LA39 and 35LA182) can be thought of as medium-size, and the remaining two (35LA39 and 35LA192) are relatively large. Rockshelters, of course, are found on the sides of hills where suitable rock outcroppings are present.

Type V. Pictographs. Pictographs have been found at four sites, all but one of which (35LA55) are rockshelters. Pictographs obviously occur in localities where rock outcroppings (and rockshelters) are common.

Type VI. Vision quest sites. Only one vision quest site has been recorded (35LA39), and the rock cairns at this site have since been destroyed. The vision quest was an initiation rite which required, among other things, that boys retire from their village to some remote area and construct stone cairns. Vision quest sites tend to be found on high mountain ridgetops; for a description of two vision quest sites in the Western Cascades, see Minor (1976). Vision quest sites should be fairly common in the Willamette National Forest, as the vision quest is ethnographically known to have been performed by the Kalapuya Indians of the Willamette Valley (Jacobs 1945:345).

The distribution of the recorded sites in the forest appears to be correlated in a general way with altitude. The sites occur across an altitude range of some 5100 feet, with the lowest occurring at an elevation of approximately 900 feet and the highest at approximately 6000 feet. The greater number of sites is in the lower end of this range. Of the 44 recorded sites, 29 are located below 3500 feet, with eight sites occurring between 4000 and 5000 feet, and seven between 5000 and 6000 feet. In contrast to the tendency for greater numbers of sites to occur at lower elevations is a tendency toward greater intensity of occupation of individual sites at higher elevations. Nine of the 11 extensive open sites (Type I) occur above 4000 feet, with five located above 5000 feet.

Further information on the nature and distribution of archaeological sites in the Western Cascades was obtained through discussions with Bureau of Land Management archaeologists Jeanette Gaston (Salem District), Michael Southard (Eugene District), and Richard Hanes (Roseburg District), whose districts are adjacent to the western boundaries of the wooded area between the floor of the Willamette Valley and the Willamette National Forest.

A settlement pattern generally similar to the one observed in the Willamette National Forest is also found in this foothills area. There is again a tendency for the size of sites to be correlated with the availability and source of water. Small lithic scatters, which are by far the most numerous archaeological sites found in this area, are most
likely to occur on ridge crests above narrow rugged valleys containing small, sometimes ephemeral, streams. More extensive sites, on the other hand, are usually found in association with larger streams, springs, and small lakes. Upland sites in the Cascade foothills appear to occur in two distinct topographic situations, either along the crests of ridges, or on benches and ridge noses above small valleys or lakes. Sites located in these two different situations probably were the scenes of different activities. Most aboriginal trails were probably located along ridge crests, rather than along overgrown creek bottoms, and it seems probable that many ridgetop sites served as wayside camps for aboriginal travelers. Many sites found on benches and ridge noses above small valleys and lakes would have been ideally located to serve as upland hunting camps. These sites are said to often contain a higher number of artifacts in proportion to lithic debitage than do sites found in other localities. Each of the three BLM districts contains a number of sites which appear to occur in association with existing trails, and the three BLM archaeologists contacted were optimistic about the possibility of identifying and reconstructing the aboriginal trail systems based on archaeological data.

In summary, known archaeological sites in the Willamette National Forest tend to occur in the following topographic situations: 1) adjacent to large, dependable sources of water, such as lakes, springs and large streams; 2) on terraces and ridgetops above smaller streams; 3) on hillsides where rock outcroppings suitable for rockshelters and pictographs are found; and 4) on high mountain ridgetops.

It is recommended that, in the normal process of assessing probable impacts of proposed forest projects, areas of these types be subjected to extensive and thorough scrutiny. Thorough examination rather than a partial sampling procedure is recommended, because the available data show these to be high probability areas for archaeologic sites. Such areas can be identified early in the planning stage of any project through the use of topographic maps and air photos, allowing ample time for a thorough assessment of their archaeological potential.

It must be stressed emphatically that the data contained in the present inventory do not allow the inference that archaeological sites are not to be expected in other kinds of terrain besides those named here. These data are the haphazard accumulation of years of unsystematic exploration which did not devote adequate attention to searching for sites in all types of terrain. Thus, although the information available tells us where sites are likely to occur, it does not give us a sound basis for inferring where they are not likely to occur. This problem must be dealt with in an interim fashion, immediately, and also in a longer-term fashion, which will ultimately provide the means to predict confidently where sites are unlikely to occur, as well as where they are likely to occur.
It is therefore recommended that for the immediate future, in the normal process of assessing the probable impacts of proposed forest projects, a systemic survey, by means of linear transects, be conducted of all project areas. Particular attention must be devoted to examination of all varieties of terrain within the tracts examined, and a systematic record must be kept of the kinds of amounts of terrain examined. This recommendation is intended to guard against present neglect of what seem, in our present state of limited knowledge, to be low-probability areas for archaeological sites, and to begin the building of a systematic, controlled information base that will eventually allow us to predict, with confidence, where sites truly are unlikely to occur. Recommendations for a long-term solution to this problem are offered in the final chapter of this overview.

Management Recommendations for Specific Sites

The archaeological sites now known from the Willamette National Forest are listed in Table 9, which recommends the specific management action to be taken in each case. Recommended actions are of several kinds, and (except for interpretation) are cumulative in the sense that each higher level of recommended action automatically includes the preceding lower levels. The evidentiary basis for these site-by-site recommendations is made clear in the detailed site descriptions contained in the companion inventory volume. The criteria used are specified in the following paragraphs.

At the lowest level of recommended action is documentation. This would normally entail the completion of a detailed site record form, and the making of a systematic photographic record of the site itself and its relationship to the surrounding terrain. With the exception of those recorded in published excavation and survey reports, most of the sites in the present inventory are inadequately documented, and should be returned to and recorded in detail.

A second level of recommended management action is surveillance, recommended for sites which are threatened by natural processes, or are sufficiently accessibly to the general public that their integrity is threatened by artifact collecting or recreational activities. Sites here recommended for surveillance are undoubtedly fewer than should be given such treatment, simply because the inventory data are seldom adequate to allow assessment of the level of hazard to which a site is exposed. As sites are returned to and documented, they should be reassessed in terms of their need for surveillance.
Table 9. Management Recommendations for Known Archaeological Sites of the Willamette National Forest

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</tr>
<tr>
<td>18</td>
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<td>extensive</td>
<td>Documentation</td>
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<tr>
<td>19</td>
<td>35LA184</td>
<td>open</td>
<td>extensive</td>
<td>Surveillance</td>
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<tr>
<td>20</td>
<td>35LA185</td>
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<td>extensive</td>
<td>Documentation</td>
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<tr>
<td></td>
<td>35LA194</td>
<td>open</td>
<td>undetermined</td>
<td>National Register</td>
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Table 9. Management Recommendations for Known Archaeological Sites of the Willamette National Forest

<table>
<thead>
<tr>
<th>Map Reference</th>
<th>Site Number</th>
<th>Type of Site</th>
<th>Size of Site</th>
<th>Management Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowell District (Fig. 43)</td>
<td>21</td>
<td>35LA178</td>
<td>open</td>
<td>restricted</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>35LA182</td>
<td>rockshelter</td>
<td>medium</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>35LA189</td>
<td>open</td>
<td>undetermined</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>35LA192</td>
<td>rockshelter</td>
<td>large</td>
</tr>
<tr>
<td>Oakridge District (Fig. 44)</td>
<td>25</td>
<td>35LA46</td>
<td>open</td>
<td>undetermined</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>35LA47</td>
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</tr>
<tr>
<td></td>
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<td>35LA48</td>
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<tr>
<td></td>
<td>28</td>
<td>35LA50</td>
<td>open</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>35LA51</td>
<td>open</td>
<td>restricted</td>
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<td></td>
<td>30</td>
<td>35LA52</td>
<td>open</td>
<td>extensive</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>35LA53</td>
<td>rockshelter</td>
<td>small</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>35LA54</td>
<td>rockshelter</td>
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<tr>
<td></td>
<td>33</td>
<td>35LA55</td>
<td>pictograph</td>
<td>small</td>
</tr>
<tr>
<td></td>
<td>34</td>
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<td>extensive</td>
</tr>
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<td></td>
<td>35</td>
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<td>36</td>
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<td>restricted</td>
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<td></td>
<td>37</td>
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<td></td>
<td>38</td>
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<td>open</td>
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</tr>
<tr>
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<td></td>
<td>41</td>
<td>35LA247</td>
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</tr>
<tr>
<td>Rigdon District (Fig. 45)</td>
<td>42</td>
<td>35LA39</td>
<td>rockshelter</td>
<td>medium</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>35LA221</td>
<td>open</td>
<td>undetermined</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>35LA222</td>
<td>open</td>
<td>restricted</td>
</tr>
</tbody>
</table>
A third level of management action is in the area of interpretation. Some sites, in locations accessible to the public and situated where adequate surveillance may be maintained, should be posted with interpretive signs which will explain their importance to the public, both in terms of historical event and in terms of their importance as non-renewable resources which must be respected and preserved. Of sites in the present inventory, Baby Rock Shelter (there are actually two adjacent shelters, LA53 and LA54), Obsidian Cliffs (LA172), and Indian Ridge (LA194) should be considered for this treatment.

A fourth level of recommended action is the nomination of selected sites to the National Register of Historic Places. The three sites just named would seem, on the basis of what is now known of them, to easily meet the criteria for placement on the register. Adequate documentation for nomination of the Baby Rock Shelter and Indian Ridge sites can be found in Olsen (1975) and Henn (1975), sources listed in the attached bibliography. The Obsidian Cliffs Site is poorly documented at present, and preparation of a nomination would entail a field assessment of the site. Other sites worthy of nomination to the National Register may be recognized as such when they are more fully documented, as recommended above.

The highest level of recommended management action in the case of archaeological sites is excavation and/or extensive study of surface remains. This is a last resort, to be carried out only when destruction or serious damage, from whatever source, is unavoidable. No sites on the present inventory are recommended for this treatment, because none are known to be seriously threatened at present. This condition however, could change, and it is the intent of the previous recommendation for surveillance that potential hazards which could result in the invoking of this recommendation be monitored.

Archaeological sites will continue to be discovered within the Willamette National Forest, as guaranteed by the forest's mandate to inventory and protect cultural resources on its lands. As new sites are discovered, the guidelines recommended here, and the procedures presented in the detailed Region 6 handbook for cultural resource managers, should be applied. The background supplied by this overview, and the references in the appended bibliography, will assist in evaluating the significance of such sites.
RECOMMENDATIONS FOR DEVELOPMENT OF THE WILLAMETTE NATIONAL FOREST'S CULTURAL RESOURCE MANAGEMENT PROGRAM

In recent years the literature concerning various aspects of cultural resource management has grown considerably. Articles have been published on the construction of sampling designs for locating cultural resources (House and Schiffer 1975; Lovis 1976), on ideas for mitigating impacts on cultural resources (Dixon 1971; Schiffer 1975), on assessing the significance of cultural resources (King and Hickman 1973; Aikens 1976), and on the general relationship of cultural resource management to academic disciplines (McGimsey 1972; Lipe 1974; Schiffer and House 1977). Many of the ideas outlined in the recommendations below are derived or adapted from the work of these and other investigators in the field of cultural resource management.

Recommendation 1. The Willamette National Forest should initiate a systematic multi-stage program of study to provide an adequate data base for the prediction of cultural resource site location.

The archaeological and historical sites now known to exist in the Willamette National Forest occur in a few characteristic locations, described in previous overview sections and specific recommendations. On the basis of this information, a number of geographic situations where there is a high probability of site occurrence have been identified. But because the existing inventory of sites has been accumulated in an unsystematic manner, we are unable to say whether the kinds of locations so far identified as high probability areas are the only kinds of locations in which sites occur. A larger and much better-controlled sample of sites is essential to resolve this problem, and to develop an inventory adequate for predictive purposes, a multi-stage approach, incorporating but going beyond the day-to-day routine examination of proposed project localities, is necessary.

The concrete objective of the proposed multi-stage survey procedures is to develop a body of knowledge about the relative occurrence of cultural resource sites on all the major types of terrain to be encountered within the forest. The following steps are recommended.

A) Routine day-to-day examination of proposed project areas can provide useful data toward this central objective, to the extent that in each case a specific and careful record is made of the amount and kind of terrain actually examined, whether or not cultural resources were discovered. Because low ground visibility is a major problem hampering the effectiveness of field surveys in the forest, project areas in which no remains were found in the initial field-check should be routinely returned to, as a second stage of project investigations,
and re-examined after project activity has removed heavy cover and exposed
the ground.

B) Routine checking and re-checking of proposed project areas, while
an important part of developing an adequate inventory, is not a sufficient
means, by itself, of developing the needed information. An active survey
program, over and above specific project-related activities, is necessary.

It is recommended that this survey program be begun with a systematic
examination of all those clear-cuts, roads, and other ground-disturbing
projects that have been conducted recently enough that the ground is not
yet completely re-covered by vegetation. Such areas will afford the
greatest degree of visibility and allow the greatest amount of areal
coverage per unit of time devoted to the work. The level of confidence
that can be reposed in the accuracy of the resulting conclusions will also
be higher than if heavily vegetated terrain were examined.

It must be realized in implementing this program that sampling man­
made openings in the forest introduces bias into the sample of terrain
covered. This bias is not overwhelming, because roads and clear-cuts
occur on most kinds of terrain, but it is present. It is unlikely that
roads, clear-cuts and the like occupy various kinds of terrain in the
same proportion that these types of terrain actually occur in the forest
as a whole. Control—that is, awareness and accurate definition—of
this bias in proportions is crucial to the usability of the survey
results for predicting site locations. Concretely, such control is
achieved by keeping survey records sufficiently detailed that the amount
and degree of coverage of each kind of terrain within the surveyed tract
can be accurately measured. A usable record would describe the area
surveyed in terms of amount (in acres or square feet) of stream terrace,
ridgeline, slope, bench, lakeshore, bay edge, etc. actually present, and
it would go on to tell how much of each kind of area was actually walked
over. Visibility conditions too, should be described, since they affect
the quality of coverage achieved. Use of an aerial photograph as a base
upon which a field sketch map could be directly drawn would be one
accurate, efficient, and inexpensive way of making such a record.

This approach is far from that of unbiased probability sampling now
much in vogue (e.g., House and Schiffer 1975; Lovis 1976). Unbiased
probability sampling has much to recommend it in certain situations, but
because its application in heavy forest with dense undergrowth would
often lead to the absurdity of a surveyor being forced by its arbitrary
dictates to examine areas so heavily covered that the ground is invisible,
it is not recommended here. It is true that the ground in designated
sample units could be cleared for examination, but in the same amount of
time, a surveyor not constrained by an arbitrary sampling scheme could
more thoroughly examine a far greater amount of more open terrain. Under
forest conditions, a selective, opportunistic approach to sampling where
cover is lightest is clearly superior to an unbiased sampling design.
that relies on chance or arbitrary rules for direction. But it must be stressed again, returning to the message of the preceding paragraph, that control of the sampling bias introduced by the recommended procedure is crucial to its success.

The ability to predict with confidence the likely occurrence or non-occurrence of cultural resource sites in any given area is obviously of fundamental importance to management planning for an agency dedicated to the principle of multiple use of its lands. For that reason this recommendation has been given first position. A timely investment in an adequate data base now will surely be many times repaid by the streamlining of future resource management procedures that it will make possible. Recommendations 2, 3, and 6 below address this matter further, from slightly different perspectives.

Recommendation 2. The Willamette National Forest should develop a standardized system for the inventorying of cultural resources.

An effective and consistent set of records should be one of the first products of the procedures outlined under recommendation 1. The location and nature of a cultural resource site must not repose solely in the knowledge or memory of the individual who found it; detailed information on the location and description of sites must be obtained and the records maintained in perpetuity. There now exists a detailed manual of cultural resource management procedures produced by Forest Service Region 6, which provides guidelines and sample forms for the field recording of cultural resource data. A good discussion of archaeological site recording can also be found in Hester, Heizer and Graham (1975:22-30).

In developing a cultural resource inventory, it is extremely important to maintain and continuously update a master map record of all areas examined for sites throughout the districts of the forest, regardless of whether or not any sites were actually found. The present cultural resource inventory reported in this volume consists of data accumulated in an unsystematic manner over a number of years, and shows only where some sites exist. It does not indicate what the blank spaces mean—whether these areas actually lack sites, or merely reflect the absence of previous surveys (Lipe 1974:224). The keeping of a central map record of areas examined for cultural resources is essential to developing an understanding of factors affecting site location, and will lead to more confident and precise prediction of where sites may be expected to occur, as previously discussed.

As a matter of policy, the inventorying process should not include collection of artifacts. The nature and relative quantity of any artifacts observed should be described in the site records, but the specimens themselves should be left at the site. This is because the surface distribution of artifacts at a site is an important aspect of the information it contains, and to the extent that this distribution
is altered, information is destroyed. Adequate information for use in planning may be obtained without biasing the surface record at numberless sites by making artifact collections (Lipe 1974:226). The time for collecting is after scientific or interpretive objectives have been clearly formulated. Until then, sites should be located, protected, and left alone to the maximum extent possible.

Following established practice, copies of all site record forms should be forwarded to official state repositories where permanent archives are maintained. Archaeological site record forms should be sent to the Oregon State Museum of Anthropology, University of Oregon, Eugene. Site record forms for historic sites should be sent to the State Historic Preservation Office in Salem.

Recommendation 3. The Willamette National Forest should develop a standardized policy for assessing the significance of cultural resources on the lands which it manages.

Management decisions about cultural resources often require assessment of the significance of specific cultural resource sites. It is extremely important, therefore, to define adequate criteria and procedures for determining the significance of cultural resources. A useful distinction has recently been made between the "scientific" and the "community" significance of cultural resources. The scientific significance of a cultural resource depends primarily on the amount and kinds of information it is believed to contain. The community significance, on the other hand, depends on the specific resource's status in terms of the values and needs of the community in which it exists. A cultural resource may have very little scientific value but still be of considerable community significance—for example, if it is associated with an important person or event (King and Hickman 1973:15).

The major premise behind evaluating the scientific significance of cultural resources is that they are significant in proportion to the amount of information they can be made to yield (House and Schiffer 1975:163; Aikens 1976:16; Schiffer and House 1977:46). Furthermore, the specific significance of a particular site must be defined in terms of its potential relationship to current or projected research needs. At the outset it is obvious that in an area like the Willamette National Forest, which has been the focus of very little scientific research, any information is very important, and, at least initially, all sites must be considered highly significant and managed accordingly.

Standard procedures of scientific analysis now in use require a data base of sites selected for their general representativeness of the kinds of sites that occur within a region (Lipe 1974). Some problems of regional history and prehistory were described earlier in this overview. Other questions will undoubtedly emerge as research progresses. Because it is not possible to foresee all of the problems and questions to which any body of cultural resources might relate, it is necessary to preserve a representative segment of the cultural resource base for potential study.
in the future. An essential step toward the evaluation of scientific significance, then, is the establishment of a site type classification based on inventory data. An initial classification of the types of archaeological sites so far reported in the Willamette National Forest was presented in Table 9. As better documentation of the known sites is achieved, and new sites discovered, this can be refined. In an adequate classification, the range of site types as well as the number of each kind of site is indicated. Table 10 suggests the kinds of functional classificatory categories that are needed. A classification of this nature will enable planners to see which kinds of sites are abundantly represented in the inventory, which are unique, and which are missing from the known record. A representative sample of sites, selected in terms of both site type and the frequency in which the type occurs, must be maintained and protected from destruction in the future.

In addition to the dimension of scientific significance in which an adequate sample of sites of all kinds--large, small, rich, sparcce, deep, shallow, wet, dry--must be given highest priority for preservation, is a further dimension within which the individual importance of specific sites can be assessed. Some sites contain more information than others, due to factors of depth, preservation, richness of content, and the like. Table 11 offers a suggested approach to weighing the significance of individual sites, based on their analytical potentials. Because such sites are rare, simple prudence dictates that they should be given special consideration, over and above that accorded to them as members of the representative sample of site types.

Beyond their significance as sources of scientific information, many cultural resource sites may be of importance to local communities or to particular interest groups because of their educational potential or religious or cultural value. Native Americans, for example, are naturally interested in the protection of archaeological sites inhabited by their ancestors. Many prehistoric sites are of importance both as sources of scientific information and as religiously or culturally important localities. It hardly needs to be emphasized, for example, that the burial places of prehistoric Oregon Indians should be considered as sacred as the burial places of any other people. To the maximum extent possible, they should be identified and carefully protected from impact by construction, vandalism and other disturbances.

There is a growing recognition of still other kinds of values which prehistoric and historic resources have in our cultural heritage. Planners are becoming interested in the potential of certain historic sites for their educational and recreational aspects. Particular groups, or individuals, are realizing the value of historic resources that pertain to their specific heritage. Architects and other persons are supporting the protection of sites and structures whose beauty and structural interest add variety to the cultural environment.
<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Housepit depressions</td>
</tr>
<tr>
<td></td>
<td>Midden deposit (settlement)</td>
</tr>
<tr>
<td></td>
<td>Cave/rockshelter - large (habitation?)</td>
</tr>
<tr>
<td></td>
<td>Cave/rockshelter - small (camp; storage?)</td>
</tr>
<tr>
<td></td>
<td>Cemetery</td>
</tr>
<tr>
<td></td>
<td>Hunting blind</td>
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<tr>
<td></td>
<td>Hunting driveway</td>
</tr>
<tr>
<td></td>
<td>Fowling station</td>
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<tr>
<td></td>
<td>Gathering camp</td>
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<td>Fishing station</td>
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<td>Shell heap</td>
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<tr>
<td></td>
<td>Trailside temporary camp</td>
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<td>Vision-quest cairns</td>
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<td>Quarry</td>
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<td></td>
<td>Knapping station</td>
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<tr>
<td></td>
<td>Other:</td>
</tr>
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</table>

Table 10. Suggested Checklist of Possible Site Types. Sites may be tentatively assigned to such a classification on the basis of close observation of surface indications and surroundings, without excavation or collection of artifacts (after Aikens 1976).


<table>
<thead>
<tr>
<th>Site Characteristics</th>
<th>Potentially Applicable Analytic Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check as many as apply</td>
<td>Locational analysis</td>
</tr>
<tr>
<td>Evidence of human use</td>
<td>Typology/Classification</td>
</tr>
<tr>
<td>Artifacts abundant</td>
<td>Artifact technology</td>
</tr>
<tr>
<td>Artifacts varied</td>
<td>Lithic sourcing</td>
</tr>
<tr>
<td>Architectural indications</td>
<td>Seriation</td>
</tr>
<tr>
<td>Buried, possible stratification</td>
<td>Stratigraphy</td>
</tr>
<tr>
<td>Organic material preserved</td>
<td>Radiocarbon dating</td>
</tr>
<tr>
<td>Natural pollen source nearby</td>
<td>Obsidian dating</td>
</tr>
<tr>
<td>Rock art abundant, varied, or unusual</td>
<td>Tree-ring dating</td>
</tr>
<tr>
<td></td>
<td>Fission-track dating</td>
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<tr>
<td></td>
<td>Paleomagnetic dating</td>
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<tr>
<td></td>
<td>Amino acid dating</td>
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<tr>
<td></td>
<td>Thermoluminescence dating</td>
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<tr>
<td></td>
<td>Sedimentology</td>
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<tr>
<td></td>
<td>Pollen analysis</td>
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<td></td>
<td>Plant macrofossil analysis</td>
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<td></td>
<td>Faunal analysis</td>
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<td></td>
<td>Coprolite analysis</td>
</tr>
</tbody>
</table>

Table 11. Checklist for Assessing the Research Potential of Archaeological Sites. The site characteristics shown in the left-hand column are presumed to indicate potential for the kinds of analyses marked by stars in the columns to the right. Significance increases with the number of potentially applicable analytic techniques. Where the same technique is shown as applicable under two or more site characteristics, each application should be counted, since each pertains to a different aspect of the potential data base. Artifacts have been given two entries in the chart to allow for differential weighting of sites on the basis of greater or lesser size and artifactual richness. A site's significance rating may be expressed by the sum of the stars shown opposite all of the site characteristics checked in the left-hand column. Test-excavation may be required to establish some of the potentials (after Aikens 1976).
In addition to its other responsibilities concerning cultural resources, the Forest Service is enjoined to nominate worthy sites to the National Register of Historic Places. The suggestions presented above should aid in identifying appropriate sites, and in providing support for nomination. Detailed discussion and procedures for nomination are outlined in the Forest Service Region 6 cultural resource management handbook. It is suggested that the most significant sites known from each district be nominated to the National Register as a means of assuring them top management priority for protection and enhancement. A number of candidates for nomination have been previously identified within the currently existing inventory.

Recommendation 4. The Willamette National Forest should study the effects of various kinds of impacts on the cultural resources under its jurisdiction.

Of central concern to managers concerned with facilitating multiple use of the forest's lands is a sound knowledge of the effects that the different uses of these lands have on cultural resources. Logging, road-building, dam building, and recreation all affect cultural resource sites. The impact of some projects, as when a cabin is bulldozed off a reservoir dam site, are obvious. But other impacts are less easily assessed. In particular, the effects of various standard approaches to timber harvesting on archaeological and historic sites should be studied. Such information would have obvious practical value to the land manager faced with a decision on what to do about a site discovered in a timber sale area. Several selected tracts known to contain archaeological sites should be studied and mapped in detail both before and after being subjected to different harvesting procedures, and the methods and results published for the information of concerned people in and out of the forest.

Similarly, the impact of recreationists on archaeological sites needs study. Visitors to archaeological sites commonly collect artifacts from the surface, or even dig into the sites, some casually and some deliberately. Selected sites, as for example in or near forest camps, should be carefully mapped, and monitored over a typical season of use. Signs that would both interpret the sites and explain the necessity for protecting them should be installed at some locations, while others should be left unsigned. In this way, the relative effect of attempted public education about cultural resource values, versus attempted concealment of cultural resource sites, could be evaluated, and could provide a basis for further management decisions.

Recommendation 5. The Willamette National Forest should take positive action to educate forest users about cultural resource values, and to enforce protective laws.
As just noted, a significant cause of destruction of cultural resources is the collecting and excavating activities of members of the general public. The problem faced by the forest is not only one of informing the collecting public about the laws which prohibit such activities, but also of convincing collectors that such activities are genuinely destructive and should be stopped. Many inveterate collectors are aware of the laws, but unconvinced of their justice. In order to accomplish these goals an active educational program should be developed. Such a program might include interpretive displays at carefully chosen (and protectable) sites, public exhibits, and free public showings of well-chosen movies (for additional suggestions, see Lipe 1975). The long-term solution to the destruction of cultural resources probably lies in this direction, and investment in a program of this sort should in the long run prove far more profitable than any other conservation measures that could be taken.

For the immediate future, however, more direct protective measures are necessary. Fencing, signing, and patrol, especially in conjunction with one another, can provide a measure of protection in some areas. Important sites already damaged by collector's excavations should be stabilized by backfilling, seeding and any other necessary measures. A serious effort, with significant budgetary commitment, is urgently necessary, or else a situation may develop in which the forest devotes great effort and expense to the protection of cultural resources from the effects of its own potentially destructive activities, only to lose them to looters.

Recommendation 6. The Willamette National Forest should expand its cultural resource program in order to adequately meet the needs noted above.

The forest's effectiveness in managing its cultural resources is directly related to the level of the skills and knowledge of the employees concerned with those resources. The current policy of the Willamette National Forest of having cultural resource field technicians in each Ranger District is a good one and should be continued. However, at its present level, the program is not sufficient to insure fully effective management of the forest's cultural resources.

Organization and coordination of the activities of the various district-level field technicians, and development of a comprehensive plan for managing the forest's cultural resources, is critical. Virtually all of the cultural resource research undertaken thus far in the forest has been conducted in conjunction with specific, local projects, that meet only local, short-term informational needs. The time is now ripe, with the completion of this cultural resource overview, for long range objectives in the acquisition of historical and archaeological information to be provided for.
In order to develop the predictive data base previously envisioned in Recommendation 1, it is not enough merely to collect data on a project-by-project basis, as is now being done under the resource technician program. A systematic, forest-wide inventory survey program, incorporating but going beyond project needs, must be staffed, and provision must be made for the collation, synthesis, and interpretation of the data gathered if it is to provide a reliable and defensible basis for decision-making. Further, to ensure that the data routinely collected by resource technicians throughout the districts meet a uniform standard that will permit this kind of synthesis, some overall quality control of the data-gathering effort is needed.

To meet these needs, it is strongly recommended that the Willamette National Forest hire a professional archaeologist. This move would not be unprecedented, as other national forests in the western United States already have added full-time archaeologists to their staffs. Similarly, the Bureau of Land Management has developed a cultural resource program employing archaeologists in each of its management districts. The Willamette National Forest should seek an archaeologist who has attained an advanced level of training and, in addition, has some background in history and historical archaeology. Responsibilities of the Forest Archaeologist would include the design and direction of the inventory survey program just mentioned; supervision of the activities of the field technicians in each Ranger District; analysis, synthesis, and publication of the results of all cultural resource research; and participation in the planning of future ground-disturbing projects within the forest. The employment of a Forest Archaeologist and the continuing use of field technicians in each Ranger District offer the best means of strengthening the Willamette National Forest's cultural resource management program, and importantly, of building public confidence and trust in its quality.

An alternative to the hiring of a Forest Archaeologist would be for the Willamette National Forest to contract for professional archaeological services on a regular basis. The contractor would be charged with conducting systematic inventory surveys, for publishing the results, and for analyzing and interpreting at regular intervals--perhaps annually--the site survey information obtained by the forest's resource technicians. In effect, the contractor would partially fill the role of Forest Archaeologist, as above outlined. It would be difficult for an outside contractor to provide the needed supervisory quality control over the work of the forest's cultural resource technicians, but an adequate arrangement involving a management-level person within the Willamette National Forest, the Forest Service Region 6 Archaeologist, and the outside contractor might be developed.

Whatever personnel arrangements are ultimately made, the need for a high level of coordination and control within the cultural resource management program is crucial, if the objectives of Recommendation 1 are to be met.
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