Cultural Resource Overview of BLM Lands in North-Central Oregon: Ethnography, Archaeology, History

Kathryn Anne Toepel
William F. Willingham
Rick Minor

UNIVERSITY OF OREGON ANTHROPOLOGICAL PAPERS NO. 17 1980
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ARCHAEOLOGY, ETHNOGRAPHY, HISTORY

By
Kathryn Anne Toepel
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ABSTRACT

This document presents a descriptive overview of the cultural resources located on lands under the jurisdiction of the Bureau of Land Management in north-central Oregon. The purpose of this overview is to provide guidance for the interpretation of cultural resources found in the region and to present a framework for assessing their scientific and community significance. The overview is divided into several parts.

An environmental overview profices background information on the setting in which the cultural developments in prehistory and history took place. Included are sections on the climate, physiography, geology, vegetation, and fauna of north-central Oregon.

An ethnographic overview summarizes the information available concerning the aboriginal peoples inhabiting north-central Oregon at the time of historic contact. The primary aboriginal occupants of the area included the Tenino, Wasco, Umatilla, and Northern Paiute, but the Cayuse, Nez Perce, Molala, and Klamath-Modoc peoples sometimes traveled through the area.

An archaeological overview summarizes prehistoric cultural developments on the southern Columbia Plateau. Archaeological evidence indicates that prehistoric peoples have been inhabiting the area for more than 10,000 years, and that for most of this time they followed a way of life closely adapted to the exploitation of the riverine resources of the Columbia River and its tributary streams.

A historical overview discusses cultural developments in the study area since the arrival of Euro-Americans during the nineteenth century. The area has a rich and varied history which reflects many of the familiar themes in the history of the American West.

Two final sections provide a synthesis of the information presented in the preceding discussions, and present some recommendations for the future management of the cultural resources located in the area.

Last of all, there is an extensive bibliography of the documentary sources used in the preparation of this cultural resource overview.
PREFACE AND ACKNOWLEDGEMENTS

The present document represents the more general, and longer, portion of a Class I Cultural Resources Existing Data Inventory for the Bureau of Land Management lands of north-central Oregon. Preparation of this document was carried out under the terms of Contract No. YA 512-CT8-110, between the United States Department of the Interior, Bureau of Land Management, and the Department of Anthropology, University of Oregon.

The sections of this document describing the environment of north-central Oregon and the area's aboriginal inhabitants were prepared by Kathryn Anne Toepel of the Department of Anthropology, University of Oregon. The section dealing with the archaeology of north-central Oregon was jointly prepared by Toepel and Rick Minor, also of the Department of Anthropology at the University of Oregon. Research for the environment, ethnography, and archaeology sections of this document was concentrated in the library of the University of Oregon and in the files of the Oregon State Museum of Anthropology, but also involved material solicited from the Prineville District Office of the BLM, and from various archaeologists who have recently been active in Oregon. Portions of this document were abstracted from a previously prepared Class I Cultural Resources Inventory for the Brothers EIS Area, Prineville District, BLM in Oregon (Toepel and Beckham 1978). Between May and December 1978, Toepel and Minor spent more than 500 hours on the project while conducting research and preparing this report.

The portion of this document describing the history of the area is the work of Dr. William F. Willingham of the Department of History, Lewis and Clark College. Dr. Willingham's research consisted of the collection of data from historical records in both published and manuscript forms. One trip was made to the north-central Oregon region in July of 1978 to consult materials held on file at several local museums. He also reviewed all of the Government Land Office original survey maps for lands encompassed within the Lakeview District on file at the Bureau of Land Management Office in Portland, examined the records of the State Historic Preservation Office for information on historic sites, and carried out research in the map and book collections at the Oregon Historical Society library in Portland, Oregon. In all, Dr. Willingham spent in excess of thirty days on the project.

The final section of this overview proposing recommendations for the future management of the cultural resources within north-central Oregon was co-authored by Toepel and Minor, in consultation with Dr. Don E. Dumond, Chairman of the Department of Anthropology, University of Oregon. Final responsibility for editing, collating, and submitting
this document was assumed by Dumond, who acted as the Principal Investigator for this project.

Earlier drafts of this document were reviewed by Brian Cunningham, Recreation Planner for the Prineville District, and by Dr. Y.T. Witherspoon of the BLM State Office in Portland. Drs. Theodore Stern and C. Melvin Aikens, both of the Department of Anthropology at the University of Oregon, reviewed the ethnography and archaeology sections of this document, respectively. Permission to cite from Dr. Aikens' unpublished manuscript on the prehistory of the Northern Great Basin (Aikens n.d.) is gratefully acknowledged. The authors would like to express their appreciation to A.B. Cox who provided illustrations for this manuscript and to the Bureau of Land Management for permission to publish this overview. In addition, the following individuals graciously gave of their time and knowledge during the preparation of this document.

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Figure 1. Indians Fishing at Celilo Falls on the Columbia River. Photograph courtesy of the Oregon State Museum of Anthropology.
INTRODUCTION

This volume presents a descriptive overview of the cultural resources of the Bureau of Land Management's holdings in north-central Oregon. Cultural resources are those fragile and non-renewable remains of human activity, occupation, and endeavor as reflected in districts, sites, structures, artifacts, objects, ruins, works of art, architecture, and natural features that were of importance in human events, both historic and prehistoric. 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.

The Bureau of Land Management is required by federal law to identify and evaluate cultural resources on public lands under its jurisdiction, and to insure that Bureau-initiated or Bureau-authorized actions do not inadvertently harm or destroy cultural resources. These requirements are mandated by the Antiquities Act of 1906, the National Historic Preservation Act of 1966 as amended, the National Environmental Policy Act of 1969 (NEPA), and Executive Order 11593 (1971). The present cultural resource overview represents a major step by the Bureau of Land Management to implement these directives in north-central Oregon.

As specified in the agreement under which this project was conducted, the research reported in this cultural resource overview consisted primarily of a search of existing documentary and archival records. Preparation of this overview is intended to meet the following objectives:

(1) To provide guidance for the interpretation of cultural resources found during on-the-ground surveys within the north-central Oregon region;

(2) To provide a framework to assist in assessing the significance of cultural resources found within the area;

(3) To serve as a source of background data necessary for Environmental Analysis Records, Environmental Statements, Unit Resource Analysis (URA), Management Framework Plans (MFP), and other government project documents;

(4) To acquaint Bureau of Land Management employees with the presence and importance of cultural resources found in north-central Oregon; and

(5) To help inform the general public about the cultural heritage of north-central Oregon and to foster a sense of respect and care for significant cultural resources.
The bulk of this volume discusses the past settlement and use of the lands administered by the BLM in north-central Oregon and includes sections describing the area's environment, aboriginal inhabitants, prehistory, and history. A companion inventory volume of limited distribution, prepared for administrative use, provides more detailed information on specific cultural resources identified within north-central Oregon. A concluding section of this overview makes general recommendations for the future management of the cultural resources located on BLM lands in north-central Oregon. 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 pursue various topics discussed below.

THE AREA

This overview reviews the cultural resources known for approximately 9,000 square miles of public and private lands in north-central Oregon. The study area includes the northern portions of two Bureau of Land Management Districts, Prineville and Burns, which are divided into seven planning units by the BLM for management purposes as shown in Figure 1. They are listed as follows:

**Prineville District:**
- Fossil Planning Unit
- LaPine Planning Unit
- Lower Deschutes Planning Unit
- Lower John Day Planning Unit
- Upper Crooked River Planning Unit
- Upper Deschutes Planning Unit

**Burns District:**
- John Day Planning Unit

These six planning units encompass all or part of eleven counties. Table 1 provides an indication of the BLM holdings within each of the counties included in the study area. A glance at the final column of this table will show that only a small proportion of the lands in north-central Oregon are under the management protection of the BLM. It is estimated that only 800 square miles, or less than 9% of the study area, have been allocated to the BLM in this region. Roughly 500 square miles fall within the Prineville District (excluding the Brothers EIS Area), while approximately 300 square miles are managed in the John Day Planning Unit of the Burns District.
Figure 2. Location of BLM Planning Units in North-Central Oregon.
Table 1.
BLM Land Holdings by County in North-Central Oregon.

<table>
<thead>
<tr>
<th>County</th>
<th>BLM-Managed Acreage</th>
<th>BLM Lands (Square Miles)</th>
<th>% BLM-Managed Lands</th>
</tr>
</thead>
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<tr>
<td>Crook</td>
<td>511,341</td>
<td>799</td>
<td>26.8&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Deschutes</td>
<td>518,534</td>
<td>810</td>
<td>26.5&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Gilliam</td>
<td>23,717</td>
<td>37</td>
<td>3.0</td>
</tr>
<tr>
<td>Grant</td>
<td>170,950</td>
<td>267</td>
<td>5.9</td>
</tr>
<tr>
<td>Harney</td>
<td>4,046,449</td>
<td>6,323</td>
<td>63.8&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hood River</td>
<td>180</td>
<td>0.3</td>
<td>0.1</td>
</tr>
<tr>
<td>Jefferson</td>
<td>26,063</td>
<td>41</td>
<td>2.3</td>
</tr>
<tr>
<td>Klamath</td>
<td>288,549</td>
<td>451</td>
<td>5.9&lt;sup&gt;5&lt;/sup&gt;</td>
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<tr>
<td>Sherman</td>
<td>43,403</td>
<td>68</td>
<td>8.1</td>
</tr>
<tr>
<td>Wasco</td>
<td>35,731</td>
<td>56</td>
<td>2.3</td>
</tr>
<tr>
<td>Wheeler</td>
<td>87,200</td>
<td>136</td>
<td>8.0</td>
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</table>

<sup>1</sup>Figures as of September 1977 (U.S. Department of the Interior 1977).

<sup>2</sup>Figures from Loy (1976:20).

<sup>3</sup>The vast majority of BLM lands in Crook and Deschutes counties fall within the Brothers EIS Area of the Prineville District which is excluded from this study area (refer to Toepel and Beckham 1978).

<sup>4</sup>The vast majority of BLM lands in Harney County fall within the Lakeview or Burns Districts which are not included in this overview.

<sup>5</sup>Most Klamath County lands are included in the Lakeview BLM District (refer to Minor, Beckham and Toepel 1979).
THE AREA IN PREVIOUS RESEARCH

As will be discussed in the archaeology section of this overview, north-central Oregon has been the scene of some of the most important archaeological research in the intermontane western region of North America. There is a long tradition of archaeological research in the region, beginning with the pioneering work of Luther S. Cressman of the University of Oregon in the 1930's and 1940's. Cressman is noted for involving scholars from other disciplines--biologists, geologists, and geographers--as parts of multidisciplinary research teams in order to formulate well-documented statements about the relationship of prehistoric peoples and past environments. His work, notably at Fort Rock Cave, provided some of the first valid evidence that prehistoric peoples had been present in the Northern Great Basin at a very early time.

Cressman was also responsible for initiating long-term salvage projects in connection with the construction of dams on the Columbia River. In this area, his most important work was at The Dalles where a more or less continuous occupation beginning around 10,000 years ago was documented. Cressman also was the principal investigator during the early years of archaeological research in the John Day Dam Reservoir area; after his retirement, this work was continued by one of his students, David L. Cole.

In more recent years there has been a decrease in the number of pure salvage projects conducted by archaeologists. Most research now involves the location and evaluation of archaeological sites to provide information used in land use planning by federal and state agencies, as well as by private parties, as required by federal laws passed during the 1960's and 1970's.

Ethnographic studies indicate that north-central Oregon was occupied by Tenino, Wasco, Umatilla, and Northern Paiute peoples at the time of historic contact. Ethnographic research has been primarily restricted to studies on Indian reservations, to which most of the aboriginal peoples were removed in the late 1800's. To date, ethnographic studies have been conducted into various aspects of the lifeways of the Tenino, Umatilla, and Northern Paiute peoples. Very little ethnographic research has been carried out among the Wasco, and most of what is known about their lifeways has been obtained during studies of the closely related Wishram who lived on the Washington side of the Columbia River.

Little research into the history of north-central Oregon has been conducted by professional historians. At this time the most important work, especially from the perspective of cultural resource management, is The Statewide Inventory of Historic Sites and Buildings compiled by Historian Stephen Dow Beckham in 1976.
SOME RESEARCH SOURCES: MUSEUMS AND ARCHIVES

Specific documentation for all materials used is contained in the separate sections of this report, with relevant sources listed in the bibliography. Brief mention will be made here of only a few of the major collections that were found to provide information that was of particular utility and which can be expected to be similarly useful in the future.

Bowman Memorial Museum, Prineville, Oregon. This county-funded museum holds approximately 3,500 photographs, 81 books and scrapbooks, miscellaneous maps, and 2,000 artifacts from the prehistoric and historic periods in Crook County. The museum maintains an inventory of historic sites and buildings, a project which commenced in 1976. One of the special strengths of the museum is the excellent collection of items associated with the range industries and agriculture in central Oregon. The museum is operated by the Crook County Historical Society.

Deschutes County Historical Museum, Bend, Oregon. Operated by the Deschutes County Historical Society, this museum is located in a one-story lava building in Bend. The museum holds general collections of artifacts that relate to the region's history and prehistory. The Deschutes County Historical Society has published its annual Deschutes Pioneers' Gazette since 1943. This publication contains considerable information on the region's local history.

DeWitt Museum, Prairie City, Oregon. This museum houses materials focusing on the mining and ranching history of the region. Most items relate to past life in the areas of Prairie City, Long Creek, and the Middle Fork of the John Day River. The collection is being reorganized.

Fort Dalles Museum, The Dalles, Oregon. This city-county funded museum is located in the restored Surgeon's Quarters, originally constructed in 1856 on the grounds of Fort Dalles. The museum contains artifacts, photographs, and furniture depicting life in the fort and the surrounding community during the last half of the nineteenth century.

Fossil Museum, Fossil, Oregon. This museum displays an unorganized collection of memorabilia from Wheeler County's past that ranges from items of limited historical value to artifacts and photographs of much worth.

Herman and Eliza Oliver Historical Museum, Canyon City, Oregon. The materials in this museum present a comprehensive display of the gold mining and ranching past of Grant County. The museum has a
growing and well-organized archival collection of documents, newspapers, and historic photographs, as well as the usual display of artifacts.

**Kam Wah Chung & Company, John Day, Oregon.** Constructed in the 1860's, the building housing this museum is the restored pharmacy and general store that served as a center for the Chinese community in eastern Oregon from 1887 until the 1940s, and includes thousands of artifacts and relics which accurately illustrate the many former uses of the site and the Chinese culture of its last occupants.

**Oregon Historical Society Museum and Library, Portland, Oregon.** This collection is one of the finest regional historical libraries in the Pacific Northwest. The holdings include 50,000 published volumes, 12,000 reels of microform, 6,700 microfiche cards, and more than 200,000 photographs and negatives. The library has extensive scrapbook collections which are indexed, biographical card files, materials on family history, holdings of Oregon census records, and maps. The Oregon Historical Society also operates the state's largest historical museum and holds thousands of artifacts and objects associated with the state's history.

**Oregon State Library, Salem, Oregon.** The State Library possesses an extensive collection of regional historical and folklore materials, including the unpublished files of the Oregon Folklore Project operated by the W.P.A. in the 1930s. It has 329,974 titles, extensive vertical files of clippings, well-maintained card indexes to Oregon biography and history, and additional materials on microfilm. Several newspapers once published in the state are held as bound volumes or microfilms by this library.

**Oregon State Museum of Anthropology, Eugene, Oregon.** The most important museum collections of archaeological materials from north-central Oregon are those deposited in the Oregon State Museum of Anthropology, located at the University of Oregon in Eugene. The Museum of Anthropology is designated by Oregon state law as the state's official depository for antiquities, and all collections which have been made during archaeological projects conducted by major museums or educational institutions within Oregon, as well as some made by BLM employees, are presently housed there. In addition to the materials in the Museum of Anthropology, other museums at the University of Oregon—the Condon Museum of Geology and the University Herbarium—maintain collections in the fields of geology, vertebrate and invertebrate paleontology, malacology, mammalogy, ornithology, paleobotany, and palynology are pertinent to the study area.
University of Oregon Library, Eugene, Oregon. Founded in 1881, the library is the largest in the state with 1,308,375 bound volumes and 535,241 items in microform. The library is especially strong in regional history with holdings of almost all extant back files of every newspaper published in Oregon, thousands of manuscript items, and many rare books, maps, prints, and photographs which are housed in a special collections department. The library has published separate finding aids to the manuscripts collections dealing with Oregon history. Additionally, the library holds extensive published materials on the region's ethnology, linguistics, and archaeology. The library is the depository for theses and dissertations written at the University in the Departments of Anthropology and History and is a full depository for state documents. The federal documents collections are extensive and include materials from the time of the establishment of Oregon Territory.
CHAPTER I
ENVIRONMENTAL OVERVIEW

In order to gain a deeper appreciation and insight into the human use, both historic and prehistoric, of any region, the history of the natural environment of the area must be understood. Human occupational and use patterns have always been directly conditioned by such environmental factors as water sources, available food resources, flora and fauna, existing climatic conditions, topography, and available industrial raw materials. A brief discussion of the environmental factors of north-central Oregon follows below in order to provide a background for further discussion of the historic and prehistoric lifeways within the region.

CLIMATE

Portions of four major climatic regions (Figure 2) join within the study area (Loy 1976:137-9). The Columbia River region is characterized by lower elevations and a warmer, drier climate than the rest of the region. The Deschutes-Umatilla Plateau region to the south of the Columbia River is marked by slightly higher elevations, higher temperatures, and smaller daily temperature ranges throughout the year. The Northeastern Highlands, further south and east in the study area, include the higher elevations and widely variable temperature and precipitation ranges of the Blue Mountains. The fourth region, the High Plateau, includes the Upper Deschutes Lands in the southern portion of the study area. In this region, temperatures are extreme, and rainfall is minimal.

The variable climatic conditions found in central Oregon result from the interplay between maritime and continental air masses and the physiographic position of the area between two great mountain ranges. The Cascade Mountain Range blocks the moist Pacific Ocean winds, and so the district, which lies in the range’s shadow, is generally much drier than western Oregon. The Rocky Mountains further east form a buffer against the northeasterly winds of the continental air masses and thus contribute to the mild climate of the region. The general climatic features of the study area are light precipitation, low relative humidity, rapid evaporation, abundant sunshine, and extreme ranges in temperature. The physiographic variation within the study area plays a large part in determining differences in temperature and precipitation (Wells 1936).

The mean annual precipitation ranges from 8 to 16 inches (20-40 centimeters) in most of the area, with portions of the Columbia River region receiving up to 40 inches (100 centimeters) annually. East of the Cascades, a winter rainfall climate prevails, with the winter precipitation making up 30-40% of the total annual fall, spring 25-30%, fall 20-25%, and summer only 10-15% of the total annual precipitation. Dry
periods are normally expected in the summertime, but droughts are usually not a problem. Precipitation in the area is usually produced by low pressure systems which move in with dominant westerly winds from the Pacific Ocean (Franklin and Dyrness 1973:42; Sternes 1974:842, 860).

Because of the varying elevations, general aridity and scant vegetation, temperature ranges often become extreme within the district.

Figure 3. Climatic Regions of North-Central Oregon (Loy 1976:137).
Average annual minimum temperatures range from $32^\circ$ to $36^\circ$F. ($0^\circ$ to $2^\circ$C.) along the Columbia River to $16^\circ$ to $24^\circ$ F. ($-8^\circ$ to $-4^\circ$C.) in the more mountainous regions. Maximum annual temperatures are generally between $80^\circ$ to $90^\circ$ F. ($24^\circ$ to $29^\circ$ C.) along the river; while the higher elevations may be cooler, than $78^\circ$F. ($23^\circ$ C.). The diurnal temperature range may be as much as $28^\circ$ F. ($15^\circ$ C.) during the winter and $48^\circ$ ($25^\circ$ C.) in the summer (Wells 1936:4-2; Sternes 1974:857-8).

Studies of the paleoclimatic conditions of the area, based primarily on analyses of pollen profiles and varved clay counts, indicate that there have been several major climatic fluctuations since the continental glaciers retreated from the Pacific Northwest at the end of the Pleistocene epoch (Hansen 1942, 1947a, 1947b; Antevs 1948, 1955; Cooper 1958; Heusser 1960). The time period from the end of the Pleistocene 11-12,000 years ago to the present is known as the Holocene epoch. Henry P. Hansen (1947a, 1947b) made an extensive study of the Holocene climate of the Pacific Northwest at the same time that Ernst Antevs (1948, 1955) was investigating the past climate of the Great Basin area, which borders the study area to the south. Both men have results which are applicable to north-central Oregon (Figure 3).

The first period within the Holocene following the Pleistocene glacial period is termed the Anathermal by Antevs and the Early Postglacial (Period II) by Hansen. This period lasted from 9000 to 7-8000 years ago. It was a time of transition from the cold and wet climate of glacial times to increasing warmth and dryness. Climatic conditions were probably much like those of today by the end of this period.

Hansen calls the next stage the Middle Postglacial (Period III) and sets its range as 4000 to 8000 years ago. Antevs' comparable period is the Altithermal which ranges from 4500 to 7000 B.P. (Before Present). This climatic interval accelerated the warming and drying trend begun in the previous period, so that the general climate was distinctly hotter and more arid than at present. Evidence indicates that lakes in the area dried up and were drastically restricted, or disappeared, during this interval.

The most recent period, from 4500-4000 to present, is labeled the Late Postglacial (Period IV) by Hansen and the Medithermal by Antevs. According to their theories, the climate became cooler and moister and the remnant lakes began to hold more water. It should be mentioned that the magnitude and rates of change during the Holocene epoch were relatively gradual, and that the general climate at any one time had quite different effects depending upon the elevation and local environments (Aschmann 1958; Bryan and Gruhn 1964).
<table>
<thead>
<tr>
<th>Years B.P.</th>
<th>GREAT BASIN (Antevs 1955)</th>
<th>PACIFIC NORTHWEST (Hansen 1947a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,000</td>
<td>MEDITHERMAL</td>
<td>LATE POSTGLACIAL (cool and moist)</td>
</tr>
<tr>
<td>2,000</td>
<td>(cool and moist)</td>
<td>(cool and moist)</td>
</tr>
<tr>
<td>3,000</td>
<td></td>
<td>MIDDLE POSTGLACIAL (warm and dry)</td>
</tr>
<tr>
<td>4,000</td>
<td></td>
<td>(warm and dry)</td>
</tr>
<tr>
<td>5,000</td>
<td>ALTITHERMAL</td>
<td>EARLY POSTGLACIAL (cool and moist)</td>
</tr>
<tr>
<td>6,000</td>
<td>(warm and dry)</td>
<td></td>
</tr>
<tr>
<td>7,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8,000</td>
<td>ANATHERMAL</td>
<td></td>
</tr>
<tr>
<td>9,000</td>
<td>(cool and moist)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4. Post-Pleistocene Climatic Sequences in Northwestern North America.

Recent archaeological, paleofaunal, and hydrologic studies by Aschmann (1958), Bryan and Gruhn (1964), Baumhoff and Heizer (1965), O'Connell and Hayward (1972), O'Connell and Ericson (1974), Grayson (1976), D. Weide (1976), and Mehringer (1977) have led to a re-evaluation of the Antevs-Hansen scheme. Research indicates that the magnitude and rates of change during the Holocene epoch were relatively gradual. More importantly, it appears that the general climate at any one time had quite different effects depending upon the local environments. Effects are so variable in some places that the local climatic trend does not seem to follow the broad regional trend proposed above. Actually, the available data is conflicting and still too scanty to support even a moderately well-defined paleoenvironmental sequence (or sequences) for the Pacific Northwest. In the meantime, the Antevs-Hansen sequence should be understood as a very broad and generalized view of climatic processes for the last 9000 years which are in fact quite intricate and locally influenced.
PHYSIOGRAPHY

The environmental diversity of the study area is indicated by its division into four natural physiographic regions (Figure 4). These regions are (1) the Columbia Basin Province which lies within the Columbia Plateau region; (2) the Blue Mountains Province which marks the southern extent of the Columbia Plateau; (3) the High Lava Plains Province which is the northernmost extension of the Western Great Basin; and (4) the High Cascades Province, a natural barrier between eastern and western Oregon (Franklin and Dyrness 1973:6; Baldwin 1976:5).

Figure 5. Physiographic and Geological Provinces of Oregon (after Franklin and Dyrness 1973:6 and Baldwin 1976:5).
Roughly one-half of north-central Oregon to the west is located within the southern portion of the Columbia Basin Province. This region, situated on the northern slope of the Blue Mountains east of the Cascades, has been well described by Baldwin (1976:83) as follows:

Most of the area slopes gently toward the Columbia River. The elevations range from a few hundred feet near the Columbia River to nearly 3,000 feet along the south and west margins. The Deschutes, John Day, and Umatilla Rivers, and Willow and Butter Creeks, as well as other smaller streams, have been entrenched into the lava plateau forming steep walled canyons. The interfluves between the streams are less dissected. Broad alluvial deposits are exposed in rolling hills west of the mouth of the Umatilla River. They are located several hundred feet above the Columbia River and extend southward for several miles from the river. There are dunes in places... The broad Deschutes River valley is constricted where the river cuts through between the Mutton Mountains and the highland near Shaniko, and that part of the valley north of the canyon is included in this physiographic area.

Much of the remainder of the study area to the southeast is included in the Blue Mountains Province, which extends east from the Deschutes River Valley through the Ochoco and Strawberry Mountains. This province covers portions of the study area in Crook, Jefferson, Wheeler and Grant Counties. The region has generally been described as having "variable relief, with individual ranges separated by faulted valleys and synclinal basins" (Baldwin 1976:91). This area is a part of an ancient plateau which has been uplifted, folded and faulted. Elevations range from 2500 feet (750 meters) above sea level in the valleys to 9000 feet (2700 meters) in the Strawberry mountains. The portion of the Blue Mountains within the study area has more moderate slopes and lower elevations than the rest of the province to the north and east.

A small portion of the study area along the Upper Deschutes River in Crook and Deschutes counties falls within the High Lava Plains Province. This physiographic region consists of "a relatively undeformed expanse of young lava flows dotted in places by cinder cones and lava buttes" (Baldwin 1976:113). The area has only moderate relief in most places due to the recency of the lava flows which blanket much of the terrain. The base elevation for most of the province is about 4000 feet (1200 meters) above sea level with relatively little variation in elevation within this portion of the district.

The most interesting features of the High Lava Plains are the result of volcanic activity during Pleistocene and Recent times (within the last 2-3 million years). Examples of such volcanic features may be found
in the Deschutes National Forest adjacent to the lands of the study area; these include Newberry Crater, Lava Butte, Lava River Cave, and Lava Cast Forest (these formations are described by Baldwin 1976:117-18). Within the study area, volcanic features are also found in the Upper Deschutes Valley as noted by Baldwin (1976:116):

The area near Bend is drained by the Deschutes River, which rises in the Cascade Mountains. A broad expanse of Pleistocene lavas and tuffaceous deposits makes up this part of Oregon (Williams 1957). Basaltic sand and pumice are exposed west of Bend along the Deschutes River, and these are overlain by hummocky lava flows. The flows contain pressure ridges, elongate folds formed as the crust hardened and the molten interior still moved. Undissected cinder cones such as Pilot Butte, Abbott Butte, and Lava Butte are probably Late Pleistocene to Recent (Holocene). An area of nearly 2000 square miles northeast of ancient Mt. Mazama is covered by pumice that was blown out just prior to the collapse of the caldera now occupied by Crater Lake.

A very small piece of the study area within Hood River County is included in the High Cascades Province. This area includes the lower Hood River and is "essentially an area of rolling terrain interrupted at intervals by glaciated channels, some quite deep, carrying westward-flowing streams" (Franklin and Dyrness 1973:25). The elevation of the gently sloping area is between 5000 and 6000 feet above sea level (1500-1800 meters). As of 1977, only 180 acres of land in Hood River County were under the jurisdiction of the Bureau of Land Management [U.S. Department of Interior 1977:4].

The Deschutes and John Day river drainages dominate much of north-central Oregon and flow to the Columbia River which forms the northern boundary of the study area. In addition to these natural rivers and streams, the Bureau of Land Management has installed many miles of water pipeline and numerous water tanks, established hundreds of reservoirs, and developed an unknown number of springs and wells within lands under its jurisdiction in the study area. Round Butte Dam on the Deschutes River and The Dalles and John Day dams on the Columbia River were also designed to control the natural water resources of the district.

GEOLOGY

The four geologic provinces of the study area correspond with the physiographic regions mentioned above. The regions include the Columbia Basin Province, or the Deschutes-Umatilla Plateau according to Baldwin's
terminology (1976:5), the Blue Mountains Province, the High Lava Plains, and the High Cascades Province. Baldwin (1976) provides an extensive review of the geology and more specific studies of these regions. Figure 5 provides a reference to the geologic time periods referred to below.

The Columbia Basin Province contains only Cenozoic rock which slopes gently northward to the Columbia River. The oldest rock is the Eo-Oligocene Clarno group which contains rhyolite, andesite, basalt flows and breccia, as well as water-deposited sedimentary rock and multicolored tuffs. The Clarno beds contain many fossils of tropical and subtropical species, such as horse, rhino, crocodile, palm trees and cinnamon. The Clarno is unconformably covered by the Oligo-Miocene John Day Formation of red, green, and buff tuffaceous sedimentary rock. Many fossils are also contained in the beds of this formation (Chaney 1956, Stock 1946, Steere 1977). The Miocene Columbia River basalt group was deposited as consecutive flows of lava which lapped against the Blue Mountains and the Cascades in depths more than 2000 feet thick. This formation is overlain in turn by the younger Dalles and Deschutes formations. The most recent geologic event in the region was the late Pleistocene Missoula Flood which cleaned the talus and soil from the edges of the Columbia River up to an elevation of about 1000 feet and deposited ice-rafted erratics on existing gravel bars (Bretz et al. 1956).

The western portion of the Blue Mountains Province which constitutes the southern portion of the study area contains some of the oldest geologic formations in Oregon. These Paleozoic formations of the Carboniferous Period are composed of limestone, mudstone, and sandstone (Merriam and Berthiaume 1943). Fossils occur in these beds which outcrop along the South Fork of the John Day River and the headwaters of the Crooked River (Kleweno and Jeffords 1961). Franklin and Dyrness (1973:27-28) describe the remainder of the Blue Mountains formations:

Triassic and Jurassic formations are located near the communities of Suplee and Izee and consist of a wide range of rocks such as conglomerate, sandstone, siltstone, shale, and limestone. The Clarno (Eocene) and John Day (Oligocene) are two formations widely known because of their abundant vertebrate fossils. Located along the Lower John Day River, these formations are composed largely of breccia and varicolored tuffs. Columbia River basalt, a thick formation extruded in many sheets during the Miocene epoch, occupies large areas within the western Blue Mountains. Late Miocene and Pliocene formations are also present and consist of bedded tuffs and silts.
## GENERALIZED GEOLOGIC TIME CHART FOR OREGON

<table>
<thead>
<tr>
<th>EPOCH</th>
<th>PRINCIPAL GEOLOGIC EVENTS</th>
<th>AGE (in millions of years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOLOCENE</td>
<td>Glaciers in mountains receding. Crater Lake and Newberry Crater formed by explosion and collapse of volcanic cones. Lava flows near Mt. Hood, at McKenzie Pass, and in central and southeastern Oregon.</td>
<td>-011</td>
</tr>
<tr>
<td>PLEISTOCENE</td>
<td>Active glaciers in mountains. Growth of large volcanoes along crest of Cascades and in central Oregon. Pleistocene lakes in southwest-central part of State. Mastodons and giant beavers in Willamette Valley; camels and horses in grasslands of central and eastern Oregon.</td>
<td>-2.3</td>
</tr>
<tr>
<td>PLEISTOCENE</td>
<td>First deposition of lava at crest of Cascade Range. Extensive outpouring of lava in south-central Oregon. Horse, rhino, camel, antelope, bear, mastodons living in John Day country. Cascade Range high enough to form climate barrier. Drier climate east of High Cascade Range. Warm temperate climate west of Cascades initiates period of Interstizial.</td>
<td>-12</td>
</tr>
<tr>
<td>Oligocene</td>
<td>Willamette Valley and parts of Coast Range covered by warm, shallow seas. Inhabited by abundant and varied mollusks. Warm temperate flora growing in both eastern and western Oregon, with Metasequoia, maple, sycamore, ginkgo, and katsura trees plentiful. Three-toed horses, camels, giant pigs, saber-toothed cats, aardvarks, tapirs in John Day country. Cascade Range too low to affect climate of eastern Oregon.</td>
<td>-37-38</td>
</tr>
<tr>
<td>Eocene</td>
<td>A subtropical climate. Cool freezing in coastal swamps. Palms, firs, maples, pears, and walnuts grow in central Oregon. Four-toed horses, rhinos, tapirs, crocodiles in Clarno area. Western Oregon covered by arm of ocean, locally many mollusks. Large volcanoes in area of Cascade Range.</td>
<td>-53-54</td>
</tr>
<tr>
<td>Paleocene</td>
<td>Not mapped separately in Oregon. Late rocks of this age known in southern Coast Range.</td>
<td>-65</td>
</tr>
<tr>
<td>Cretaceous</td>
<td>Most of State covered by warm sea. Ammonites, trigonias, and other mollusks, abundant in Malheur and Mitchell areas. Tree ferns growing near Austin in Grant County. Formation of principal metasiltiferous deposits in State following batholithic intrusions.</td>
<td>-126</td>
</tr>
<tr>
<td>Jurassic</td>
<td>Oregon largely covered by seas. Brachiopods, mollusks, and ammonites abundant. Some ancient reptiles. Ferns, eyes, ginkgoes, and conifer growing on land areas. Period of terrigenous intrusion with formation of chlorite deposits followed by granitic intrusions in Klamath Mountains, Blue Mountains, and possibly Wallowa Mountains.</td>
<td>-190-195</td>
</tr>
<tr>
<td>Triassic</td>
<td>Most of Oregon covered by warm sea. Spines, corals, ammonites, gastropods, and nautiloids. Volcanoes active and widespread especially in northeastern and southwestern Oregon.</td>
<td>-225</td>
</tr>
<tr>
<td>Permian</td>
<td>Warm seas cover much of State. Limestone reefs forming. Foramniferans common. Volcanism in northeastern part of State. Rocks now exposed in central and eastern Oregon.</td>
<td>-280</td>
</tr>
<tr>
<td>Carboniferous</td>
<td>Much of State covered by warm seas containing brachiopods and corals. Ferns and helminthoids growing on land areas. Rocks now exposed in Siskiyou area of central Oregon.</td>
<td>-345</td>
</tr>
<tr>
<td>Devonian</td>
<td>Seas probably covered Oregon. Small limestone outcrops in central Oregon contain Middle Devonian corals (about 370 m.y.):</td>
<td>-395</td>
</tr>
<tr>
<td>PRE-DEVONIAN: <em>Pre-Devonian</em> includes the vast stretch of geologic time extending back to the oldest rocks found on the earth. Rocks of this age are not known in Oregon. Nearest <em>pre-Devonian</em> rocks (450 m.y. old) are in Klamath Mountains, northern California.</td>
<td>-Adapted from U.S. Geol. Survey</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6. Geologic Time Periods of Oregon (from Baldwin 1976:3).
The High Lava Plains, in contrast to the Blue Mountains, is a province composed of more recent geological formations (Walker et al. 1967; Greene et al. 1972). This province has been typified by Franklin and Dyrness (1973:33) as follows:

Geologic formations in the High Lava Plains Province consist largely of Pliocene and Pleistocene lavas, tuffs, and alluvium. In many areas, Quaternary valley fill deposits overlie the older volcanic flows. These are comprised of alluvium and lake deposits plus eolian sediments, all of which were derived from the volcanic rocks of the uplands. Evidences of extensive volcanic activity during Pleistocene and Recent times are abundant...
Pumice, resulting from the eruption of (Newberry Crater) about 4,000 years ago, mantles an extensive area to the north and east of the crater.

Geologic activity in the area has resulted in a relatively flat land dotted with volcanic formations, few of which have been formally described and named. The recency of many of the volcanic flows is attested to by their lack of forest cover. During the Pleistocene, lava flowed into the Deschutes and Crooked rivers and filled much of the valleys. Later erosion carved the valleys now seen today.

The High Cascades Province, bordering the western edge of the study area, is explained by Franklin and Dyrness (1973:25-26):

The High Cascades Province is geologically young; some flows of lava (scoriaceous 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....Bedrock in the High Cascades Province is frequently obscured by a mantle of pumice and ash from several volcanic eruptions. The most extensive deposition of these materials resulted from the explosive culminating eruption of Mount Mazama, which occurred about 6800 years ago. Glacial deposits are also locally abundant, especially adjacent to some of the higher peaks.

Deposits of obsidian, crypto-crystalline silicates (such as chert and chalcedony), and basalt, which are the best materials for making
lithic tools, were quarried and utilized by the aboriginal peoples inhabiting north-central Oregon. During pioneer times, mining activity in the area was primarily focused on quartz, gold, and quicksilver. At the present time, deposits of industrial minerals (such as diatomite, zeolite, perlite, pumice and cinders, and asbestos) and metallic minerals, including chromium, copper, lead, zinc, gold, silver, mercury and uranium, have been located within the district. In addition, prospective areas for oil and gas, as well as coal deposits, have also been found in the region.

VEGETATION

Five main vegetation zones of the forest and steppe provinces have been recognized by Franklin and Dyreness (1973) within north-central Oregon. These zones are as follows: (1) Abies grandis (grand fir) Zone of the moist highlands; (2) Pinus ponderosa Zone, a lower elevation within the forest province; (3) Juniperus occidentalis, the transitional zone between the forested areas and the shrub-steppe; (4) the shrub-steppe region, dominated by big sagebrush (Artemesia tridentata); and (5) the steppe zone of drought tolerant grasslands. The distribution of each zone is given in Figure 6.

The Abies grandis Zone constitutes only a small portion of the study area in the higher elevations of Hood River County. The zone is found in the moderate environs of the eastern forests where neither moisture nor temperature conditions are extreme. The coniferous forests of this zone thrive at elevations of 3700 to 5000 feet (1100 to 1500 meters) above sea level in the central Oregon Cascade Range and at a range of 5000 to 6700 feet (1500 to 2000 meters) in the Ochoco and Blue mountains. Grand fir is characteristic of the zone's forests, although Douglas fir is a prominent species on warmer and drier sites.

The Pinus ponderosa Zone is located in the foothills of the Cascades and the Blue Mountains within the study area. The elevation range of the zone is about 3000 to 5000 feet (900 to 1500 meters) above sea level to the north, with the elevation generally becoming higher to the south. At the lower limits of the zone, ponderosa pine stands merge and are often interspersed with the open juniper-sagebrush woodland. A preference for xerophytic (dry) conditions as well as a liking for coarse-textured soils distinguishes the ponderosa pine from other major floral zones.

The composition of the species within the zonal community is affected by factors such as soil type, climate, geographical location, elevation,
Figure 7. Vegetation Zones of North-Central Oregon (from Loy 1976:145).
and stand disturbances (e.g., fire, logging). Tree species which occur with Pinus ponderosa within the study area include Quercus garryana (white oak), Pinus contorta (lodgepole pine), and Juniperus occidentalis (western juniper) all of which occur in the more xeric (dry) areas, and Populus tremuloides (quaking aspen), which is restricted to shorelines, banks, and poorly drained wet areas. The open nature of Ponderosa pine stands provides abundant understory niches for a variety of plants, including many shrub-steppe species. The most widespread of these are Purshia tridentata (bitterbrush), Artemisia spp. (sagebrush), Chrysothamnus spp. (rabbitbrush), Agropyron spicatum (bluebunch wheatgrass), Festuca idahoensis (Idaho fescue), Poa sandbergii (Sandberg's bluegrass), and Bromus tectorum (cheatgrass brome).

The Juniperus occidentalis Zone is the northernmost extension of the Pinyon-Juniper Zone which characterizes so much of the Great Basin. This open woodland/savanna zone is scattered throughout the southern half of the district, occupying regions which are intermediate in moisture between the forest and shrub-steppe zones. The zone's elevational range is between 2500 and 4600 feet (760 to 1400 meters). The Juniperus occidentalis community thrives on even more xeric conditions than Pinus ponderosa, and so it occurs in areas where the soil is more loamy, shallower, and not as coarsely textured as that preferred by the forest zone. A general description of the species within the zone is given by Driscoll (1964:5):

Juniperus occidentalis is the dominant tree species of the area. An occasional Pinus ponderosa may be found in canyon bottoms or on north slopes where soil moisture is more effective. Natural wide spacing of individual junipers provides the aspect of a savanna...Artemesia tridentata (big sagebrush) is most often the dominant shrub in the understory. Occasionally it is displaced wholly or to codominance by Purshia tridentata (bitterbrush).

Other shrubs characteristic of the area are gray and green rabbitbrush, gray horsebrush, granite gilia, and low sagebrush. Bluebunch wheatgrass and Idaho fescue, as well as bluegrass and needlegrass, are characteristic grasses of the Juniperus occidentalis understory.

The fourth zone occupies the central portions of the study area which lie in the arid areas of the lower elevations at the base of the mountain ranges. The Shrub-Steppe Zone, a grassland with conspicuous shrub layers, is dominated by perennial grasses and sagebrush species. These sagebrush communities are typically found in areas of finer textured, clayey soils. Artemesia tridentata prefers deeper soils, while A. arbuscula (low sagebrush) occurs with more shallow, stony soils.

Some of the shrubs which occur in association with sagebrush include Chrysothamnus (rabbitbrush), Ribes cereum (wax currant), and Symphoricarpos
rotundifolius (round-leaved snowberry). Juniperus occidentalis occasionally occurs on rimrock habitats, intermittent drainages, and mesic northern slopes. Primary associated grasses are Agropyron spicatum (bluebunch wheatgrass), Festuca idahoensis (Idaho fescue), Bromus tectorum (cheatgrass brome), and Elymus cinereus (giant wildrye). A variety of perennial and annual herbs also occur in this zone.

The final zone, the steppe proper, dominates the northern section of the study area. The zone is primarily composed of grassland species with occasional individuals of Pinus ponderosa and Juniperus occidentalis and scattered shrubs of sagebrush and rabbitbrush. The dominant understory vegetation is Festuca, Agropyron, and Poa (bluegrass). Cercocarpus (mountain mahogany) predominates in some communities. Much of the original steppeland has been altered, but under pristine conditions the zone was dominated by Idaho fescue, bluebunch wheatgrass, and Sandberg's bluegrass (Poa sandbergii), as well as a number of other herbs (Loy 1976:144).

Some paleoenvironmental research, primarily by Hansen (1947a), has been carried out within the boundaries of the study area and provides a means for surmising the vegetation of the area through much of the Holocene. Unfortunately, most of the inferences concerning paleoenvironmental conditions and related vegetation in eastern Oregon have been based on tree genera, and not on the shrubs and grasses which are typical of eastern Oregon (Heusser 1960; Leopold 1967:239). The recency of the land formations in the area, particularly in the High Lava Plains to the south, makes it seem likely that the lower elevations were composed of open woodlands and meadows, rather than forests. Due to the moister climate prior to the early postglacial times, the vegetation probably would have been lushier and better able to support browsing and grazing animals than the grasslands present today (McCormack 1920:18). Pollen studies at Tumalo Lake near Bend indicate that the forests may have extended lower in elevation than at present, due to the cooler and moister climate (Hansen 1947a:115). As the climate became warmer and drier, the forests receded and the meadows became grasslands. During the drier times of the Middle Postglacial, the grasslands probably expanded in area for a time, only to return to their present distribution with the cooler and wetter Late Postglacial climate (Detting 1968).

Before the arrival of white settlers and livestock, the effects of fire and grazing on shrub-steppe vegetation were apparently quite limited. It has been suggested by some, however, that range fires and particularly overgrazing by cattle and sheep have had an acute effect on the status of the shrub-steppe region. The status of sagebrush, which does not regenerate after burning, and the native perennial grasses, which were heavily affected by overgrazing, has been altered, and alien species have moved in to establish themselves. Many studies of the ecological aspects of shrub-steppe vegetation have been made (refer to Franklin and Dyrness 1973:210-11; also Young et al 1976), but further work remains to be done.
FAUNA

During the latter part of the Pleistocene epoch over 10,000 years ago, eastern Oregon was inhabited by several animal species which no longer occupy the area. Most of these animals were large browsers and grazers, such as bison (Bison antiquus, B. bison), camelids (Camelops), native horse (Equus) and ground sloth (Mylodon) (Hester 1960; Martin 1967). With the climate changes which marked the end of the Pleistocene, these animals were replaced by more modern species. It has been proposed that the climatic shift and/or human hunters served as agents for the extinction of these megafaunal species (Martin and Wright 1967).

A wide variety of animal species presently inhabit north-central Oregon. The following summary has been derived from Bailey (1936), Burt and Grossenheider (1964), Ingles (1965), Verts (1971), and Loy (1976). All give extensive reviews of wildlife in Oregon.

Mammals of the region include among the lagomorphs the pika, cottontail, two rabbits, and two hares. Species of rodents make up the most numerous group, ranging from mountain beaver and yellow-bellied marmot through eight species of squirrels, two of chipmunks, twenty-three of gophers, mice, rats, and voles to porcupine, nutria, and beaver. One marsupialia, the opossum, is known. It is an introduced species, having been released in Umatilla County in 1912. Shrew species number four, and fourteen species of bats are found.

Among the hoofed animals are black-tailed, white-tailed, and mule deer, Rocky Mountain and Roosevelt elk (Wapiti), and the pronghorn antelope.

Short-tail and long-tail weasels, mink, marten, fisher, river otter, badger, and spotted and striped skunks make up the quite numerous mustelidae. The canids are represented by the red and the gray fox, and by the ubiquitous coyote. Wolves had been thought to be extinct, but some recent reports leave this in doubt. The grizzly bear is undoubtedly extinct in this area, but the black bear is frequently found in the forested and more mountainous areas of this study. Bobcat, lynx, and mountain lion represent the felines in steadily diminishing numbers.

According to Stebbins (1966), amphibians are found in seasonally as well as year around moist habitats in this area, and include several species each of salamanders, frogs, and toads. Reptiles are numerous; included are at least ten species of harmless snakes, plus the western rattlesnake. This species is found in all habitats in the area, and is rightly respected for its danger to humans and livestock. Eight species of lizards are easily seen on warm days in appropriate habitats.
The many rivers and streams of the study area harbor numerous fish species. Native freshwater species include suckers, minnows, dace, and trout. Native anadromous fish include steelhead, salmon, lamprey eel, sturgeon, smelt, and sculpin. Some species, such as bass, sunfish, catfish, salmon, trout, and minnows, were introduced by accident or by design. Four state fish hatcheries, and one federal hatchery are located within the study area and reflect the economic importance of commercial, Indian, and sport fishing.

Hundreds of bird species breed, migrate, or winter in various portions of north-central Oregon. The Deschutes, John Day, and Columbia River valleys form a major North American flyway, and provide as well an important wintering area for large numbers of hawks and eagles. The grassland, forest, and grassland/forest ecotones, together with considerable miles of river bank, provide the necessary habitats. Several state and federal wildlife management areas are found here.

In addition to wildlife, the district also provides grazing lands for domestic livestock. Within the Prineville District proper, over 1.3 million Bureau of Land Management acres were used for grazing cattle, horses, sheep, and goats in 1976.

**SUMMARY**

North-central Oregon consists primarily of private lands interspersed with a scattering of lands administered by the Bureau of Land Management. The Bureau lands addressed here are located for the most part close to the Deschutes and John Day water courses and sometimes border on National Forest Service lands which form the boundaries of much of the study area.

The climate of the area is characterized by light precipitation, abundant sunshine, and extreme temperature ranges. A majority of the area has variable relief and generally lies between elevations of a few hundred to 9000 feet above sea level.

On the basis of physiography and geologic characteristics, north-central Oregon can be divided into four major regions. Roughly one-fourth of the study area to the west is located within the Columbia Basin Province which is situated on the northern slope of the Blue Mountains east of the Cascades. Much of the area is dissected by well-intrenched tributaries of the Columbia River. Much of the remainder of the study area is included in the Blue Mountains Province which was formed by an ancient plateau that has undergone much lifting, folding and faulting to form the variable relief which characterizes the region. A very small portion of the study area falls within the High Cascades Province, while the remainder of the
study area along the Upper Deschutes River is included in the High Lava Plains. This latter region is covered with recent lava flows having little in the way of a definitive drainage pattern which has created a rather flat terrain.

Five major vegetation zones are found in the study area. The zoning of vegetation is a reflection of different factors, such as soil, climate, elevation and physiography. The highest elevational zone is the Abies grandis or Grand Fir Zone, constituting only a small portion of the study area in Hood River County. The Pinus ponderosa Zone is also located in the higher elevations of the study area, along the slopes of the Cascades and the Blue Mountains. Ponderosa pine occurs with western juniper, bitterbrush, Idaho fescue, and other grasses and sedges within this zone. The Juniperus occidentalis Zone is the transitional zone between the pine forests and the grasslands. This zone, which occupies scattered regions throughout the southern half of the district, includes western juniper, sagebrush, rabbitbrush, bitterbrush, and assorted grasses. The fourth zone, the shrub-steppe, is a grassland primarily composed of sagebrush, rabbitbrush, and a variety of perennial and annual grasses and herbs. This zone covers the lower elevations in the central portion of the study area. The final zone, the steppe proper, dominates the northern section of the district and is characterized by grassland species with occasional pine and juniper and scattered sagebrush and rabbitbrush.

Wildlife in the area includes a wide variety of large and small mammals (both game and non-game species), amphibians, and reptiles. Many fish species are found in the waters of the region, and hundreds of bird species occupy various portions of north-central Oregon.

Paleoecological studies indicate that there was a climatic change at the end of the Pleistocene with the glacial recession. The climate began a trend from a moist cool climate to warmer and dryer conditions after 8-10,000 years ago. The vegetation adjusted from the lush meadows of a moister environment to the less rich grasslands of a more arid and hotter climate. Many animal species, including large browsers and grazers such as bison, camels and horses were unable to survive and became extinct. Subsequent climatic fluctuations were not major, but these later changes also affected the distribution of plant and animal species.

Archaeological evidence indicates that eastern Oregon has been occupied by humans for at least 13,000 years. During this time, people have had to adjust to climatic changes, shifts in vegetation and game, and to geologic occurrences such as volcanic activity. The patterns of human use in the area, past and present, must be seen in the context of the land's formation and the distribution, abundance, and exploitability of its resources. The various ways in which the Euro-American and Native American cultures utilized the same environment, at different times and for different purposes, will be examined in the following sections of this overview.
CHAPTER II
ETHNOGRAPHIC OVERVIEW

INTRODUCTION

The interpretation of past lifeways which are evidenced in the archaeological record depends primarily on making inferences from pertinent ethnographic evidence. This method, known as ethnographic analogy, involves comparing the archaeological evidence with the known cultural patterns of natives inhabiting the region during times of white contact. Inferences about the older lifeways are then made on the basis of similarities and differences between the historic and prehistoric inventories. The main difficulty with the use of ethnographic analogy is that it is often not possible to assign to archaeological material a specific linguistic or cultural affiliation. In the case of north-central Oregon, the archaeological record indicates that the inhabitants have followed the same basic subsistence pattern based on hunting, fishing, and gathering for many millennia. Although it is possible and even likely that the same cultural or linguistic groups have not always occupied the region, the most accurate interpretation of the prehistoric record can be obtained only by examining the ethnographic and historical records describing the aboriginal occupants of the area during contact times.

There is one major shortcoming in the accounts of explorers, fur traders, pioneers, and missionaries who were the earliest Euro-Americans in the area. When Oregon was initially explored and settled, the explorers, settlers, and fur traders "clung to the main river course (the Columbia River) shunning the arid country which borders it on both sides from the Cascade range to the Snake River" (Suphan 1974a:14). The arid central plateau of north-central Oregon did not have any rich farm land or productive trapping territory to offer the whites, and so the area was generally by-passed and the lifeways of its inhabitants left largely unrecorded. The earliest records we have describing the area are the journals of Lewis and Clark (Thwaites 1905), which mention the inhabitants of settlements encountered along the Columbia River in 1805-6, as well as hearsay which was gathered from the Columbia River Indians mentioning the people to the south.

Fortunately, several journals exist which recount later explorations into north-central Oregon along the Deschutes and John Day river valleys. Peter Skene Ogden, a fur trader for Hudson's Bay Company, kept a journal while he trapped along the Deschutes and John Day rivers in 1825-29 (Ogden 1950, 1961, 1971). Nathaniel J. Wyeth (1899) kept an account of his expedition along the Deschutes River in 1834-35. John Charles Fremont (1846) explored the Deschutes on his way to California in 1843, and Lieutenant Abbot (1855) of the
Pacific Railroad Survey reported his journey down the Deschutes from Klamath territory. These historic accounts provide scant but important bits of information on the natives of the region.

In addition to the historical records, various ethnographic and linguistic studies have also been made of the historic native inhabitants of north-central Oregon. The more important studies include Curtis (1911), Jacobs (1937), Loud (1929), Mooney (1896), Murdock (1938, 1958), Ray (1936, 1938, 1939, 1942), Rigsby (1965, 1969), Stewart (1934, 1937, 1938, 1939), Stewart (1938, 1939, 1941), and Whiting (1950). Additional studies will be mentioned below in the appropriate subsections on the native occupants of the region.

It should be mentioned that all ethnographic research in this region was undertaken many years after the aboriginal inhabitants had been moved to various reservations and their culture drastically affected by contact with the whites. As a result, these accounts may not relate a completely accurate picture of the native cultures prior to historic contact.

Linguistic Relations of Aboriginal Occupants

The languages of North American Indians have been taxonomically ordered according to the number of linguistic features they share with each other. Like the biological taxonomies after which the language taxonomies are patterned, inclusion in a particular grouping indicates a given level, or certain degree, of "genetic" or shared similarities. For example, phyla are more distantly related than families, which in turn share fewer features than languages within a single family. Dialects are closely related forms of a single language which can be understood by a speaker of any dialect of that language. Languages which contain a high level of unique features are termed "language isolates"; this term indicates that such languages can only be related tenuously to other languages within the language phylum.

The aboriginal people who occupied north-central Oregon at the time of historic contact spoke several languages which have been classified into two main language phyla as indicated in Table 2. Speakers of the Penutian languages were situated along both sides of the Columbia River and occupied the northern two-thirds of the study area, as well as most of Oregon (Figure 7). Speakers of Northern Paiute, a Uto-Aztekan language, covered most of southeastern Oregon including the lower portions of the study area.
Figure 8. Indian Distribution in Oregon, circa 1850 (after Loy 1976:7).
Culture Areas of North-Central Oregon

Much of north-central Oregon is included in the Middle Columbia region of the Columbia-Fraser Plateau culture area as defined by Kroeber in his outline of Cultural and Natural Areas of Native North America (1939:56):

The Middle Columbia area is partly sagebrush-juniper and partly bunch-grass steppe, with pine forest on the higher levels. This is the recent Sahaptin area, with a few interior Salish tribes, such as the Wenatchi, Sinkiuse, Spokane, and the Wailatpu (Cayuse). The Sahaptin territory on the lower Snake and Salmon rivers is pine, interspersed with bunch-grass tracts.

An additional culture area, the Great Basin, is represented in the southernmost portions of the study area which were occupied by the Northern Paiute in ethnographic times (Kroeber 1939:50). Although Kroeber acknowledges the similarities between the two culture areas, he concludes that their basic union "seems to rest on the recognition of a negative fact: the absence of nearly all the more intensive culture manifestations of the coast on one side and of the plains on the other" (1939:49). Kroeber prefers to see cultural ties between the Great Basin and California and views the Middle Columbia region as a transition area between the Plains and the Northwest Coast culture areas (1939:57).

Problems Regarding Aboriginal Distribution

It is quite difficult to determine the pre-contact territories occupied by native groups as they have varied through time. There are several reasons for this territorial state of flux. Contact with Euro-Americans brought diseases and epidemics for which the aboriginal people had no resistance. Although the impact of disease on the Indians of Oregon has not yet been fully documented, it is known that some groups had no survivors of these epidemics and others were only a little more fortunate. Consequently, the local native populations were drastically reduced by as much as 60% to 90% in eastern Oregon in the early 1800's. The virulent epidemics were mainly concentrated among the large settlements along the Columbia River (Minto 1900:309), but disease also took its toll among the more sparsely settled natives of the interior plateau to the south, significantly reducing their populations. With a sudden reduction in population, the territorial boundaries of various groups were not as stable as they otherwise might have been.
TABLE 2

CLASSIFICATION OF EASTERN OREGON LANGUAGES
(AFTER VOEGLIN AND VOEGLIN 1964, 1965).

<table>
<thead>
<tr>
<th>I. Penutian Phylum</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Chinookan Family (includes the Upper Chinookan language spoken by the Wasco peoples)</td>
</tr>
<tr>
<td>B. Sahaptian Family</td>
</tr>
<tr>
<td>1. Nez Perce Language</td>
</tr>
<tr>
<td>2. Sahaptin Language</td>
</tr>
<tr>
<td>C. Cayuse Language Isolate</td>
</tr>
<tr>
<td>D. Molala Language Isolate</td>
</tr>
<tr>
<td>E. Klamath-Modoc Language Isolate</td>
</tr>
</tbody>
</table>

| II. Aztec-Tanoan Phylum (includes the Northern Paiute language of the Ut-Aztekan Stock) |
Another reason for the uncertainty of the native distribution in eastern Oregon is that the aboriginal populations had been shifting and becoming more mobile in the protohistoric period, further blurring the boundaries of group territories. This was largely due to acquisition of the horse which was in the possession of the Plateau people sometime after 1730 (Haines 1938; Ray 1939:13). The horse increased the mobility of the natives, allowing the Cayuse, Nez Perce, Sahaptins, and others to go on bison hunting trips on the Plains. The acquisition of the horse also increased the ease with which the Penutians and Northern Paiute could raid and make war on each other. According to Ray (1939:40) "Sahaptin informants declare that this antagonism, and consequent conflict, has existed from time immemorial." Apparently, the boundary between the Northern Paiute and the Tenino, in particular, fluctuated frequently.

The remainder of the ethnographic section of this overview will be concerned with the subsistence and settlement patterns, technology, social structure, political organization, and religious systems of the Tenino, Umatilla, Wasco, and Northern Paiute who occupied the study area, and their neighbors. Summaries of these aspects of the aboriginal lifeways are abstracted from the historic accounts mentioned above and the ethnographic sources cited in each subsection. Such information should be seen as an integral part of the process of locating, interpreting, and managing aboriginal sites in north-central Oregon.

THE TENINO

Just before the establishment of the reservations in the 1850s, the Tenino occupied much of north-central Oregon in the present Prineville BLM District. Their territory included the Deschutes and lower John Day river systems as well as a small portion of the Columbia River. Only 400 square miles, or 5% of the 8,000 square miles of former Tenino territory, are presently under the jurisdiction of the Bureau of Land Management, but the BLM lands do include the more heavily used of the Tenino area, those along the main river course. A majority of the remaining lands are privately owned, although a sizeable portion has been allocated as the Warm Springs Reservation.

Although the Tenino were located along the Columbia River, the earliest and most frequented trail for Euro-American travelers and explorers, they were given scant attention by early ethnographers. The only substantive fieldwork done among the Tenino was undertaken by George Peter Murdock (1938, 1958) during the summers of 1934 and 1935. Verne F. Ray (1939, 1942) discusses the Tenino in the context of other Plateau groups but relies primarily on Murdock's field notes.
More recently, Suphan (1974a) interviewed Tenino informants in the early 1950s in preparing a comprehensive ethnological report for the Indian Claims Commission.

Language

The Tenino, or Wayampam as they have sometimes been called, spoke several dialects of the Sahaptin language of the Penutian language phylum. Other speakers of Penutian included the Nez Perce (who were closely related to the Sahaptin peoples), the Molala, the Cayuse, the Umatilla, the Wasco, and the Klamath-Modoc. Rigsby (1965:48) has delineated a group of closely related linguistic varieties within the Sahaptin language which he refers to as the Columbia River Sahaptin dialect cluster. Within Oregon, these dialects include (1) Tenino, (2) Tygh Valley, (3) Celilo, and (4) John Day dialects which each correspond to a subgroup of the Tenino. The Umatilla dialect is also included in this dialect cluster with the Tenino dialects. Two other Sahaptin dialect clusters have been defined by Rigsby on the Washington side of the Columbia River.

Linguistic material on the Tenino is almost as scarce as the ethnographic material. Some information has been collected by Melville Jacobs (1929, 1930, 1937), Bruce Rigsby (1965), and earlier researchers whose unpublished word lists are now in the Bureau of American Ethnology Archives.

Territory

According to Murdock (1958:299), the Tenino occupied the south bank of the Columbia River in aboriginal times from Big Eddy east to Arlington in Gilliam County and the lower watersheds of the southern tributaries of the Columbia, including Eightmile Creek and the Deschutes and John Day rivers (Figure 8). Neighbors included the Umatilla who resided to the east, the Wasco who occupied a pocket of territory northwest of the Tenino along the Columbia River, and the Molala who occupied areas to the west and south in the Cascades. To the south in the lava plateaus lived the Northern Paiute with whom the Tenino frequently feuded in historic times. Across the Columbia River from the Tenino on the north bank lived several other Penutian groups, including the Wishram and other Sahaptin peoples, but the Tenino did not recognize them as fellow tribesmen.

Murdock (1938:395-402) mentions that his informants stated that the Molala formerly occupied the Tygh Valley but were expelled in the early nineteenth century by one of the Tenino sub-groups and consequently occupied lands as far south as La Pine and Crane Prairie.
Figure 9. Territorial Boundaries in North-Central Oregon as Given by Ethnographic Sources (after Suphan 1974a). "A" refers to "disputed territory of Paiute, used by John Day Tenino for hunting;" "B" denotes area which was "originally Paiute territory, from which the Paiute were displaced by Tenino" in post 1810-20 period according to Murdock (1938).
Rigsby's Tenino informants, however, made no such mention of the Molala as former residents of the region. Rigsby suggests that the territory in southern Wasco and Jefferson counties was shared by several groups including the Wasco, Tenino, Cayuse, and Northern Paiute, with "perhaps even some Molala from west of the Cascades who crossed over 'to have a look around'" (Rigsby 1965:61). The problem of shifting tribal territories and the indeterminacy of the same has been briefly touched upon above.

Tenino Sub-Tribes

Before the establishment of reservations in the historic period, the Tenino numbered about 1,200 and were divided into four sub-tribes. Murdock described the organization of the Tenino as follows (1938:396):

They were divided into four sub-tribes or rather pairs of villages--one, with rather flimsy and temporary buildings, located on the river and used during the fishing season in the warmer months; the other, with substantial permanent dwellings, located several miles distant, usually away from the river, at a spot which provided water, fuel, and shelter from the winds during the colder half of the year.

These autonomous but friendly sub-groups each spoke a different dialect and were named after their village sites. The four local groups are described by Murdock (1938:396-7; 1958:299-300) and Rigsby (1965:52-62). Rigsby's orthography is used for the Tenino terms cited in this section.

(1) The Tenino proper (tinaynułáma) had a summer village four miles east of The Dalles on the Columbia River known as tinánúy, and they wintered inland along Fifteenmile Creek. The archaeological site (WS-4) which was excavated by L.S. Cressman (Créssman et al 1960:16-17) represents a portion of the sod summer village of tináynu. Cressman was in error in assigning this site to the Wasco as the Tenino have probably occupied that stretch of the Columbia River for a long period of time. (Further discussion on the location of the village of tináynu may be found in Rigsby 1965:55-57.)

(2) The Wyam of Lower Deschutes (wayamłáma) occupied the summer village of wayám ("above") at Celilo Falls near one of the largest fisheries on the Columbia River. When the dam at The Dalles was put into operation in 1957, the old village site and the falls were inundated. This summer village was a trading center for groups for many miles around. The Wyam generally spent the winter months at wanwa'wi, a village "on the left bank of the Deschutes River just above its junction with the Columbia" according to Murdock (1958:300);
Figure 10. Indians fishing with dip nets at Celilo Falls on the Columbia River about 1888. Photography courtesy of the Oregon Collection of the University of Oregon Library.

Figure 11. Three Indian men spearing salmon at Celilo Falls on the Columbia River, date unknown. Photograph courtesy of the Oregon Collection of the University of Oregon Library.
Rigsby cites tćux as the winter village and gives its location as "at the mouth of the Deschutes River" (1965:54).

(3) The John Day people (takšpašlāna) occupied several villages on the south side of the Columbia River. Tawāś was a summer village near present-day Quinton, Oregon; qe'mel was also a summer village located on the lower reaches of the John Day River (Murdock 1938:397). Winter sites included takšpāš near the mouth of the John Day and maxāx several miles up the river. Rigsby (1965:53) also mentions the site of tamāypx, the easternmost John Day village which was located near the present town of Arlington, Oregon.

(4) The Tygh or Upper Deschutes people are the most difficult group to properly locate due to the great amount of movement in the region in the last one hundred years. This group includes several small bands which wintered in Tygh Valley and adjoining regions and utilized portions of the Deschutes River system on their annual rounds. Rigsby attempts to locate and describe these small bands as follows (1965:57):

There is no single name to comprehend all these people. Tavxilāna properly refers to those people resident in Tygh Valley where two or more winter villages were situated. Tāxnilāna refers to those people resident at tāxni, at Sherar's Bridge, a choice fishing spot on the Deschutes River in the spring, summer, and fall. Milāna designates the people who resided at mili ("hot springs"), on the present Warm Springs Reservation.

Subsistence

Because the Tenino knew how to exploit riverine resources, the most important staple in their diet was salmon, of which several species annually ascended the Columbia River and its tributaries in great runs. Other water species, such as trout, whitefish, eels, suckers, and chub, were available throughout the year. In order to catch the fish, the Tenino used weirs, dams of rock and/or bundles of willows, funnel and hoop traps for use in creeks, open-top baskets below falls, willow bark and hemp nets (with wooden net floats and grooved stone net sinkers), gill nets, dip nets, hooks of bone and horn, spears, harpoons, and poison (Ray 1942:104-114).

Hunting seems to have been less important to Tenino subsistence. Deer, elk, antelope, brown bear, grizzly bear, and mountain goat were hunted with bow and arrow, spears, and clubs. Group hunting methods included surrounding the game or driving it into a natural enclosure. Rabbits, beaver, coyotes, and other small animals were taken with nets, deadfalls, and pitfalls. Birds were caught by nets and snares or were shot from blinds.
Figure 12. Excavations in progress at the Roadcut Site (35WS4) at Fivemile Rapids on the Columbia River during the mid-1950s. Photograph courtesy of the Oregon State Museum of Anthropology.
Vegetables and fruits also constituted a significant portion of the diet. Suphan (1974a:10-11) describes the available varieties:

Of the roots, camas and kouse were undoubtedly the most important; the former was gathered in the moist upland meadows and prairies primarily in the spring of the year, while kouse was found along open hill sides in dry rocky soil during April and May. These--as well as other roots such as lupine, wild onions, and wild carrots--were either eaten raw or prepared in various manners. Among the numerous berries to be found along the mountain slopes and river courses in fall, huckleberries, blackberries, chokecherries, and cranberries were perhaps among the most prevalent. Hazel nuts and acorns, as well as a moss used as a condiment, were also gathered in the forests in fall.

The following account of the annual subsistence round of the Tenino as given by Murdock (1958:300-301) also describes the seasonal activities and various shelters:

From November to March the Tenino occupied their winter villages, where each extended family had two houses--an oval or elliptical, semi-subterranean, earth-covered lodge used for sleeping and a rectangular frame dwelling with mat-covered walls and roof used for cooking and day-time activities. The winter was spent in the manufacture of artifacts, in stream fishing and fuel gathering, and in hunting and trapping.

Late in March the Tenino dismantled their winter dwellings and removed to their summer villages, where each extended family erected a rectangular shed of poles and mats with a flat rather than gabled roof. Half of this structure was used for drying salmon, the other half as living quarters. Special parties ritually gathered roots and caught salmon for an important first-fruits ceremony in early April. Neither salmon nor roots could be eaten until after these rites had been performed.

Following the spring festival, about half the families of a village departed for a series of expeditions into the interior, where the women gathered roots and the men hunted.

They lived in temporary camps of mat-covered tipis. The rest of the population remained in the summer village, catching and drying salmon. In July all returned to the villages for another first-fruits ceremony, this one featuring venison ritually obtained by a special party of six men and six women.
After the summer festival the Tenino again divided, part remaining in the villages to continue the salmon fishing, and to trade, while the rest visited the mountains to gather berries and nuts, with incidental hunting. In September, at the conclusion of the berry season, parties set out on long hunting expeditions up the Deschutes or John Day river, camping in tipis. The women smoked the meat which the men caught and gathered late-ripening roots and berries. In October a special party collected tule reeds for mats. The drying sheds were now dismantled, and the people moved to their winter villages, re-conditioning their semi-subterranean dwellings to initiate a new seasonal round.

Material Culture

In his monograph on Plateau culture element distributions, Ray (1942:140-164) gives an extensive account of the material culture of the Tenino. Utensils and dishes included twined willow baskets which were sometimes covered with pitch to hold water, twined cedar bark or rush baskets, mountain-sheep horn cups and spoons, wooden spoons and spatulas, clamshell spoons, wooden bowls, folded cedar-bark bowls, wooden and stone mortars, and stone pestles. Implements used in subsistence activities included a variety of wooden, horn and bone digging sticks, horn wedges, chisels, stone and wooden pile drivers, one-piece horn drills, obsidian knives, and horn and fishbone awls. Other items were flat, U-shaped, twined sifters, sewed rush baskets; skin carrying bags; rush and bark matting; a variety of fibers and cords; and raccoon and rabbitskin blankets. Weapons included three-foot self bows with sinew bowstrings, arrows with obsidian and bone points, wooden clubs, and rawhide shields. For water transport, the Tenino utilized dugout canoes and log rafts.

Sociopolitical Organization

The sociopolitical organization of the Tenino consisted of autonomous villages headed by village chiefs. The office of the village chief was simply an advisory and judicial one. The position was not necessarily hereditary, although the eldest son of a chief frequently assumed his father's role. Wealthy chiefs were preferred since they were better able to "help their people in bad times" (Suphan 1974a:26). Wealth distinctions were recognized, but no formal class distinctions existed. Since the Tenino engaged in the slave trade, they tolerated and practiced slavery to a limited extent even though the institution was generally disapproved among themselves.
Households were ordinarily composed of the families of two men, who were usually brothers, a man and his married son, or related in another way. Young couples often resided with the man’s parents for a time after marriage until the house was overcrowded. Local exogamy (marriage outside the village) was preferred. Intermarriage with neighboring Plateau groups frequently occurred. Polygamy, as well as the levirate and sororate, were commonly practiced. Weddings were major ceremonial occasions involving an elaborate exchange of presents between families and much feasting.

Feasting also commonly occurred after funerals. Much weeping and mourning accompanied the funeral preparations. The body was painted, adorned, and then tightly bound in new tule matting. Valuables were sometimes placed alongside the deceased. Bodies were most frequently interred in gravel banks or talus slopes; river banks and islands were also used as burial spots. Sometimes during the winter a corpse would be placed temporarily on a platform in a tree to await a spring burial. The Tenino preferred to bury their dead some distance from their villages (Ray 1939:61).

Religious Beliefs

Rituals and religion were an important part of Plateau life. Among the Tenino, all children were sent at the age of six or older on a one-night vigil or spirit quest in search of a guardian spirit. During these quests for spirit visions, the child was often instructed to keep alert by building rock piles (vision quest mounds). The spirits often took the form of birds and animals, but certain inanimate objects, natural phenomena, heavenly bodies, and mythological creatures also acted as guardian spirits. The grizzly bear, wolf, thunder, and lightning were considered to be the most powerful of the spirits. The powers conferred by the guardian spirits included weather control, clairvoyant power, warrior power, hunting and fishing powers, and the ability to find lost objects or persons (Ray 1942:234-5; Murdock 1965:166).

Shamans acquired more than the usual number of spirit helpers and could use their powers to either injure or cure. Murdock (1965: 170) points out that shamans also fulfilled a judicial function within the community, since the village chief lacked authoritarian power. In addition to healing, shamans were known to be capable of sorcery and were expected to use it against malefactors within the community. A good and successful shaman held greater prestige than a chief, but a malignant shaman who used his powers for his own gain was quickly killed to protect the community.

Several ceremonies were observed throughout the year. For the First Fruits Rite, which was held both in early April and in July,
venison, salmon, camas and berries were ritually prepared and a big feast was held amidst dancing, speeches, prayers, and singing. The Winter Spirit Dance was the major religious ceremony of the Plateau groups. The dance was sponsored by a shaman and lasted intermittently for sixty days. Activities of the mid-winter dance included initiation ceremonies, spirit dancing and singing (Ray 1942).

**Intertribal Relations and Trade**

The Tenino augmented the natural resources of their environment with items obtained through trade along the Columbia River. The Dalles region was a major trade center during aboriginal times, with an associated trade network extending throughout the Columbia Plateau, westward to the Pacific Ocean, eastward to the Great Plains, and as far south as northern California. Most of this trade took place from August to October after the salmon runs had slackened. Suphan (1974a:12) describes some of the trade items:

> From the east came buffalo robes, horses, and meat; the Klamath to the south brought elk skins and beads, the Wenatchee and Klikitat of Washington brought goat hair robes, slaves, meat, nuts and berries, while the coastal Indians came upstream to trade oysters, wappato, and trade goods obtained from the whites (Spier and Sapir 1930:227; Curtis 1911:8:93).

These items and others were traded for dried salmon, fish oil, and furs from the Tenino at the trade centers. Such widespread trade relations aided in the maintenance of intertribal peace throughout the Plateau. Some of the major trails used by aboriginal traders and travelers in north-central Oregon are shown in Figure 9. Many groups traveled and visited extensively, intermarried, and learned each other's languages. The only people with whom the Tenino had conflicts were the Northern Paiute, who had very little to trade. The Tenino and other Plateau groups often raided the Paiute for slaves to trade (Murdock 1958:302).

**Historic Contact**

The arrival of the Euro-Americans wrought many changes in the Tenino way of life. Disease depleted their numbers. White trade goods replaced traditional tools and household goods. The arrival of the horse, which the Tenino did not acquire until after 1800, provided greater mobility for them.

A southward expansion by the Tenino has been correlated with their acquisition of horses and guns. It is generally agreed that the Northern Paiute occupied the regions of the upper Deschutes south of the Mutton Mountains prior to being shoved out by the Tenino:
Most of this region, on the south or Oregon side of the Columbia, was formerly held by Shoshonean tribes of Paiute connection, which have been dispossessed by the Sahaptian tribes and driven farther back to the south... The Tenino themselves conquered the present Warm Springs Reservation from the Snakes. The expulsion was in full progress when Lewis and Clark went down the Columbia in 1805, but had been practically completed when the first treaties were made with these tribes fifty years later. (Mooney 1896:742)

With the treaty of June 25, 1855, the Warm Springs Reservation was established on the land which was newly acquired by the Tenino from the Paiute. The Tenino subsequently removed to the reservation where many of them settled in the vicinity of Simnasho. Murdock (1938:397) notes that "since their establishment on the reservation they have called themselves malila, meaning "warm springs".

THE WASCO

The ethnographic distribution of the Wasco included Hood River County and the northwestern corner of Wasco County in north-central Oregon. Although only a few square miles of the former Wasco lands are under the jurisdiction of the BLM, much of that land is situated at The Dalles, a significant area of concentrated aboriginal activity. The Wasco also traveled throughout the remainder of Wasco County and interacted extensively with the Tenino, the predominant occupants of north-central Oregon.

As with the Tenino, ethnographic information available on the Wasco is quite limited. Because there is no complete ethnography of the Wasco, a thorough study of their Wishram neighbors on the north side of the river (Spier and Sapir 1930) has often been used by extension as the primary source on the Wasco. Spier's discussion (1936) of tribal distribution in Washington only mentions the Wasco as affiliated with the Wishram. Edward Sapir includes a small collection of Wasco tales and myths gathered by Jeremiah Curtin in his volume on Wishram texts (Curtin 1909). Sapir also wrote a brief summary of the Wasco for Hodge's Handbook of American Indians (1912:2:917-918). Curtis (1911) presents a smattering of information on the Wasco and Wishram with his photographic studies. For his report to the Indian Claims Commission in the early 1950's, Robert J. Suphan (1974a) interviewed several Wasco informants who were born in the late 1800's after the establishment of the Oregon reservations. From 1952 to 1954 David and Kathrine French conducted research on the Warm Springs Reservation among the Indians of north-central Oregon. David French (1961) subsequently published a summary of Wasco-Wishram culture...
change based in part on their field research. Angelo Anastasio (1972) conducted a thorough literature search of the southern Plateau groups, including Wasco, in presenting an ecological analysis of their intergroup relations.

Language

Although the Wasco were closely allied with the Tenino, the two groups spoke languages belonging to two different Penutian language families. The Wasco represented the easternmost extension of the Chinookan language family, while the Tenino were the westernmost Sahaptian-speaking group along the Columbia River. The Dalles-Celilo sector was utilized by both, and it was at that place that Lewis and Clark noted the language distinctions between the two groups in 1805 (Thwaites 1905:3:164):

We took a Vocabulary of the Languages of these two chiefs which are very different notwithstanding they are situated within six miles of each other. Those at the great falls (Celilo Falls) call themselves E-nee-shur (Sahaptins) and are understood on the river above. Those at the Great Narrows (The Dalles) call themselves E-che-lute and are understood below.

Wasco was one of a series of dialects of the Upper Chinook language as defined by Franz Boas (1894, 1911) which extended along much of the Lower Columbia River. The closest linguistic relatives of the Wasco were the Wishram on the opposite side of the river.

 Sapir (in Hodge 1912:2:917), followed by Swanton (1952:475), attributes the derivation of the term "Wasco" to wacsq'lo, meaning "cup or small bowl of horn," from which the tribal name Gałasq'lo ("those that have the cup") was derived. The Wasco were called Añúlakin and Awásko amnim by the Kalapuya to the west, Saxlatks by the Molala to the south, and Ampxänkni ("where the water is") by the Klamath. Various other terms which have been applied to the Wasco are listed by Sapir (Hodge 1912:2:918).

Territory

Little is known about the territorial extent of the Wasco other than that they lived along the Columbia River from the Cascades eastward to Ten Mile Rapids and southward to Mount Hood. The ethnographic literature and historical accounts offer a plethora of different names for the people to be found in this area and no means of identifying the boundaries between the Wasco and their neighbors. With the rapid decimation of the Upper Chinook population by disease in the early
1800s, the Wasco tribe ultimately absorbed the weakened remnants of other Upper Chinookan peoples.

The neighbors of the Wasco included the Sahaptins to the north, east and south, the Molala also to the south, and closely related Chinookan tribes to the west. The Wasco were on friendly terms with their neighbors and frequently made use of neighboring lands as far south as Fifteen Mile Creek and Tygh Valley (Suphan 1974a:50).

Wasco Sub-Groupings

The Wasco were composed of autonomous village groups which were characteristic of the southern Plateau. They did not form a true "tribe" in the sense of having a strong political organization and an overall governing chief or council because such a system was lacking among the Wasco. The unity of the Wasco stemmed from sharing a common habitat, culture, language and blood ties, and was recognized by informants who consistently classified the same villages as Wasco (Suphan 1974a:32). The Wasco should be seen as a social group; as one well-known Plateau ethnographer noted, we fall into error only if we interpret group names as indicative of political groups (Ray 1939:10).

Three groups of Wasco villages have been distinguished on the basis of geographic, not political, subdivisions:

(1) The Dalles Wasco, or the Wasco proper, lived on the south side of the Columbia River, in the neighborhood of The Dalles, in Wasco County (Hodge 1912:2:917). In 1805-06 Lewis and Clark observed that this region was devoid of settlements, which they attributed to the warfare between the Snakes and the Columbia River peoples (Thwaites 1905:3:145, 149, 163). Several years later, however, permanent residences identifiable as Dalles Wasco were reported in the area (Rollins 1935:54; Ross 1855:1:186).

Unfortunately, historical accounts and ethnologies offer little information on the Dalles Wasco. Their likely distribution has been summarized by Suphan (1974a:41) as follows:

The total range of Dalles Wasco fishing sites and villages would then seem to fall within the area from a point east of Hood River to Ten Mile Rapids; Spier's allegation that they had sites farther upstream at Celilo and the Deschutes being rejected inasmuch as it conflicts with all other historical and ethnological sources which uniformly attribute all villages and camps above Ten Mile Rapids to Sahaptin Indians. It may be noted with reference to this point that the "Handbook" list of twenty-one Dalles Wasco
village and camp sites (Hodge 1912:2:917-18) indicates only
two east of the Dalles; clearly these people centered their
activities along the river from the Dalles westward rather
than upstream.

Three main village sites have been recorded in the literature
(Suphan 1974a:41):

(a) Wasgo was located at Big Eddy, Oregon, a few miles
above the present town of The Dalles and opposite the main Wishram
village at Spearfish (or Spedis), Washington (Curtin 1909:240;
Spier and Sapir 1930:160).

(b) Wotsys ("lone pine") was formerly located at Seufert,
Oregon, near The Dalles bridge. Sapir referred to this village site
as Watsokus (Hodge 1912:2:918).

(c) Winkxot was situated at the mouth of Mill Creek at The
Dalles, Oregon. Sapir called this site Winkwot (Hodge 1912:2:918).

(2) The Hood River Wasco occupied the Hood River (or Dog River)
drainage. Lewis and Clark grouped these people with the White Salmon
River band on the opposite side of the Columbia and called them the
"Smuck-shop Band of Chil-tuck-kit-te-quaw" who "reside on the Colum-
bia on each side from the Entrance of River Labieche (Hood River) to
the neighborhood of the Great rapids (Cascades) of that river"
(Thwaites 1905:6: 115). In 1805, the explorers reported two villages
on the Oregon side, one at the mouth of Hood River and the other
approximately five miles downriver from Hood River (Thwaites 1905:3:
170).

Curtis (1911:8:179) referred to the Hood River Indians as the
Ninuhtidih after their main village site and distinguished them
from the White Salmon River Indians in Washington. Mooney (1896:741)
called them Kwikwulit or Dog River Indians. Despite the linguistic
and cultural similarities between the Hood River and White Salmon
River Indians, Suphan's native informants maintained that the two
were distinct ethnic groups.

Only two sites can be located from the literature (Suphan
1974a:43):

(a) Ninuhtidih (reported by Curtis) "on the flat on the
west bank of Hood River from its junction with the Columbia to Indian
Creek; given as Gawilaptck on the Oregon shore at the approach to the
Hood River bridge; it is Lewis and Clark's village of four houses at
Hood River" (Suphan 1974a:43).
(b) A village of four houses in the Ruthton-Sonny, Oregon, sector (reported by Lewis and Clark), situated five or six miles downstream from Hood River on the south shore of the Columbia.

(3) The Cascades Indians, or Watlala, lived downstream from the other Wasco groups. Once again, the ethnological and historical literature throws little light on these people and their settlements, with the exception of Curtis' study. Curtis' informant divided the Cascade Indians into two groups (1911:8:181), one on each side of the Columbia River. The Oregon Cascades were called the Gahlawalighi by Curtis' informant who placed their main village, Waiahih, at the site of Cascade Locks. Another village, Swapapani, was reported a few miles below at Eagle Creek. The dialect spoken by the Cascades "differed considerably from that of the villages above them" (Curtis 1911:8:181; also Sapir 1907:533).

The impact of the 1829 epidemic on the native lifeways is described by Farrand (Hodge 1912:2:922):

A division of the Chinookan family formerly living at the cascades of Columbia r. and, at least in later times, on Dog (now Hood) r. about halfway between the cascades and the Dalles, in Wasco co., Ore. Early writers mention several tribes at or near the cascades, but as the population of that region was very changeable from the fact of its being a much frequented fishing resort, and as many of the so-called tribes were merely villages, often of small size, it is now impossible to identify them with certainty. After the epidemic of 1829, the Watlala seem to have been the only remaining tribe, the remnants of the others probably having united under that name, though they commonly were called Cascade Indians by the whites. In 1854 they were reported to number 80. In 1855 they joined in the Wasco treaty under the name of 'Ki-gal-twai-la band of Wascoes' and the 'Dog River band of the Wascoes,' and were removed to the Warm Springs res. in Oregon, where a few still survive.

The dialect differences between the Cascade and Wasco Indians are indicative of a former split between the two groups. It appears from the above quotation, however, that the decimation of the Columbia River populations led to the eventual coalescence of the Wasco and Cascade groups after 1830, resulting in the view of present-day informants that but one people occupied the Oregon shore from the Cascades to The Dalles (Suphan 1974a:46).
Subsistence

The subsistence activities of the Wasco have been extensively reviewed by French (1961:356ff.) and are briefly summarized by Sapir (Hodge 1912:2:917-18):

The Wasco were a sedentary people, depending for their subsistence mainly upon fish (several varieties of salmon, suckers, sturgeon, eels), to a less extent upon edible roots, berries, and least important of all, game. Salmon were caught in the spring and fall, partly with dip-nets, partly by spearing; smaller fish were obtained with hook and line or by means of basket traps. Definitely located fishing stations were a well-recognized form of personal property; the capture of the first salmon of the season was accompanied with a ceremony intended to give that particular fishing station a good season's catch. Pounded salmon flesh was often stored away for winter use; it also formed an important article of trade with neighboring tribes, the chief rendezvous for barter being the falls a few miles above The Dalles. Also berries were dried and preserved for winter use.

Anastasio (1972:119ff.) and French (1961:342) elaborate on the subsistence pattern of the Wasco which was similar to that of the Tenino. Fish was a major staple of the diet, forming from one-third to one-half of the Wasco's food supply. The fish runs began at The Dalles and Celilo Falls in the latter part of April and probably continued to run into late fall. The abundance and importance of the fish runs in this area, which enabled the Wasco to store and/or trade their large surplus, were observed by Morgan (1871:241-42):

But the crowning advantage of this favored area was found in the inexhaustible salmon fisheries of the Columbia River which, at stated seasons, filled the land with superabundance of food. If the current representations with reference to these fisheries may be credited, they are unequalled in any part of the earth, in the quantity and quality of fish annually supplied. They enter this river in myriads, and penetrate its several branches, even into the mountain elevations.

Root crops and other plant items constituted another one-third to one-half of the diet. Root crops, such as camas, apparently never failed and were gathered in the uplands by the women in the spring and fall. Some reports state that only a few days' work was necessary to gather a year's supply of camas (Stevens 1855:12:199; Haines 1955:158).
Berries and some other plants were more susceptible to frost and climatic variation and were not as reliable as the root crops, but enough berries were available each fall to make it profitable for households to move briefly to the mountains to pick berries while the men hunted.

Game animals included antelope, deer, elk, bear, mountain sheep, mountain goat, duck, quail, squirrel and beaver, which were hunted using a wide range of techniques. Due to the great surplus margin offered by salmon and root crops, the Wasco are not reported to have hunted beyond fulfilling their local needs for food, clothing, and skin bags.

After the acquisition of the horse around 1800, the Wasco may have joined Nez Perce buffalo hunting expeditions on the Plains (French 1961:349), but such activities did not significantly add to the group's subsistence base. The Wasco were one of the few Plateau groups to store their surplus food supplies for the lean seasons. Other groups, who depended more on hunting than fishing, frequently experienced low supplies in the late winter and early spring, but there are no reports of deaths by famine anywhere in the southern Plateau.

*Shelter*

Several different forms of shelter were constructed by the Wasco according to their activities and needs (refer to French 1961:342). The stable winter villages along or near sheltered portions of the bank of the Columbia were typically composed of large, semi-subterranean multi-family dwellings, "roofed with cedar bark and having board platforms about the walls for beds" (Hodge 1912:2:918). Temporary summer houses were constructed at fishing sites, upland areas, and other places where the people were away from the permanent communities. The summer house had a "frame of fir poles and covering of tules or cedar bark" (Hodge 1912:2:918). Often it was large enough to hold several fireplaces and three or four families. Sweathouses were also frequently used for cleansing and curing rites. Fish racks and structures for caching fish were found by houses near fishing sites.

French (1961:359) mentions that mat-covered houses, which were typical of the Tenino, were not mentioned for the Wasco until after 1840. This may indicate a change in temporary house types at that time.
Material Culture

The material items used by the Wasco were quite similar to the items of the Tenino mentioned by Ray (1942) in his monograph on Plateau culture element distributions. Although an extensive inventory of the material culture of the Wasco is lacking, Sapir comments on some of the more notable items (Hodge 1912:2:918):

The most notable of their industries were work in wood (bowls, spoons), horn (spoons, cups), and twined basketry (bags, various forms of stiff baskets). Coiled basketry has been learned since closer contact with the Kliktat; the chief materials used in twining are cedar roots and various grasses, of late also trader's cord and yarn. Realistic figures are carved in wood and horn; while the basket designs are partly geometrical, recalling the basketry art of N. California, and, as in that area, bearing conventional pattern names, partly realistic, though crudely so (angular figures of men, eagles, and deer are characteristic of the basketry art of the lower Columbia). The latter designs may be plausibly explained as an adaptation of forms familiar from woodcarving to twined basketry with its straight line and angular patterns. The original Wasco costume consisted of blanket robes (the pelts of bear, deer, wolf, coyote, raccoon, and mountain goat in summer), sleeveless shirts of raccoon or coyote skin, breechcloths of raccoon skin, and moccasins of deerskin; hats and gloves were made of coyote skin.

French (1961:357-363) observes that bedding and clothing were made from the skins of deer, elk and mountain goat. Baskets were made in various forms for storing berries and pounded fish, carrying water, and stone-boiling meat and fish. Bark containers were also made, along with grass mats which were used for lining houses and for sleeping.

Weapons included the usual knives, war clubs, spears, bows, arrows and quivers. Guns first appeared among the Wasco by 1805-6. Armor or protective jackets made of split wooden rods were sometimes worn.

Canoes were most frequently acquired through trade from Chinookan speakers further west. A type of skiff was used, however, to cross the Columbia to the Wishram side; larger craft with a raised bow and stern were also made (Thwaites 1905:3:166-67; Stuart 1935:36; Ordway 1916:304).
Sociopolitical Organization

Although the sociopolitical organization of the Wasco Indians is not made clear in the ethnographies, the Wasco no doubt occupied autonomous villages headed by village chiefs. Each village was usually composed of members of extended families, related by marriage, along with some slaves. The Wasco participated in a Northwest Coast class stratification system which set them off somewhat from their Tenino neighbors. Three social classes were recognized: chiefs, common folk, and slaves who were obtained by capture (Hodge 1912:2:918). The Wasco did not emphasize wealth to the extent that the coastal peoples did. Chieftainship followed hereditary lines, and although a headman was not required to be rich, wealthy chiefs were preferred by the people.

Prior to white contact, the powers of the Wasco village chief were determined by the respect held for him by the villagers. The chief was looked to for advice and judgments regarding village disputes. After the whites arrived, the chiefs gained new powers and prestige through their connections with governmental officials (French 1961:361-62) to the point where they became almost dictatorial (Suphan 1974a:27).

Slaves were obtained through capture during warfare or through trade. French (1961:363-364) summarizes what is known about the slaves of the Wasco:

Slaves were obtained from the south in raids or were traded to the Wasco-Wishram by the Klamath. Shastas, and Achomawi-Atsugewi or Pit Rivers, were the typical groups from which slaves were taken (Allen 1850:259; cf. Spier 1930:27, 40, 41, 236). Unless Lee and Frost (1844:177) made a mistake in identification, the Klamath themselves sometimes became slaves. Probably any war captives, for example Paiutes, were kept or sold as slaves on occasion. The Wasco-Wishram were not only slaveholders but also slave dealers, trading them to the north and probably also down the Columbia.

Slaves were most useful for doing heavy work and were important for the prestige they brought their owners.

Religious Beliefs

The beliefs of the Wasco, as with other Plateau peoples, centered about guardian spirits and their powers. Children of both sexes were sent out at an early age on guardian spirit quests, but such quests among the Wasco have gone unrecorded. Guardian spirits were acquired
by shamans as well as by others. The shamans typically acquired many spirit helpers whose powers were used to cure and protect individuals from danger.

Wasco ceremonials can be grouped into the following categories:

(1) First Fruits ceremonies included a ritual of thanksgiving with the arrival of the first salmon in the spring (Thwaites 1905:4:300, 302). Information on additional first products ceremonies is lacking for the Wasco, although other rites were known to be performed by the Tenino.

(2) Life cycle rites included a menstrual dance marking the puberty of girls, marriage celebrations, and rituals associated with death. With regard to the latter, several days of lamentation accompanied the disposal of the deceased's goods and burial of the body, which was accomplished by wrapping it on a board in skin robes to be placed in wooden charnel houses ("dead people's houses") on burial islands in the Columbia (French 1961:365).

(3) Spirit ceremonies consisted for the most part of curing rituals performed by shamans and the midwinter guardian spirit dance at which individuals possessing the power songs of their guardian spirit(s) sang their songs and exhibited their shamanistic skills (Lee & Frost 1844:163-64; French 1961:367).

(4) War dances were also performed, apparently in preparation for offensive warfare. Raiding was led by men who were not necessarily village chiefs or shamans but who had exhibited a supernatural power for invulnerability and bravery (French 1961:363; Lee & Frost 1844:164; Townsend 1905:359-60).

Intertribal Relations and Trade

The Wasco had many contacts with outside Penutian and Chinookan groups, probably due to their strategic location at the central trade center for the Plateau, namely The Dalles-Celilo region. Although the Wasco had the means for being quite mobile, it appears that they received visitors much more frequently than they themselves were visitors. In keeping with the peaceful nature of the Plateau peoples, the Wasco were on good terms with their neighbors, maintaining friendly relations through trade, recreation, and intermarriage. Intermarriage occurred most frequently with the Wishram and Tenino who lived next to the Wasco (Anastasio 1972:153). The only warfare that the Wasco are known to have undertaken were raids against the Northern Paiute to the south in conjunction with the Wishram, Tenino and Klikitat groups.
Peoples from all over the Plateau visited The Dalles-Celilo trade center to exchange items, gamble, and gossip. The general spectacle to be found here in 1811 was described by Alexander Ross (1904:118):

The articles of traffic brought to this place by the Indians of the interior are generally horses, buffalo-robess, and native tobacco, which they exchange with the natives of the sea coast and other tribes for higua beads and other trinkets...Now all these articles generally change hands through gambling, which alone draws so many vagabonds together at this place; because they are always sure to live well here, whereas no other place on the Columbia could support so many people together. The long narrows, therefore is the great emporium or mart of the Columbia, and the general theatre of gambling and roguery.

Among the trade items to be found at The Dalles were wappato (Sagittaria) roots and trade beads from western Oregon which were traded for dried root cakes, pounded salmon, and bear-grass (Xerophyllum) for making baskets (Thwaites 1905:3:180; 1905:4:260). Local Sahaptins traded meat, roots, berries and slaves to the Wasco and Wishram for preserved fish, canoes, and European trade items. European goods, such as beads, brass thimbles, cloth and guns, had reached the Wasco from the mouth of the Columbia prior to Lewis and Clark's visit in 1805.

Trading was especially heavy from spring through fall during the salmon runs, although trade could and did occur at any time of the year. Trade was often carried out through a system of established trading partners (French 1961:347). Much social interaction, such as gambling, dancing, singing and courting, almost always took place in conjunction with trading. Ross (1904:129) was of the opinion that these social activities were even more important than trading.

**Historic Contact**

The impact of Euro-American contact was indirectly felt by the Wasco in the form of European trade goods and horses which had reached the Wasco prior to Lewis and Clark's visit in 1805. With the arrival of fur traders and explorers to the area came smallpox and other diseases which drastically reduced the population of the Columbia River peoples. In 1820, the population of the Wasco was estimated at 900 (Morse 1822), but by 1910 it had declined to 242 (Swanton 1952:475). The influx of new cultural items and the depletion of the native population resulted in an upheaval of the traditional lifeways, an amalgamation of the remnant populations left in the area, and the eventual disappearance of the pre-contact culture.
In 1855, the Wasco offered little opposition to signing a treaty with U.S. government officials establishing the Warm Springs Reservation in Oregon.

Although many of the Sahaptins rebelled against the whites in 1855 during the Yakima War, the Wasco did not participate but quietly sat it out under the careful watch of the whites near The Dalles. By 1858 most of the Wasco had moved onto the new Warm Springs Reservation to join the Tenino. It is during this later reservation period that the ethnographic studies of the Wasco were undertaken (e.g., Curtis 1911; Spier & Sapir 1930). An excellent analysis of culture change among the Wasco and Wishram during historic times is presented by French (1961).

THE UMATILLA

Along the eastern boundaries of the study area lay lands commonly attributed to groups now known as the Umatilla. Although a majority of Umatilla activities were conducted outside the study area in the Baker and Spokane BLM districts, they often ventured onto Tenino lands to the west and south into present-day Grant County to hunt, fish, gather, and visit with the Tenino and other native groups.

Because of their great similarity to the Wallawalla and Cayuse Indians to the north and east, the Umatilla were frequently not distinguished from these other peoples by early writers, such as Lewis and Clark, and were generally lumped under the designation of Wallawalla. This has resulted in a lack of information regarding the aboriginal distribution and land-use practices of the Umatilla. Information on many other aspects of Umatilla culture has been recorded and discussed by several ethnographers. Verne F. Ray (1936, 1938, 1939, 1942) presents his discussions of Umatilla culture within a framework of other Plateau peoples. In the early 1950s, Robert J. Suphan (1974b) interviewed several Umatilla informants who were born in the late 1800s for the purpose of compiling an ethnological report on the Umatilla, Wallawalla and Cayuse for the Indian Claims Commission. Theodore Stern also conducted fieldwork in the region from 1952 until 1969; he has incorporated the results of this fieldwork and his study of ethnohistorical documents in a summary of the Umatilla, Wallawalla and Cayuse peoples (Stern n.d.). Anastasio (1972) and Garth (1964) have provided extensive discussions of Plateau intergroup relationships, including the role of the Umatilla, based primarily on the records of others.
Language

The Umatilla spoke a dialect of the Sahaptin language of the Penutian phylum which was very closely related to the dialects spoken by the Tenino to the west. Rigsby (1965:22) places the Umatilla and Tenino dialects into a grouping termed the Columbia River Sahaptin dialect cluster. This classification has revealed an apparent contradiction: the Umatilla are most closely related to the Tenino linguistically but have been characterized as most similar to the Wallawalla and Cayuse in terms of culture patterns although the latter are more distantly related linguistically to Umatilla. This inconsistency is easily explained by the fluidity of the cultural and linguistic patterns in the area and the lack of strong cultural boundaries between the various groups on the Plateau.

The Umatilla have been referred to in many ways in the literature: Yowmalolam, Umatallow, Emitilly, Ottilah, Utilla, and other variants. The current term seems to have been derived from imatilam ("lots of rocks, rocky bottom"), which was the name of their principal settlement at the mouth of the Umatilla River (Stern n.d.; Rigsby 1965:48; Ray 1938:385).

Territory

In historic times, the Umatilla occupied the rocky, dry plateau region on both sides of the Columbia east of the Tenino and west of the Cayuse. Although the earliest accounts (Curtis 1911:6:79-80; Mooney 1896:744) restrict the Oregon distribution of the Umatilla to the lower reaches of the Umatilla River, Ray (1938:385-86) greatly extends the boundaries of their territory as follows:

The Umatilla (yumati'la, from name of principal village, imatilam, "lots of rocks") occupied both banks of the Columbia River from the vicinity of Rock Creek (Washington) to a point a few miles below the mouth of the Walla Walla River. North of the Columbia the territory extended to the Horse Heaven Hills, southern boundary of the Yakima. In Oregon a much greater area was held, reaching south to the John Day River. Beyond lay the Paiute. The eastern and western boundaries were less definite due to greater intercourse with neighboring tribes. Rock Creek (Oregon) furnished an approximate western boundary but Umatilla families sometimes camped as far west as the John Day River; reciprocally, the Wayampam or Tenino enjoyed free movement eastward to Willow Creek. Even on the Columbia River, where lines of demarcation were usually very definite, several villages were jointly occupied by Umatilla and Tenino.
The tribal distribution of the Umatilla as given by Ray (see Figure 10) does not include all lands which were jointly occupied by Umatilla and Tenino as described by Ray above. Although the Umatilla are placed within the study area in Gilliam, Wheeler, and Grant counties, none of the villages mentioned by Ray (1936:150-51) are located in these counties. Suphan (1974b, Appendix A) lists 118 sites used by the Umatilla, Wallawalla, and Cayuse of which at least 20 specific Umatilla sites can be located in the southern extremes of Umatilla territory in Grant County. No other sites are listed for the Umatilla west of Grant County in the study area. All of these site locations were recalled in 1941 by several elderly Indians who undertook to visit and identify some of the native subsistence areas. Suphan

Figure 14. Tribal Distribution in Northeastern Oregon and Adjacent Regions (after Ray 1938:386).
(1974b:132-33) summarizes what is known of Umatilla occupation in
Grant County as follows:

South of these areas, in what is now Grant County, the
Umatilla occupied various spots along the forks of the
John Day River from about Monument eastward. Specific
areas in this region include: that about Beech Creek,
Oregon; the Beech-Laycock creek junction; five sites
along the Middle Fork of the John Day downstream from
Bates, Oregon; Bull, Granite, and Crane creeks. Other
important areas in Grant County were on Silvies River
just south of Seneca, in Logan Valley and on Poison
Creek just east of Silvies, Oregon, the headwaters of
the Malheur River, and the prairies between it and the
North Fork of the Malheur. Virtually every one of these
sites was jointly shared with the Cayuse, while those
along the John Day, Silvies, and Malheur River were also
visited and exploited by the Warm Springs (Tenino)
Indians, Columbia River Indians, and the Paiute.

To reiterate Suphan's statement, all of the lands in the study
area which were used by the Umatilla were also jointly shared with
the Tenino and/or the Cayuse concurrently. In addition, as indicated
in Figure 10, Grant County was occupied by Northern Paiute bands
prior to 1800 and perhaps later.

Subsistence

The annual subsistence round of the Umatilla was quite similar to
that of the Tenino as described by Murdock (1958). Suphan briefly
summarized Umatilla subsistence activities (1974b:112); Stern (n.d.)
offers an extensive discussion.

The permanent winter villages were located in sheltered areas
along the Columbia River and the lower reaches of the Umatilla River.
During the winter months, the people survived by hunting, stream fishing,
and living off stored food supplies. With the coming of spring,
women and children dug root crops along the stream banks while the men
prepared their fishing equipment for the spring fish runs which cen-
tered along the Columbia and lower Umatilla rivers. In June and July,
as the fish moved up the tributaries toward the headwaters, the families
followed to camp along the mountain streams. The men fished and hunted
deer, elk, antelope and mountain goat, while the women and children
picked berries, gathered roots and dried the fish. A family usually
succeeded in drying several hundred pounds of salmon during several
weeks of fishing in the hills.
Throughout the summer and fall, the Umatilla occasionally visited with the Tenino and Wasco at The Dalles trading center to fish, gamble, race horses, and trade with the many groups from near and far which were attracted by the trading activities. With the coming of winter, the Umatilla returned to their winter villages to re-erect their lodges near their stores of fish, roots and berries, although it was not uncommon for some to elect to stay with the Tenino for a winter.

Shelter

The winter villages of the Umatilla were composed of long mat lodges which were constructed in the form of an inverted-V with rounded ends over shallow depressions. Some of the dwellings were up to sixty feet long and held as many as ten fires for as many households within each lodge. Earth lodges, like those built by the Tenino, were not used by the Umatilla in ethnographic times for day-to-day habitation.

When the Umatilla left the winter villages in the spring, the lodges were dismantled only to be reassembled before the next winter arrived. Flat-roofed sheds were erected near the fishing stations in the spring and summer. Half of the shed was used for drying salmon while the remainder was used as living quarters. Mat-covered tipis, probably adopted from Plains culture in recent times, were used as temporary habitations during expeditions into the hills.

Other structures used by the Umatilla were pithouses for storing winter supplies of fish and roots and for the seclusion of young girls preparing for womanhood. Mud-baths and sweat houses for each sex were also constructed near the main habitation lodges.

Material Culture

The varied activities of the Umatilla necessitated the use and manufacture of a wide variety of tools and utensils. An exhaustive list of material items is provided by Ray (1942) in his monograph on culture element distributions on the Plateau. Because a number of items are quite similar to those of the Tenino, only the more characteristic elements given by Ray (1942) will be mentioned below.

Equipment for fishing included weirs of twined willow, scaffolds, willow fish traps, dip nets, harpoons, three-pronged spears with bone points, and wooden fish clubs. Hooks were apparently not used and net sinkers are not mentioned. Nets were often used in snaring small animals and fowl. Dogs, which were numerous, were not used for hunting but were mainly kept as companions.
Skin dressing was an important activity undertaken by women. Hides were usually prepared by soaking off the hair and placing them on slanting logs to be scraped with a deer or elk rib scraper. In graining (finishing) the leather, a hafted stone or beveled wooden grainer with a buckskin wrapped handle was used.

Utensils and dishes included coiled baskets, wooden bowls, elk-horn cups, wooden spoons, clamshell spoons, paddle-shaped food stirrers, wooden and stone mortars, and tapered stone and wooden pestles. Implements included simple firedrills of serviceberry wood, two-piece wooden tongs, deer ribs for removing bark from trees to collect the inner bark, unilaterally beveled horn wedges, wooden wedges, horn chisels, stone mauls, hammers with grooved heads for hafting, stone and bone adzes with horn or wooden handles, beaver-tooth engravers, a variety of stone knives, and bone and horn sewing awls. Some wooden digging sticks were pointed at both ends and reversible; others had crutch handles of wood or antler. Pack straps, mats, cordage, and carrying bags were fashioned from skins and vegetable fibers. Weapons consisted of bows in excess of three feet in length and arrows which were sharpened or had points of obsidian and bone. Clubs were wooden bats or buckskin filled with rocks. Shovel-nose dugout canoes were hollowed from pine or drift cedar logs and pitched on the outside. Log rafts were sometimes used.

Men generally wore breechcloths and skin shirts, while women wore breechcloths and skin gowns. Skin capes and robes were worn during the cold months along with fur leggings and mittens, fur caps, basketry hats obtained from the Nez Perce in trade, and skin moccasins. The clothing described by Ray (1942:164ff.) appears to have been dominated considerably by Plains influences which heavily affected the Umatilla after Euro-American contact (Stern n.d.).

Sociopolitical Organization

The Umatilla occupied autonomous villages of two to seven hundred inhabitants during the winter. Each village held recognized settlement sites as well as fishing stations, hunting grounds and berry patches, although visitors were always welcome to use the lands. Unfortunately, the records do not offer us any information on subgroups or bands within the Umatilla such as are recorded for the other groups discussed in this overview. Information on the inclusive territories for each winter village is lacking as well.

Households, or the occupants of a single lodge, were composed of related families or families linked by friendship. The lodge formed a social sub-unit within the village: the most influential member of the lodge served as its spokesman, and members of the lodge had a strong controlling influence on the behavior of other members. The sharing of fish and game within the lodges may be seen as indicative of the basic social unity of the lodge members.
The close-knit nature of the lodge should not be taken as an indication of a rigid social order. Rather, the Umatilla were composed of flexible social groups. Local group composition frequently broke down during the spring-to-fall quest of fish, roots, berries and game, when family groups frequently joined families from other lodges, villages and even other tribes according to their eventual destinations in the hills. As a result of this flexibility, which was typical of Plateau culture, many of the lands located in the study area were utilized by more than one ethnic group as noted above.

The spokesmen of each lodge in the village formed a council which was informally presided over by a headman chosen by the council members. A headman was chosen for his natural leadership qualities and was intended to be a model of honesty, patience and moral uprightness for his village. Headmen were frequently picked from among the relatives of former headmen, but where desirable candidates were lacking the council looked elsewhere. A moderately wealthy and respected man with a strong backing of kinsmen was often viewed as the ideal headman. The functions of the village council members and the headmen were purely advisory and judicial; these leaders held their positions only by common consent of the people.

The simple social hierarchy typical of the Columbia River peoples was also found among the Umatilla. Three general classes were recognized: the wealthy, the commoners, and the slaves. With the late influences from the Plains, the emphasis between the rich and the poor became quite marked, and the poor were often considered little better than the slaves who were captured during raids.

**Religious Beliefs**

The religion of the early Umatilla and their neighbors has been only cursorily recorded. Their mythology speaks of many mythical beings with varying powers who existed prior to the advent of humans and who were responsible for the events which shaped the world of the Umatilla. Other supernatural spirits imparted special powers to individuals who sought these powers. Children of both sexes were customarily sent out on a spirit quest from about the age of ten. The initiate traveled to a secluded spot to fast and pile rocks until a guardian spirit appeared in a vision to bestow its powers or until several days had passed unsuccessfully (Stern n.d.).

Shamans used the powers of their guardian spirits for a variety of purposes, including curing, divining, attracting game, and controlling the weather. The shamans exhibited their skills during the winter in the headman's lodge at which time the novice shamans gave their first public demonstration of their powers. Shamans were also believed to hold the power of illness and death; suspected shamans were often killed by the kinsmen of the afflicted one in revenge.
Ceremonies and feasts were held throughout the year for various purposes. Marriages and funerals were always occasions for feasting. Like the Tenino, several ceremonies were observed by the Umatilla at particular times of the year. Feasts were formerly held in February to observe the winter equinox and the return of the wild celery. A thanksgiving feast was held in April to celebrate the first salmon and roots of the new year. Such feasts were usually a time of rejoicing, dancing, singing, speech-making and socializing.

Intertribal Relations and Trade

The Umatilla enjoyed a network of intertribal alliances with many of the Plateau groups. Although they appeared to be most closely allied with the Cayuse and Walla, the Umatilla also had intimate relations with the Tenino. Anastasio (1972) details the nature of these Plateau relations which primarily entailed group intermarriage, trade, recreation, and co-utilization of sites. Stern (n.d.) also addresses the issue via an in-depth look at ethnohistorical sources. Although Plateau relations were typically friendly, the Umatilla often joined with the Tenino to raid the Northern Paiutes to the south (Ray et al 1938; Ray 1939:40). Both Plateau and Paiute peoples continued to utilize the upper John Day region in the study area, however, which frequently resulted in fighting whenever they happened to meet.

Historic Contact

The impact of Euro-American contact on the Umatilla and other Plateau groups was profound. The earliest sign of white contact came in the form of the horse which was acquired by the Nez Perce and Cayuse after A.D. 1730 (Haines 1938). The use of the horse no doubt spread quickly to the Umatilla who were eager to follow the lead of the powerful Nez Perce in acquiring the trappings of Plains culture. The Umatilla soon adopted Plains clothing, joined bison expeditions to the Plains, and placed a greater emphasis on warfare and fighting. As a result, much of the early literature on the Umatilla emphasizes these recently acquired Plains traits and neglects the long-established undercurrent of traditional Plateau culture.

The detrimental effects of the earliest decades of contact with white traders and settlers are reflected in the population estimates for the Umatilla. Based on other sources, Stern (n.d.) estimates a population of 1,500 for the Umatilla in 1790. In 1853, disease had contributed in reducing their number to 600 (Anastasio 1972:202).

Friction with the white settlers and missionaries led to a series of outbreaks in the late 1840s and 1850s. In 1855, the Umatilla,
Wallawalla, and Cayuse signed a treaty with the federal government in which they agreed to settle on a reservation on Cayuse lands in the Umatilla Valley. Fighting continued for several more years, however, until the Indian rebellion was quashed in 1858. The Umatilla and their allies moved to the Umatilla Indian Reservation in 1860, soon after the end of the fighting and the ratification of the treaties. Stern (n.d.) provides a detailed summary of the changes, past and present, which have arisen in Umatilla culture as a result of historic culture contact.

THE NORTHERN PAIUTE

At the time of white contact, the Northern Paiute occupied vast territories in the northwestern portion of the Great Basin in Oregon, Idaho, Nevada, and California. Although they were primarily a desert people, the territory of the Northern Paiute also included portions of the Columbia Plateau in the southern reaches of the study area near the headwaters of the Deschutes and John Day rivers. These people shared a single cultural tradition and spoke various dialects of the same language. Within Oregon, the Northern Paiute were situated in the central and southeastern regions, occupying close to one-third of the state. They were bounded to the north by the Tenino, Umatilla, Cayuse, and Nez Perce who were located along the Columbia River; to the west were the Molala, Klamath, Modoc, and Achumawi peoples.

The only substantial ethnographic fieldwork specifically among the Oregon Paiute was that carried out by Omer C. Stewart (1938, 1939, 1941). Other sources which deal with the distribution of the Northern Paiute in Oregon include Blyth (1938), Murdock (1938), and Suphan (1974a, 1974b). Additional studies, such as those by Lowie (1924), Angulo (1929), Julian Steward (1933, 1934, 1937, 1938, 1955), Park (1934, 1937), Kelly (1932), Underhill (1941), Wheat (1959, 1967), Whiting (1950) and Riddell (1960) have dealt primarily with Northern Paiute bands outside of Oregon.

Language

The Northern Paiute have been referred to by various names in historical journals and ethnographic accounts. The term "Snake" was used by early explorers, such as Lewis and Clark, Ross, and Ogden, to refer to all peoples speaking languages of the Numic, or Plateau Shoshonean, family of the Ut-Aztekan language stock. Numic speakers include the Northern Paiute, Mono, Shoshone, Ute, and Southern Paiute, all of whom inhabited the Great Basin--so that the term "Snake" was applied to Great Basin peoples in general and not solely to the Northern
Paiute. Other terms, such as "Bannock", were similarly applied to a variety of Great Basin groups including the Northern Paiute and their Shoshone neighbors. "Paviotsos" and "Digger Indians", on the other hand, were terms which apparently distinguished the Northern Paiute from the Shoshone to the east. The term "Paiute" is derived from the native words pa ("water") and ute ("direction"), although the Northern Paiute spoke of themselves collectively as nomo ("people") (Stewart 1939:127).

**Territory**

The range of the Northern Paiute was generally restricted to the desert of the Great Basin physiographic province. Omer Stewart (1939:144) gives a detailed description of the extent and nature of the boundaries of the Northern Paiute territory:

The total Northern Paiute territory, shaped roughly like an isosceles triangle with a 275-mile base at Blue Mountains, Oregon, and with 600-mile sides reaching to a point at Owens Lake, California, contains approximately 78,000 square miles of the near desert land of the Basin and Range physiographic province of western United States. The western boundary conforms closely with the edge of the Great Basin, although the Paiute did not exclusively occupy the slopes of the Sierra Nevada and the Cascade mountains. The northern boundary, technically beyond the edge of the interior basin because it includes streams draining to the ocean, is, nonetheless, coincident with the desert sagebrush vegetation zone boundary, for the volcanic plateau which extends into the northern end of the Great Basin has modified the physiographic scene more than it has the vegetation. Consequently, we may assume that Blue Mountains, the northern edge of the Great Basin flora, is the real border of the Basin. Since both early explorers and my informants considered Blue Mountains the northern boundary of Oregon Snake (Paiute), we can say that the northern and western boundaries of the Northern Paiute tribe coincide with geographic boundaries. The eastern boundary between the Paiute and the Shoshoni, both within the Great Basin, does not agree with any geographic boundary.

There is no doubt that the Northern Paiute considered themselves to be one people. In addition to occupying the same physiographic zone, they spoke mutually intelligible dialects of the same language and shared the same semi-nomadic hunting-and-gathering lifestyle. They also made a sharp distinction between themselves and the adjacent
Penutian and Shoshone tribes, whereas the band divisions within the Northern Paiute tribe were often vague and indefinite, as noted by Stewart (1939:130).

The Northern Paiute Bands

The sociopolitical organization of the Northern Paiute is best described as being of the band type at "the family level of integration" (Service 1962:64). These bands did not exist as political entities, but were simply a loose association of a number of family groups occupying the same general region. The composition of these bands was fluid, and families moved from band to band as they desired. Stewart (1939:261) made the following observations on the nature of Northern Paiute bands:

There was no native band concept connoting true solidarity among members of a political or territorial division. They agree that land was not owned by any group, that the population was fluid, and that political control was minimal, never extending over the inhabitants of a well-defined territory: in short, that the main bond between families was association in more or less the same area.

Twenty-one Northern Paiute bands have been identified by Stewart (1939). Bands were frequently named after local foods or geographical landmarks which were for some reason considered remarkable by neighboring groups; hence Northern Paiute bands included, among others, the Wadadɔkədɔ (Wada-Seed Eaters), the Kjə'agaitɔka (Salmon Eaters), the Atǝnakədɔkwa tuviwarai (Red Butte Dwellers), and the Sawawaktɔdɔ tuviwarai (Sagebrush Mountain Dwellers). Stewart (1939:262) concludes that "the emphasis...is clearly upon the territory rather than upon any unified group of people occupying it." When a family or group moved to a new locality, it acquired a new name derived from their new habitat.

Given this native pattern of nomenclature, it is not surprising that apparent contradictions in group names and boundaries have been recorded. A band may be addressed by more than one name by its neighbors or several bands may be referred to by the same name. Also, since well-defined boundaries between bands did not exist, it is expected that the various maps of Northern Paiute band territories based on information from native informants will not necessarily coincide. In particular, Stewart's map (1939:126) does not agree in detail with Blyth's distribution of Oregon Paiute bands (1938:396). Stewart (1939:262) suggests that "it will never be possible to make a final map of bands for the greater part of the Northern Paiute area" simply because bands did not exist as separate social and political entities and because a standard nomenclature for bands was not in use by all the Northern Paiute.
Stewart (1939, 1941) discusses four aboriginal Paiute bands whose ranges may have fallen within the study area (refer to Figure 11).

Blyth (1938) lists six groups as well, some of which roughly correspond with some of the bands Stewart mentions (see Figure 12). These groups and their territories are briefly described below.

(1) The Hunipwi'tōka (meaning unknown to Stewart) or Walpapi, also known as the Canyon City Indians, occupied an area of about 7,000 square miles, which included the Crooked River Valley and the upper reaches of the John Day River. The boundaries are given by Stewart (1939:131):

The boundary...starting at Pauline Mountain (Twin Buttes) in Deschutes County, runs North through Jefferson County to the Wasco County line where Highway 97 crosses; thence east to the John Day River, up the river to North Fork, then up the North Fork to the Blue Mountains; thence south along the Blue Mountains to the head of the Malheur River; thence southwesterly along the divide between the John Day and the Malheur drainages to Pauline Mountain, the place of beginning.

Stewart mentions that this area may have been occupied by more than one band. Blyth locates three groups within this area. The first group, the Wa'dh'ichi't'ka (Juniper-Deer Eaters), inhabited the area between Bend to the south and Gateway to the north. Their range included Prineville in the east and Mount Jefferson to the west. Portions of this band customarily wintered at Bend and along the northern bank of the Metolius River. The second group mentioned by Blyth was the Hu'niwi'tīka (Root Eaters). These people appear to be the same as those referred to by Stewart. Blyth designates their winter camps as centering around Canyon City Creek, the town of John Day, and the John Day valley to the west. They inhabited areas as far west as Dayville and as far south as Seneca and Izee. Blyth was uncertain as to their northern and eastern boundaries but indicated that the group ranged as far east as Baker. The third group mentioned by Blyth was the Pa't'hi't'ka (Elk Eaters); some of her informants stated that this band resided east of the Root Eaters in the vicinity of Prairie City and Baker, Oregon. Other of her informants, however, indicated that those people were part of the Root Eaters band.

(2) Directly south of the Root Eaters, Stewart places the Wadatōka (Blyth's Wada't'īka), or Seed Eaters. Stewart estimated that their area covered 5,250 square miles, including the drainage areas for Harney and Malheur lakes and Malheur River. Blyth cites this group as wintering in Silver Creek, Harney, Diamond, Blitzen, and Catlow valleys in Harney County. Hampton, located on the toe of Deschutes County, was given by Stewart as the northwesterly extent of this band's territory. Although the territory of the Seed Eaters
Figure 15. Distribution of Northern Paiute Bands as Given by Stewart (1939).
Figure 16. Distribution of Northern Paiute Bands According to Blyth (1938).
does not appear to extend into the study area, it is quite likely that this group occasionally extended its subsistence activities into the upper John Day drainage area of the John Day Planning Unit.

(3) The southwestern reaches of the study area were probably occupied by the Goyatoki (Crawfish Eaters), also called the Yahuskin by Stewart (cf. Stern 1966:288, note 54), or the Yapaltika (Yapa Eaters) according to Blyth. This group was centered in the vicinity of Paisley in Lake County, west of the Seed Eaters and south of the Juniper-Deer Eaters. According to Stewart, the band covered 5,000 square miles within the region of Silver, Summer, and Abert lakes. This group traveled as far north as the Paulina Mountains region which was the southerly range of the Juniper-Deer Eaters. As in the case of the Seed Eaters, the commonly acknowledged territory of the Crawfish or Yapa Eaters did not extend into the study area, but members of this group no doubt traveled into the LaPine Planning Unit on occasion.

(4) The fourth band mentioned by Stewart was the Koa'agaitoki (Salmon Eaters), which he places in a 7500 square mile area in the vicinity of Boise, Idaho. Blyth, however, places the Agaltika (also translated as Salmon Eaters) further west and states that they "wintered on the north and south sides of the Malheur River and fished on the Snake" (1938:404). Some families of this band extended as far west as the North Fork of the Malheur, which places this band close to the John Day Planning Unit.

Subsistence

Each band's territory centered upon a core area which was relatively rich in food resources. The extensive, sterile, dry stretches surrounding the productive spots were not necessarily recognized as belonging to a certain band. Rather, several bands may have made mutual use of the more barren areas. However, bands did recognize possession of certain productive tracts such as lakes, streams or hunting grounds which they established primarily through regular use. Other bands were free to hunt and gather in those areas, but they always did so with the understanding that they were visitors.

The scarcity of foods in the region was such that the population of the Northern Paiute had an average density of one person for every ten to twenty square miles, depending on the locality. The distribution of food sources required that each family be, for the most part, a self-sufficient economic unit. In order to make the best use of the desert's scattered food resources, the Northern Paiute families moved about frequently in their search for food.

After a long cold winter when stored food supplies were becoming low or had disappeared, the Northern Paiute searched the stream banks,
lake edges and low hills for the first green plants of spring. The stems or leaves of many of those plants, such as thistle and squaw cabbage, could be cooked or eaten raw as "greens." With the coming of summer, seeds of many plants began to ripen in the moist hills. Many people left their winter villages in small groups of one or two families and sometimes trekked great distances to collect the tiny seeds. Occasionally, families traveled thirty or forty miles if word reached them that there was an abundant crop to be found in that area. Seeds of innumerable species of grasses in the desert provided much of the Northern Paiute diet. These grasses included common fescue, wheat grass, Indian rice grass, and bluegrass. Seeds of the cattail, rushes, and sunflowers were also sought. The Paiute collected sagebrush seeds as well, but because the seeds were so bitter, they were only collected when there was little else to eat.

Seeds were collected by knocking them off the stalk into conical baskets with basketry seed beaters; they were then winnowed and sometimes parched in basketry trays. In order to be eaten, the seeds were ground into flour on stone metates or were boiled in pots to make a mush. Stored seeds were cached in pits, baskets, bags, and available caves and rock crannies located as near as possible to the winter village so that they would be easily accessible during the bleak winter season.

Later in the summer, edible roots, bulbs and berries were gathered from the moist grounds near springs, lakes and streams to add to the winter's stores. Wild onion, camas, arrowroot, tiger lily bulbs, bitter-root, cattail root, and tule were among the roots dug with a simple digging stick to be baked, boiled, or dried and stored. Serviceberries, gooseberries, currants, raspberries, and wild cherries were gathered to be eaten immediately or dried and stored for winter. In addition, sugar was found in the reeds which grew in marshy areas.

With the coming of winter, the desert plants became less fruitful, and the Northern Paiute settled down into villages consisting of two to fifteen families which were located near a reliable source of water and the food caches of stored seeds, roots, and berries. Although plant foods provided much of their diet throughout the year, the people welcomed the addition of fresh fish and game, particularly in the winter-time. In the higher elevations, deer, pronghorn antelope and mountain sheep were occasionally taken by individual hunters during the year. Communal drives for deer or antelope were occasionally organized by several families of a band. Such large-scale hunts could only take place on an average of every twelve years in the same general area due to the low population of the larger game animals in the desert. Snares, nets, traps, and blinds were used by hunters to catch small game, such as squirrels, field mice, gophers, raccoons, rabbits, chipmunks, porcupines, and an assortment of birds. Fish and waterfowl constituted an integral part of the Paiute diet. Fishermen caught trout, suckers, salmon, and
minnows in lakes and streams, using fish nets, weirs, rock dams, elongated fishing baskets of willow or tule, harpoons, fish arrows, and lines with bone hooks. Waterfowl, including mud hens, ducks and geese, were taken in occasional communal drives and were also stalked by individual hunters. Caterpillars, ants, crickets, and insect larvae added variety to the general diet when they were in season.

Although the population of the Northern Paiute had an average density of only one person for every ten to twenty square miles, the desert could probably have supported many times as many people except for several limiting factors. First, the plants which provided the much needed seeds and roots were widely scattered across the countryside, limiting the efficiency with which they could be gathered. Second, the seeds of various plants could be gathered for only a few days to a couple of weeks before the seeds fell off the stalks and could no longer be collected for food. Consequently, most seeds ripened and fell before the inhabitants had a chance to gather them. Third, due to the erratic rainfall in the region, the seed yield varied considerably from year to year and sometimes failed to support even the tiny local population. In the event of a severe food shortage, the families of a band split up to visit friends and relatives in more productive areas. Sometimes, however, food was scarce in many places and the people starved.

Material Culture

The nomadic Northern Paiute had to keep their possessions to a minimum. Because they did not have horses until after contact times, they had to pack everything on their backs. As a result, they carried only essential baggage on their wanderings. Tools for butchering, food processing, and woodworking were often fashioned on the spot from available cobbles and abandoned when the immediate task was completed. Countless "activity areas" of this sort, hundreds or thousands of years old, are still found in the desert today. Favorite grinding tools or other bulky or heavy items which the owner wished to keep were probably stored at the winter camp to which the owner returned year after year.

The limited number of material items made and used by the Paiute show how frugally these people used plants and animals for purposes other than food. Bone and horn were used to fashion spoons, dippers, stirrers, knives, knife handles, awls for punching holes in skins, drill tips, and arrowheads. Wood was used to make cooking implements, drillshafts, arrowshafts, and bows. Black obsidian, a natural glass so frequent in eastern Oregon, made knives, scrapers, and arrow points whose freshly chipped edges were sharper than surgical steel. Willows and tule provided the materials for fashioning the seed beaters and baskets used in food gathering. Since the Northern Paiute did not make pottery of any kind, they wove watertight ollas or bottles covered with pitch for carrying precious water on their long treks through the desert. Watertight
unpitched baskets were also used for cooking. Red-hot stones were taken from the fire and stirred in a basket partially filled with water, to boil the flesh of rabbit or duck, seed meal, or other food (Lowie 1924: 225). Shredded sagebrush bark, which was always in abundance, proved useful for weaving bags, blankets, and sandals. The lower stems and roots of the rabbitbrush provided an ever-available supply of chewing quids. Numerous other plants were used for concocting poisons, treating ailments, and making rope.

Weapons of the Northern Paiute included a three-foot sinew-backed bow of juniper or serviceberry, with a sinew or vegetable fiber bowstring. Arrows were made of various woods and were generally about 2½ feet in length. Stone, bone, and horn points were made and attached to arrowshafts with sinew. Arrow poison was sometimes used in hunting. To straighten arrow shafts, a hunter used his teeth, a grooved stone slab, or a perforated horn. Stone-headed clubs were used, but atlatls and darts were not in use at the time of Euro-American contact. Slings were used only as toys and not for serious hunting.

Women usually wore knee- or shinlength dresses of deer, antelope, or mountain-sheep skins, which were often decorated with paint, Olivella shells, or bone beads. The men generally wore nothing except skin headbands and belts, although they did don skin shirts, fur leggings, and fur hats to keep warm in the winter. Robes and capes for keeping out the cold were twined from vegetable fibers and furs or were made from a patchwork of hides. Although the Paiute usually went barefoot, they sometimes wore moccasins of skin or sandals of shredded bark or tule and rushes.

Shelter

The Northern Paiute constructed several forms of shelter according to their needs. For temporary or summer camps, they often formed a crude windbreak or sun shade out of brush. A circular domed wickup with a frame of bent willows covered with grass, tule, brush, or mats was used both in summer and in winter. These dwellings were usually six to eight feet high and eight to fourteen feet in diameter and had grass-covered floors. A tripod-foundation house, with three supporting poles tied at their intersection like a tipi, was also sometimes constructed in both summer and winter. Occasionally, caves served as temporary dwellings. Wickiup-type sweat houses big enough for as many as four people were built and heated by pouring water over hot rocks; sweathouses were used for curing sicknesses as well as for ritual cleansing and praying (Stewart 1941:377-379).
Sociopolitical Organization

Since the organization of the Paiute was very flexible, there were no rigid social prescriptions. Leaders led with the consent of the entire group and had little authority. Leadership was not inherited but depended upon personality and experience. Special "chiefs" each organized and led different activities, such as dances, and rabbit, antelope and waterfowl drives. There were no definite rules for marriage, except that one could not marry a blood relative. Marriage residence was also optional, although matrilocal residence (living with the wife's family) was preferred. Both polygyny and polyandry occurred, but apparently these practices were not frequent (Park 1937, Stewart 1937). The sororate, a practice where a man married his dead wife's sister, and the levirate, where a widow married her husband's brother, were also practiced.

Religious Beliefs

Rituals were exceedingly limited and religion served as an integrating factor only to a minor degree. The primary religious figure among the Paiute was the shaman. Shamans were either mature men or women who had acquired shamanistic power in a dream. In the dream, power was bestowed by one or more spirits in the form of an animal or natural phenomenon, such as thunder, lightning or the moon. Shamans received several power-bestowing dreams from their guardian spirits during their lifetimes and sometimes went on long lonely retreats in quest of such visions. The shamans were highly respected and feared for their powers, which allowed them to cure diseases, wounds and snakebites, control the weather, and foretell the future. The people believed that a shaman could punish them supernaturally with sickness or death if they did something wrong, so the presence of the shaman served as an effective form of social control. Shamans who misused their power and caused innocent people to die, however, were killed as a menace to the group.

The Paiute conceived of death as the loss of one's soul. When death occurred, the body was usually painted, adorned and wrapped in a blanket for burial. The usual method of disposing of the body was by burial in the ground, especially on rocky hillsides or talus slopes, and covering the grave with stones to protect it from wild animals (Lewis 1906:190; Stewart 1941:412). Bodies were also placed in caves or rock clefts which were then blocked with stones (Lowie 1924:262). The deceased's house was usually burned, and personal property was destroyed, buried, or taken by relatives.

Among the native traditions of the Northern Paiute are stories of a people called the "Old-time" Indians, who occupied the desert land before the Paiute came to live there. The Paiute claim that the "Old-timers" were the ones who made and left all the stone mortars and pestles which
are now found in the Paiute country. They also say that the petroglyphs or rock carvings which occur in the area were done by the "Old-timers" (or by Coyote, an important mythological figure) and not by the Paiute (Stewart 1941:418). Interestingly, there is some archaeological and linguistic evidence to indicate that the Paiute have been in eastern Oregon for only a thousand years or less.

Trade

Since the Northern Paiute were somewhat removed from the trading centers along the Columbia River, trading was not a major activity, particularly in pre-contact times. A Deer-Eater Paiute informant is reported by Suphan (1974a:64) as saying that "the Paiute traded regularly with the Tenino living at Sherar's Bridge, giving buckskin and roots for salmon and horses." Anastasio (1972:136) notes that roots and elk meat were traded to the Plateau people by the Great Basin groups. In addition, from the archaeological evidence it is known that the obsidian from Glass Buttes and the surrounding area was traded as far away as British Columbia.

Historic Contact

Subsequent to the advent of Euro-Americans in the Northwest, the northern boundary of Paiute territory changed rapidly in response to the movements of neighboring native groups. During the 1700s, Paiute territory probably extended further northward to include the present-day Warm Springs Indian Reservation. The Northern Paiute traditionally were a peaceful people for whom warfare was practically nonexistent, but there is abundant evidence of friction between the Sahaptins and the Paiute. Ray (1938:391) describes the nature of this conflict as follows:

Sahaptin informants declare that from time immemorial conflict has existed with the (Northern Paiute)...Neither side ever attempted to wrest territory from the other. Marauding parties carried away moveable property, but the main object of warfare was the attainment of glory...In these contests the [Northern Paiute] often pushed as far north as the Columbia River...but the invaders never remained long and in no case established permanent camps.

Before 1800, these raids, specifically between the Northern Paiute and the Tenino, were made on foot and required several days of travel. At the turn of the century, however, the balance between the two groups began to shift in favor of the Tenino. The northern group, situated along the Columbia River trade route, acquired the horse and new weapons from Euro-Americans, which gave them a definite advantage over the
Paiute, who had not yet adopted the horse. Consequently, the Tenino began to push south into the area of the present day Warm Springs Reservation, which originally was Paiute country.

After the Tenino were settled on the Warm Springs Reservation in 1857, the Northern Paiute took the opportunity to raid the Tenino in return. During this time, the Paiute also apparently raided the Klamath on occasion (Stern 1966:23). By this time, the mobility of the Paiute had been greatly increased due to the acquisition of the horse sometime during the mid-1800s. The Northern Paiute raids continued for about ten years and even extended past the signing of two treaties in 1864 and 1865 (refer to Wheeler-Voegelin [1955] for a complete account of the treaty process). The Northern Paiute were eventually subdued and persuaded to move onto reservations. The Paiute moved to several reservations, including the Klamath Reservation (which was terminated by law in 1954), the Warm Springs Reservation and the small Burns Reservation in Oregon, as well as several reservations in Idaho and Nevada.

**PENUTIAN NEIGHBORS**

In addition to the Tenino and Umatilla, other Penutian groups sharing similar lifestyles also occupied eastern Oregon. These groups included (1) the Cayuse and Nez Perce who greatly influenced the lifeways of the Umatilla, (2) the Molala who resided to the west of the Wasco and Tenino, and (3) the Klamath-Modoroc who lived to the south of the study area but frequently visited the trade center at The Dalles during historic times. Because these groups do not figure prominently within the study area, they will be commented upon only insofar as they relate to an understanding of aboriginal activities within north-central Oregon.

**The Cayuse and the Nez Perce**

The Cayuse and Nez Perce were closely associated, neighboring groups occupying the northeastern portion of Oregon, with the Cayuse sandwiched between the Umatilla to the west and the Nez Perce to the east. Great Basin peoples resided to the south. The Nez Perce language is closely related to the Umatilla and Tenino dialects, which are all Sahaptian languages of the Penutian phylum. The Cayuse spoke a language which is considered to be a language isolate within the Penutian phylum, which means that it is only very distantly related to other Penutian languages, such as the Sahaptian languages, if at all. Ray (1939) described cultural patterns of both the Cayuse and the Nez Perce; information on the Cayuse is also presented by Suphan (1974b), and descriptions of the Nez Perce are found in Spinden (1908) and Walker (1973). Comprehensive articles on both groups are in Walker (n.d.).
The Nez Perce, who constituted the largest ethnic group or tribe on the Plateau, as well as the Cayuse shared similar basic Plateau culture patterns with the Tenino and Umatilla (Ray 1939). The Nez Perce, who were located next to the Plains, were heavily influenced by Plains culture and passed this influence on to the Cayuse as well. After acquiring the horse in the mid-eighteenth century, the two groups began traveling and trading extensively; they also began to make frequent excursions to the Plains to hunt buffalo (Garth 1964:47). They kept up a peaceful interchange with their Penutian neighbors, but made raids on the Great Basin peoples to the south, both within and outside the study area. They also apparently joined forces to make raids on the Klamath, as evidenced by a quotation attributed to the Klamath Indians of Klamath Lake by Ogden in 1826, and traveled through the study area to execute these raids:

The Nez Perces have made different attempts to reach our village but could not succeed. Even last summer we discovered a war party of Cayouuse and Nez Perces in search of us; but they did not find us. (Elliott 1910:210)

Although the central territories of the Cayuse and Nez Perce were somewhat removed from the study area, various accounts cite occurrences of both groups in the vicinity. Both groups frequently visited, and occasionally raided as well, the Tenino and Wasco at The Dalles-Celilo trading center (Coues 1897:2:799; Lee and Frost 1844:177; Stern n.d.; Anastasio 1972:145). In addition, it appears that many of the sites utilized in Grant County by the Umatilla and Tenino were also sometimes used by the Cayuse (Suphan 1974b). Although there is no doubt that the Cayuse and Nez Perce frequently visited the area, it is seriously doubted whether any camp sites or cultural remains could be positively identified with either of these groups.

The Molala

The Molala were a small aboriginal group who are now extinct and for whom little ethnohistorical or ethnographic information is available. The Molala spoke a language which is classified as a "language isolate" of the Penutian phylum, which indicates that the Molala language was only distantly similar to the other Penutian languages of Oregon, which include Tenino, Umatilla, Cayuse, Nez Perce, and Klamath-Modoc.

Scattered references to the Molala may be found in the notes taken by various linguists and ethnographers, including Hale (1846), Gatschet (1877), Powell (1891), Boas (1890), Teit (1926), Spier (1930), and Murdock (1938). Unfortunately, much is second- or third-hand information from other native groups and was not verified in the field. The results of treaty attempts on the part of the U.S. government
and the Molala War of 1847-48 are briefly mentioned by Bancroft (1886), Coan (1922), Clark (1927), and Stern (1956).

Although the historic range of the Molala was restricted to the mountains of the central Cascade Range, Murdock (1938:397-398) assigns the Molala to the Tygh Valley and areas along the Deschutes River in early times. According to Murdock, the Molala were displaced by the Tenino sometime during 1810-1820 and shoved into the Cascades by brute force. On the basis of more recent informant testimony, however, Rigsby and French are of the shared opinion that the Tenino have lived in the Tygh Valley for quite some time. The western portion of the study area was "exploited by a number of groups including the Wasco Chinookans, various Sahaptin bands, some Northern Paiute groups, and perhaps [emphasis added] even some Molala from west of the Cascades who crossed over 'to have a look around" (Rigsby 1965:61). Consequently, although the Molala cannot be considered former residents of the area, it is likely that they were among the many visitors to the Tenino lands within the study area.

**The Klamath-Modoc**

The Klamath-Modoc were located to the southwest of the study area at the southern end of the Cascade Range. The ethnographic literature on the Klamath and Modoc includes the following sources: Gatschet (1890), Co-ville (1897, 1902), Dorsey (1901), Barrett (1910), Spier (1927a, 1927b, 1930), Ray (1939, 1942, 1963), and Stern (1966).

Although the Klamath-Modoc resided some distance from the trading center at The Dalles, they were frequent visitors to the site during historic times. Actually, the earliest recorded contact between the Klamath and the Sahaptins of the Columbia River occurred in the early 1800s when the Sahaptins began to raid the Klamath for slaves (Ray et al 1938). Before mid-century, however, the Klamath and Modoc were raiding other neighboring tribes in turn, particularly the Achumawi, for slaves to be traded at The Dalles.

The Modoc rarely journeyed to trade at The Dalles as the Klamath usually acted on their behalf in trading. Items exchanged by the Klamath at The Dalles included slaves, Pit River bows and beads, and lily seed (wokas) which were swapped for horses, blankets, buffalo skins, parfleches, beads, dentalium, dried salmon and lamprey eels (Spier and Sapir 1930).
SUMMARY

The primary inhabitants of north-central Oregon during ethnographic times were the Tenino who occupied the central portion of the study area along the lower Deschutes and John Day rivers south of the Columbia. The Wasco claimed a small portion of territory in the northwestern corner of north-central Oregon, and the Umatilla extended along the eastern fringe of the Upper Prineville District and south into the Upper Burns District. The Northern Paiute, who occupied the southern reaches of the study area, frequently exchanged raids with the more northern groups. Other neighbors with whom the Tenino interacted were the Molala, Cayuse, Nez Perce, and Klamath-Modoc during the latter's excursions into north-central Oregon for trading purposes.

Generally speaking, little is known of these groups because they were rapidly decimated due to factors such as disease, war, and famine which resulted from contact with Euro-Americans. Nevertheless, the available ethnographic information indicates that the Columbia River and Northern Paiute groups who occupied the study area shared many basic cultural traits in common. Both followed a semi-sedentary subsistence pattern. Settlements tended to be seasonal, with groups generally returning repeatedly to the same village sites and camping spots. Food resources were utilized on a seasonal basis whenever and wherever they occurred. Both groups hunted game animals, fished, gathered roots, seeds, and berries, and stored dried food for the winter. Due to environmental differences, the Northern Paiute emphasized hunting and seed gathering, while the Columbia River groups relied more on fishing and root gathering.

Neither group had a well-developed sociopolitical organization. The Paiute were much more flexible and loosely organized, however, than the Columbia River folk. Group territory boundaries were indistinct, and many subsistence areas within the study area were shared to some extent by Paiute, Tenino, Umatilla, Wasco, Cayuse and/or Nez Perce. Peaceable relations and extensive trading permeated the Columbia Plateau, but the Paiute had little to trade and engaged in frequent raids against the Plateau people who raided the Paiute in return.

The emphasis on raiding which was exhibited by both sides seems to have been a result of contact with Euro-Americans and the acquisition of the horse and guns. Other traits, such as the taking of slaves, the development of a more centralized political organization among the Columbia River groups, and increased trading activities, were also apparently outgrowths of the contact era and do not reflect the pre-contact lifeways.

Drastic changes occurred with the arrival of the white settlers and their domesticated plants and animals. In a few short years, the settlers succeeded in altering the natural vegetation of the land to such an extent that the traditional means of subsistence were no longer viable for
the Indians, causing many to suffer. Whites and Indians competed to survive, but the military strength and sheer numbers of the whites soon overpowered the Indians who gave up only after years of fighting.

The native populations of north-central Oregon, when seen without their veneer of post-contact traits, represent the local cultural traditions which have characterized the area for centuries and possibly millennia. The human use patterns documented in historic times therefore provide a basis for interpreting the prehistory of the study area. In the process of inferring past cultural patterns from documented lifeways, one must seek clues in the archaeological record as to how human lifeways have developed and changed over time. The following section will be addressed to these prehistoric concerns.
CHAPTER III
ARCHAEOLOGICAL OVERVIEW

INTRODUCTION

North-central Oregon is situated within the southern portion of the Columbia Plateau physiographic province of North America, which also includes large areas in neighboring Washington and Idaho. This region consists of a broad lava plain which is incised by the Columbia River and its tributaries to form steep-walled canyons along the water courses. For the purposes of this archaeological overview, discussion will be largely restricted to research which has been conducted in the southern Columbia Plateau--along the Middle Columbia River, and along the Deschutes and John Day rivers--which are major southern tributaries of the Columbia River in north-central Oregon.

The widespread distribution of speakers of Penutian languages over much of Oregon and southeastern Washington suggests that the Penutian speakers have been the dominant occupants of the Columbia Plateau for many millennia. In ethnographic times, the Columbia Plateau was characterized by an orientation toward harvesting salmon and other anadromous fish which were plentiful in the Columbia River and its tributaries. During the annual runs in the summer, the aboriginal population congregated at key points along the rivers to take salmon, and in the winter settled in small villages in sheltered canyons inland from the major water courses. During spring and fall, the people traveled in small family groups into the uplands to gather roots and berries and to hunt.

Over the years several developmental frameworks for the evolution of prehistoric cultural patterns on the Columbia Plateau have been proposed. Most of them are the result of archaeological research conducted in the state of Washington. Because familiarity with these developmental schemes may aid in interpreting the archaeological remains found in north-central Oregon, they are briefly discussed below in a separate section entitled "Theories of Cultural Development on the Columbia Plateau."

To some extent, all of these cultural sequences attempt to relate changes in subsistence patterns and material culture to the climatic fluctuations outlined by Hansen (1947) and Antevs (1948, 1955). Hansen's earliest stage, Period I, predates 9000 years ago and coincides with the cold and wet climate prevalent during the time when continental glaciers covered much of northern North America. Period II, the Early Postglacial, lasted from 9000 to 8000 BP, according to Hansen, and was a time of increasing warmth and dryness following the recession of the glaciers. Period III, the Middle Postglacial, saw the climate reach its hottest and most arid maximum between 8000 and 4000 BP. Period IV, the Late Postglacial, lasting from 4000 BP to the present, saw a return to cooler and moister conditions resulting in today's climate.
PALEOINDIANS IN OREGON

The Paleoindian occupation of Oregon encompasses archaeological manifestations dating earlier than approximately 8000 years ago (BP). The evidence for the presence of prehistoric peoples in Oregon at this early time may be divided into three main categories: (1) anomalous early finds, which probably predate 10,000 to 12,000 BP and are sometimes associated with extinct Pleistocene megafauna; (2) the Fluted Point horizon, equatable with the Clovis and Folsom complexes which have been assigned a time range from 11,500 to 10,000 BP on the Great Plains and in the Southwest; and (3) slightly younger archaeological complexes, dating from 11,000 to 8000 BP, which can be subsumed within the concept of a San Dieguito-Windust-Milliken Horizon (Aikens n.d.). A list of finds attributable to the Paleoindian occupation of Oregon is presented in Table 3; the locations of these finds are shown in Figure 13.

Anomalous Early Finds

At the present time, the earliest radiocarbon dated evidence of human occupation in Oregon is at Fort Rock Cave. The cave is situated on a former terrace of Pleistocene Fort Rock Lake in south-central Oregon, and was excavated in the late 1930's and again in 1966 and 1967 under the direction of Luther S. Cressman of the University of Oregon (Cressman et al. 1940; Cressman 1942; Bedwell and Cressman 1971; Bedwell 1970, 1973). During the later excavations a small hearth was uncovered near the bottom of the cultural deposit in the cave. Charcoal from this hearth subsequently yielded a radiocarbon date of 13,200±720 BP (Bedwell 1973:141).

The artifact assemblage associated with this radiocarbon date includes two projectile points, several scrapers, gravers and modified flakes, and a fragment of a hand-held grinding stone or mano. One projectile point is vaguely reminiscent of the Lake Mohave type, and the other is a small lanceolate with a concave base. It should be noted that the latter specimen was at first thought to be a fluted point (Bedwell 1973:142). A more recent examination, however, suggests that this identification was incorrect, and that the specimen is actually an unfinished projectile point or blank (Fagan 1975).

At nearby Cougar Mountain Cave No. 2, charcoal recovered during excavations by the same University of Oregon field crew produced a slightly later radiocarbon date of 11,950±350 BP (Bedwell 1973:141). The only artifacts associated with the dated level at this site were lithic flakes exhibiting indications of use-wear; such specimens are not diagnostic of any particular time period.
Due to the paucity of information from the lowest levels at these two localities, it is not possible at the present time to determine how these sites fit within existing culture-historical sequences for western North American prehistory. The radiocarbon date of 13,200 ± 720 BP from Fort Rock Cave is almost 2000 years earlier than the first well-known archaeological complex in North America, the Fluted Point horizon. A lack of detailed information on the exact manner in which the artifacts were associated with the charcoal sample and the hearth has caused some archaeologists to doubt the validity of this early radiocarbon date (Haynes 1969). At the present time, then, Fort Rock Cave and Cougar Mountain Cave No. 2 are considered anomalous sites whose exact affiliations with other Paleoindian manifestations are so far unknown.

Several discoveries in south-central Oregon of cultural materials in association with the remains of extinct Pleistocene megafauna can probably also be viewed as evidence of Paleoindians in Oregon. At a locality on Lower Klamath Lake an obsidian knife and a crude scraper were found in association with bone and tusk fragments from a mammoth (Cressman 1942:99). Excavations at Paisley Cave No. 3 in the Summer Lake Basin produced cultural materials in association with the remains of Pleistocene horse and camel (Cressman et al. 1940:10; Cressman 1942:136; Cressman 1966). At Catlow Cave No. 1 in Catlow Valley human skeletal remains were found in association with an Equus (horse) bone which Cressman (1942:27-31) presumed was of Pleistocene age (cf. Krieger 1944). Unfortunately, all of these associations of extinct megafauna and cultural materials were discovered before the advent of radiocarbon dating, and thus their exact age is unknown. The most recent discovery of the remains of extinct megafauna in association with cultural materials involved a possible camelid kill site near Fossil Lake (Minor and Spencer 1977). Collagen extracted from fragments of the animal's bones recently produced a radiocarbon date of 9955±165 BP (SI-3458).

A review of the information on extinct megafauna and associated radiocarbon dates led Martin (1967) to conclude that most Pleistocene megafauna in North America became extinct by around 11,000 years ago. Since this estimate falls within the time span of the known human occupation of Oregon, and since cultural materials (notably Clovis and Folsom projectile points) are found in association with the remains of Pleistocene megafauna in other parts of North America, it seems reasonable that some apparent associations of artifacts with megafauna remains in Oregon are valid indications of the presence of Paleoindians. These situations appear to be quite rare, however, since there are a number of sites in western North America which have been radiocarbon dated to the period between 12,000 and 8000 BP at which the remains of extinct megafauna are not present (Hester 1973:61).


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<th>No.</th>
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<th>Period of Occupation</th>
<th>Literature Reference</th>
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<td>F S</td>
<td>Fagan and Sage 1974</td>
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<td>Fagan and Sage 1974</td>
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</tr>
</tbody>
</table>

? = Paleoindian finds of unknown affiliation  
F = Fluted points (Clovis-Folsom)  
S = San Dieguito-Windust-Milliken horizon finds
The Fluted Point Horizon

The second category of Paleoindian finds in Oregon is characterized by large, well-made, fluted lanceolate projectile points. These distinctive artifacts can be equated with the early Clovis and Folsom complexes found throughout North America. The distribution of fluted point finds in Oregon is shown in Figure 13.

Clovis projectile points are thin lanceolate blades, 3 to 6 inches in length, with short flakes or "flutes" removed from the base (Figure 14). On the Great Plains and in the Southwest these distinctive points are often found in association with extinct Pleistocene megafauna, in most cases the remains of mammoths. Folsom projectile points are also lanceolate in form, but on these points the fluting covers a greater portion of the specimen (Figure 15). On the Great Plains and in the Southwest Folsom projectile points are frequently found with the remains of an extinct species of bison.

For many years it was believed that fluted projectile points, relatively common in other parts of North America, were not significantly represented west of the Rocky Mountains. This notion was first dispelled by Davis and Shutler (1969) who plotted the known distribution of fluted projectile points in California and Nevada. More recently, Aikens (1978) has mapped the distribution of fluted points throughout all of the western United States. Together, these studies indicate that there now is sufficient evidence to make it clear that the makers of fluted projectile points were widespread throughout the West as a whole.

Unfortunately, none of the fluted projectile points in the West have been directly dated, since they most commonly occur as surface finds. On the Great Plains and in the Southwest, however, Clovis projectile points have been radiocarbon dated within the narrow time range of 11,500 to 11,000 B.P., while Folsom projectile points generally date between 11,000 and 10,000 B.P. (Haynes 1971). In the absence of direct information on the age of fluted projectile points west of the Rocky Mountains, it seems reasonable to suggest a time range from 11,500 to 10,000 B.P. for the Fluted Point Horizon in the West as well.

The San Dieguito-Windust-Milliken Horizon

The third category of evidence attributable to the Paleoindian occupation of Oregon consists of a series of intergrading stone artifact complexes which are widespread and have been given several names in different parts of North America. In California and Nevada this early cultural manifestation is usually referred to as the San Dieguito Complex (Warren 1957). In the Columbia Plateau region of the Pacific Northwest this early culture complex is assigned to the Windust Phase (Rice 1972). Further north in British Columbia, a similar artifact complex is known as the
Figure 18. Clovis Fluted Points, Actual Size (after Jennings 1974).

Figure 19. Folsom Fluted Points, Actual Size (after Jennings 1974).
Milliken Phase (Borden 1960, 1969). Noting the similarities between these local complexes, Aikens (n.d.) has collectively termed them the San-Dieguito-Windust-Milliken Horizon.

The artifact assemblages in each of these culture complexes are not identical, but they are sufficiently similar to suggest that they are all related in a single widespread cultural horizon. The artifact assemblages are characterized by large stemmed and shouldered lanceolate projectile points, large leaf-shaped projectile points or knives, chipped-stone crescents, scraper planes, and flake scrapers of several kinds (Figure 16); in addition, they often contain milling stones.

The San Dieguito Complex has been dated between 9000 and 10,000 BP (Warren 1967). The Windust Phase has been assigned dates ranging from 7500 to 10,500 BP (Rice 1972). The Milliken Phase also falls within this time range, and has been dated between 9000 and 8000 BP (Borden 1969). Based on the dates from these cultural complexes, then, the general time frame of this San Dieguito-Windust-Milliken Horizon falls within the period from 8000 to 11,000 years ago (Aikens n.d.).

THE ARCHAEOLOGY OF THE SOUTHERN COLUMBIA PLATEAU

The later aboriginal cultures of the southern Columbia Plateau were derivatives of the early San Dieguito Complex (Warren 1967) and the Windust Phase (Rice 1972). After about 8000 years ago, however, the archaeological record in North America becomes more complex, as prehistoric peoples became more closely adapted to the natural resources available in each region. Where before there was a series of similar lithic assemblages occurring over an area of several thousands of square miles, after about 8000 BP artifact assemblages geared to the exploitation of the resources locally available in each region began to appear. In broader perspective, the later prehistoric cultures of the Columbia Plateau followed a way of life characteristic of the continent-wide Archaic Stage, which involved the intensive exploitation of available natural resources by means of hunting, gathering, and fishing. On the Columbia Plateau, this Archaic way of life persisted up to the beginning of the historic era.

The following review of the archaeology of the southern Columbia Plateau will address the prehistoric cultural record in terms of the following regions: the Middle Columbia River, the Deschutes River, and the John Day River. The sites referred to in the discussion are listed by subregion in Table 4; their locations are indicated in Figure 17.
Figure 20. Projectile Points from the San Dieguito-Windust-Milliken Horizon (after Jennings 1974).
Figure 21. Location of Major Archaeological Projects in North-Central Oregon. (Key, Table 4)
<table>
<thead>
<tr>
<th>Map No.</th>
<th>Location</th>
<th>Literature Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MIDDLE COLUMBIA RIVER</td>
<td>Strong et al 1930&lt;br&gt;Butler 1959&lt;br&gt;Cressman et al 1960</td>
</tr>
<tr>
<td></td>
<td>The Dalles Region</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>McNary Dam Reservoir Area</td>
<td>Shiner 1961; Osborne et al 1961</td>
</tr>
<tr>
<td>4</td>
<td>Bonneville Dam Reservoir Area</td>
<td>Krieger 1935; Phebus 1978</td>
</tr>
<tr>
<td>5</td>
<td>THE DESCHUTES RIVER</td>
<td>Cressman 1937a&lt;br&gt;Cressman 1948&lt;br&gt;Osborne 1950&lt;br&gt;Daugherty and Mallory 1961;&lt;br&gt;Combes 1962; Ice 1962&lt;br&gt;Cressman 1963; Ross 1963</td>
</tr>
<tr>
<td>6</td>
<td>Wiklup Damsite No. 1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Odell Lake Site</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Benham Falls Reservoir Area</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Lava Butte Site</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Round Butte Dam Area</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Mack Canyon Site</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Lower Deschutes River</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>THE JOHN DAY RIVER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Butte Creek Area</td>
<td>Krieger 1938; Cressman 1950&lt;br&gt;Polk 1976</td>
</tr>
<tr>
<td></td>
<td>Lower John Day River</td>
<td></td>
</tr>
</tbody>
</table>
The Middle Columbia River

The middle portion of the Columbia River extends from The Dalles to the bend in the Columbia River in Umatilla County, Oregon. In this region, the lava plateaus on either side of the river have been eroded away by occasional floods which have swept down the channel in times past. This stretch of the Columbia contains several dams and reservoirs which have been the focus of most of the archaeological research on the southern Columbia Plateau to date. In prehistoric times, as well as today, the area provided rich riverine resources, such as runs of salmon, and easy access to the available resources in the nearby uplands. The archaeological evidence indicates that prehistoric peoples have been exploiting the resources of the Columbia River for at least the last 10,000 years.

The Dalles Region

The earliest archaeological research along the Middle Columbia River was conducted from 1924 to 1926 in The Dalles region by archaeologists from the University of California. The project consisted of a reconnaissance survey which subsequently led to a petroglyph study (Strong and Schenck 1925) and the excavation of several sites in the vicinity of Miller's Island (Strong, Schenck and Steward 1930). This research also resulted in articles on carvings in the Columbia Valley (Steward 1927) and on an unusual type of stone implement (Steward 1928).

The University of Oregon conducted its first project in The Dalles area in the 1930's at a site threatened with destruction by highway construction. L.S. Cressman directed the excavations at the Big Eddy Site (35WS2), located on the downstream end of the Long Narrows of the Columbia River, and upstream from The Dalles (Drews 1938). This significant site was revisited in the late 1950's by the University of Oregon for further excavation (Cressman et al. 1960). In addition to The Dalles project, Alex D. Krieger (1938) conducted an archaeological reconnaissance of north-central Oregon, locating several sites at the confluence of the Deschutes and Columbia rivers near the town of Miller, Oregon.

Archaeological salvage work associated with the construction of The Dalles Dam in the 1950's spawned a lengthy series of reports. A survey and some preliminary excavations were conducted by Joel Shiner of the Smithsonian Institution River Basin Surveys (Shiner 1952, 1953). The archaeological salvage program for sites threatened on the Oregon side of the river was contracted to the University of Oregon by the National Park Service in 1952. This program, under the direction of L.S. Cressman, continued until 1957 and resulted in several formal reports (Cressman and Emmons 1953; Cole 1954; Cressman et al. 1960). During this time, the Big
Eddy Site (35WS2) was revisited and further excavated. More important, however, was the excavation of the Fivemile Rapids Site (35WS8), which contained an archaeological sequence extending back to 10,000 years ago. Primarily on the basis of results obtained from the Fivemile Rapids Site, Cressman developed a three-stage cultural sequence for The Dalles area (Cressman et al 1960:58-63). The sequence includes Early, Transitional, and Late Stages (See Table 5).

The Early Stage is radiocarbon dated between 9785 and 7875 B.P., although Cressman suggests that "the earliest occupation of the site started not less than 11,000 or more years ago" (Cressman et al 1960:66). This stage consists of three subdivisions. The Initial Early has a small and simple artifact inventory consisting of blades, scrapers, and a few worked bone pieces. The Full Early inventory includes a wider variety of artifacts, including a rich bone and antler technology, bolas, burins, blades, immense quantities of salmon vertebrae, bird and animal bones, and early stemless, leaf-shaped or incipient-stemmed projectile point types. The Final Early signifies the decline and eventual disappearance of the bone and antler industry, as well as the bird, animal and fish bones, burins, and bolas, while lithic tools such as scrapers, gravers, and punches gradually increase in occurrence.

The Transitional Stage is dated between 7875 and 6090 B.P. on the basis of C-14 determinations. The inventory is characterized by a few projectile points and non-diagnostic artifacts such as choppers and scrapers. The decrease of artifacts in the assemblage indicates that the occupation during this time was not as heavy as that for the preceding period.

The Late Stage extends from 6090 B.P. into historic times and has three subdivisions. The Initial Protohistoric sees an increased use of the site and the appearance of smaller notched and stemmed projectile points. The Full Protohistoric assemblage contains a wide variety of projectile point types, carved stone, carved bone pipes, ornaments, and other items. The Contact-Historic subdivision is marked by the introduction of trade materials, such as copper beads, iron knives, firearms, hatchets, fish-hooks, and flints, to the inventory of the Full Protohistoric subdivision.

The Fivemile Rapids Site (35WS8) provides the most extensive cultural record of early Columbia River cultures and shows that a riverine adaptation based on salmon fishing had begun at least 10,000 years ago at The Dalles. Cressman has suggested that the disappearance of the lifeway defined in the Early Stage is a function of ecological change. The Transitional and the beginning of the Late Stages are contemporary with the drying Alithermal trend, which may have encouraged people to migrate from the more arid interior regions to the more stable water and food resources of the rivers and lakes. The origins of the elaborate stone art workings found during the Late Stage are unknown, but the art forms appear to be the result of
<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</td>
<td>6090 B.P. -</td>
</tr>
<tr>
<td></td>
<td>stones, choppers, concave scrapers, beads, drills, notched sinkers, stone</td>
<td>Historic Contact</td>
</tr>
<tr>
<td></td>
<td>sculpture</td>
<td></td>
</tr>
<tr>
<td><strong>Initial Protohistoric</strong></td>
<td>Increased use of site; appearance of new projectile point styles</td>
<td></td>
</tr>
<tr>
<td><strong>Transitional Stage</strong></td>
<td>Light occupation of site, small artifact assemblage, projectile points, choppers,</td>
<td>7875 B.P. -</td>
</tr>
<tr>
<td></td>
<td>scrapers</td>
<td>6090 B.P.</td>
</tr>
<tr>
<td><strong>Early Stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Early</td>
<td>Decline and disappearance of bone and antler industry, disappearance of bird, animal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and 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</td>
<td>9785 B.P.* -</td>
</tr>
<tr>
<td></td>
<td>vertebra, bird and animal bones, red ochre, early projectile point styles (non-</td>
<td>7875 B.P.</td>
</tr>
<tr>
<td></td>
<td>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>
<td></td>
</tr>
</tbody>
</table>

*First occupation estimated to be as early as 11,000 B.P. (Cressman et al 1960:66).
contact with or in-migration of new aboriginal populations rather than an in situ development (Cressman et al 1960:63-70).

On the Washington side of the Columbia River, archaeological salvage work in The Dalles Dam Reservoir area was carried out by the University of Washington, also under contract with the National Park Service, for three field seasons directed by Douglas Osborn. Several sites were excavated and reported in numerous articles and reports (Butler 1955, 1957a, 1957b, 1958a, 1958b, 1959, 1960, 1961, 1962a, 1963, 1964, 1965a; Caldwell 1956, 1957; Garner 1963; Weld 1959). The most extensive excavations were conducted at Wakemap Mound, a major village site, which was occupied from 1200 B.P. to historic times. The site containing the oldest archaeological record may be the Indian Well Site, which according to some archaeologists was occupied as early as 10,000 years ago.

On the basis of these salvage excavations, Butler (1959) presented the following generalized chronology of prehistoric periods at The Dalles:

(1) The Early period (circa 10,000 to 7500 B.P.) may represent the earliest habitation of the Columbia River Valley by somewhat restricted groups of generalized hunting-fishing-gathering peoples sharing a rather simple cultural tradition.

(2) The Middle period (circa 7500 to 1500 B.P.) is associated with the onset of the Altithermal and the appearance of Desert culture traits, such as large side-notched (Bitterroot or Northern Side-notched) projectile points and food grinding implements.

(3) The Late period (circa 1500 to historic times) is characterized by stone and antler carving, rectangular wood-framed houses, specialized fishing equipment, and the appearance of obvious trade items such as whalebone clubs and copper.

(4) The Full Historic period (historic times to present) is marked by a dominance of European trade goods in the cultural inventories of cremation burials, with aboriginal items markedly declining in number and quality.

According to Butler, the Early period inhabitants were a part of a widespread cultural tradition which was termed the Old Cordilleran culture (Butler 1958b, 1961, 1962b, 1965b). The carriers of this tradition utilized streams and valley resources, hunting a variety of game and birds, gathering roots and berries, collecting mussels and snails, and fishing. During the Middle period, the Old Cordilleran culture was influenced by elements of the Great Basin culture. Eventually, during the Late period, the Old Cordilleran culture gave way to the way of life which developed into ethnographic Plateau culture.
The John Day Reservoir Project

Further upstream in the John Day Dam Reservoir area, the University of Oregon, under contract with the National Park Service, undertook an extensive eleven-year archaeological salvage program which was concluded in 1968. The reservoir area was initially surveyed by Joel L. Shiner of the Smithsonian Institution River Basin Surveys program (Shiner 1950). The archaeological resources of the area were reevaluated some years later (Cole and Newman 1958). Archaeological investigations were begun at sites in the reservoir area during the summer of 1958 and fieldwork continued each year until the area was inundated in 1968. During this time a large number of archaeological sites which were threatened by the proposed dam construction were tested and/or excavated. At the present time, however, the results of this fieldwork are only available in the form of a number of interim reports. A summary of the research conducted during the eleven seasons of the John Day Reservoir Project is presented in Table 6.

During the John Day Reservoir Project a number of important archaeological sites featuring house pit depressions were investigated. The results of excavation at the most important of these—the Wildcat Canyon Site—are briefly described below.

The Wildcat Canyon Site (35GM9) was located on a terrace below the basalt cliffs on the south bank of the Columbia River at the mouth of Wildcat Creek, approximately seven miles east of the John Day River. The site covered an extensive area on both sides of Wildcat Creek and contained complex cultural deposits. Parts of nine field seasons were spent investigating the site by archaeologists from the University of Oregon.

For purposes of excavation, the site was divided into six areas: Area 1, a road cut east of the creek and south of Highway U.S. 30 (before relocation) against the cliffs; Area 2, a mound east of the creek and adjacent to the river; Area 3, a cemetery west of the creek and south of Highway U.S. 30; Area 4, recent burials and blowouts west of the creek and on a high dune against the bluffs; Area 5, an area of intensive occupation west of the creek and on the terrace adjacent to the river; and Area 6, a part of Area 5 (see Cole 1968b, Figure 1).

Area 1 was tested during the 1959 field season and found to contain only sparse evidence of occupation (Cole and Cressman 1960). Artifacts recovered from Area 1 included historic trade goods. No further fieldwork was conducted in this area.

Area 2 was first excavated during the summers of 1959 and 1960 (Cole and Cressman 1960, 1961), and again during the 1967 field season (Cole 1968a). Cultural materials were recovered to a depth of more than three meters below ground surface, and a succession of eight cultural levels
<table>
<thead>
<tr>
<th>Season</th>
<th>Site</th>
<th>Type of Investigation</th>
<th>Reference</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>35MW1</td>
<td>Excavation</td>
<td>Cole and Cressman 1959</td>
<td>Several housepits and other features were exposed; rich cultural deposits</td>
</tr>
<tr>
<td></td>
<td>45BN58</td>
<td>Tested</td>
<td></td>
<td>Grave site thoroughly disturbed by relic collectors</td>
</tr>
<tr>
<td></td>
<td>45BN59</td>
<td>Excavation</td>
<td></td>
<td>Only sparse evidence of occupation; cultural materials were concentrated near the surface</td>
</tr>
<tr>
<td></td>
<td>Blalock Island Sites</td>
<td>Tested</td>
<td></td>
<td>Further work warranted</td>
</tr>
<tr>
<td>1959</td>
<td>35GM1</td>
<td>Tested</td>
<td>Cole and Cressman 1960</td>
<td>Site had been thoroughly disturbed by relic collectors</td>
</tr>
<tr>
<td></td>
<td>35GM2</td>
<td>Tested</td>
<td></td>
<td>Most of the site was covered by a railroad roadbed</td>
</tr>
<tr>
<td></td>
<td>35GM9</td>
<td></td>
<td></td>
<td>Wildcat Canyon Site; Areas 1 and 4 contained only sparse cultural deposits; Area 2 contained several house pits; Area 3 contained an extensive cemetery</td>
</tr>
<tr>
<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
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<tr>
<td>--------</td>
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</tr>
<tr>
<td>1959</td>
<td>35GM20</td>
<td>Tested</td>
<td></td>
<td>Evidence of only intermittent occupation was found at this site</td>
</tr>
<tr>
<td></td>
<td>45KL18</td>
<td>Excavation</td>
<td>Cole and Cressman 1960</td>
<td>Site had been greatly disturbed by relic collectors; cultural materials were concentrated near the surface; five burials were recovered</td>
</tr>
<tr>
<td>1960</td>
<td>35GM9</td>
<td>Excavation</td>
<td>Cole and Cressman 1961</td>
<td>Wildcat Canyon Site; Area 2 contained rich cultural deposits; Area 5 was merely tested at this time</td>
</tr>
<tr>
<td></td>
<td>Area 2</td>
<td>Tested</td>
<td></td>
<td>Two of the eight house pit depressions at this site were excavated.</td>
</tr>
<tr>
<td></td>
<td>Area 5</td>
<td>Tested</td>
<td></td>
<td>Hobo Cave; rich natural deposits; further excavations warranted</td>
</tr>
<tr>
<td>1961</td>
<td>35GM4</td>
<td>Surface Inspection</td>
<td>Cressman and Cole 1962</td>
<td>Site had been destroyed by a highway construction project</td>
</tr>
<tr>
<td></td>
<td>35GM7</td>
<td>Tested</td>
<td></td>
<td>Only sparse evidence of occupation was found</td>
</tr>
<tr>
<td></td>
<td>35GM8</td>
<td>Excavated</td>
<td></td>
<td>Site had been disturbed by bank erosion</td>
</tr>
<tr>
<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
</tr>
<tr>
<td>--------</td>
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<td>----------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1961</td>
<td>35GM9 Area 5</td>
<td>Excavated</td>
<td></td>
<td>Wildcat Canyon Site; Area 5 contained rich cultural deposits</td>
</tr>
<tr>
<td></td>
<td>35GM10</td>
<td>Tested</td>
<td></td>
<td>Only very sparse evidence of occupation was found</td>
</tr>
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<td></td>
<td>35GM 17</td>
<td>Tested</td>
<td></td>
<td>Site had been destroyed by a road building project</td>
</tr>
<tr>
<td></td>
<td>35GM24</td>
<td>Excavation</td>
<td>Cressman and Cole 1962</td>
<td>Hobo Cave excavations completed</td>
</tr>
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<td></td>
<td>45KL19</td>
<td>Tested</td>
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<td>Only sparse evidence of occupation was found at this site</td>
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<td></td>
<td>45KL23</td>
<td>Tested</td>
<td></td>
<td>Petroglyph site; no evidence of occupation was found</td>
</tr>
<tr>
<td>1962</td>
<td>45KL15</td>
<td>Excavation</td>
<td>Cole 1963</td>
<td>Historic period site; burial area destroyed by relic collectors; habitation area largely destroyed by bank erosion</td>
</tr>
<tr>
<td></td>
<td>35GM9 Area 5</td>
<td>Excavation</td>
<td></td>
<td>Wildcat Canyon Site, Area 5</td>
</tr>
<tr>
<td>1963</td>
<td>35GM9 Area 5</td>
<td>Excavation</td>
<td>Cole 1964</td>
<td>Wildcat Canyon Site, Area 5</td>
</tr>
<tr>
<td></td>
<td>Blalock Island</td>
<td>Excavation</td>
<td>Cole and Leonhardy 1964</td>
<td>Village site with two associated burial areas</td>
</tr>
<tr>
<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
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<td>--------</td>
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<td>-----------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1963</td>
<td>45BN65</td>
<td>Tested</td>
<td></td>
<td>Burial Island with petroglyphs; destroyed by relic collectors</td>
</tr>
<tr>
<td></td>
<td>45BN72</td>
<td>Surface collected</td>
<td></td>
<td>Cultural materials limited to the ground surface</td>
</tr>
<tr>
<td></td>
<td>45BN73</td>
<td>Tested</td>
<td></td>
<td>Only scattered traces of occupation found</td>
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<tr>
<td></td>
<td>45BN74</td>
<td>None</td>
<td></td>
<td>Site was recorded in 1950, but could not be relocated in 1963</td>
</tr>
<tr>
<td></td>
<td>45BN75</td>
<td>None</td>
<td>Cole and Leonhardy 1964</td>
<td>Local informants mentioned a burial area at this locality, but no evidence of a site could be found</td>
</tr>
<tr>
<td></td>
<td>45BN76</td>
<td>Surface collected</td>
<td></td>
<td>Only scattered evidence of occupation could be found</td>
</tr>
<tr>
<td></td>
<td>45BN77</td>
<td>Surface collected and tested</td>
<td></td>
<td>Historic site extensive in area but containing only shallow cultural deposits</td>
</tr>
<tr>
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<td>45BN78</td>
<td>None</td>
<td></td>
<td>Site was recorded in 1950, but could not be relocated in 1963</td>
</tr>
<tr>
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<td>45BN79</td>
<td>None</td>
<td></td>
<td>Site had been destroyed by hydraulic mining</td>
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<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
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<td>--------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1963</td>
<td>45BN80</td>
<td>None</td>
<td></td>
<td>Site was recorded in 1950, but could not be relocated in 1963</td>
</tr>
<tr>
<td></td>
<td>45BN81</td>
<td>Tested</td>
<td></td>
<td>Only scattered evidence of occupation could be found</td>
</tr>
<tr>
<td></td>
<td>45BN82</td>
<td>Surface collected</td>
<td></td>
<td>Only limited evidence of occupation was found</td>
</tr>
<tr>
<td></td>
<td>45BN83</td>
<td>Tested</td>
<td></td>
<td>Site covers an extensive area and probably dates from around 1000 years ago</td>
</tr>
<tr>
<td></td>
<td>45BN84</td>
<td>Surface collected and tested</td>
<td></td>
<td>Scattered evidence of occupation was found, all on the ground surface</td>
</tr>
<tr>
<td></td>
<td>45BN85</td>
<td>None</td>
<td>Cole and Leonhardt 1964</td>
<td>Site was recorded in 1950, but could not be relocated in 1963</td>
</tr>
<tr>
<td>1964</td>
<td>45KL5</td>
<td>Excavation</td>
<td>Cole 1965</td>
<td>Alderdale Site; house pit site with rich cultural deposits</td>
</tr>
<tr>
<td></td>
<td>45KL9</td>
<td>Excavation</td>
<td></td>
<td>Site had been disturbed by erosion, railroad and highway construction, and by relic collectors; only a small artifact sample was obtained</td>
</tr>
<tr>
<td></td>
<td>35GM3</td>
<td>Excavation</td>
<td></td>
<td>The Hook Site; the site had been badly disturbed by relic collectors; evidence of occupation beginning around 1100 years ago was found</td>
</tr>
<tr>
<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
</tr>
<tr>
<td>--------</td>
<td>------------</td>
<td>-----------------------</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1964</td>
<td>35GM15</td>
<td>Excavation</td>
<td></td>
<td>The Purgatory Site; house pit site; a radiocarbon date of 1740 BP was obtained from this site</td>
</tr>
<tr>
<td></td>
<td>35GM9</td>
<td>Excavation</td>
<td></td>
<td>Wildcat Canyon Site, Area 5</td>
</tr>
<tr>
<td></td>
<td>Area 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>45KL5</td>
<td>Excavation</td>
<td>Cole 1966</td>
<td>Alderdale Site; house pit site containing rich cultural deposits</td>
</tr>
<tr>
<td></td>
<td>35UM35</td>
<td>Excavation</td>
<td></td>
<td>The Umatilla Site; site had been impacted by urban development; a radiocarbon date of 2420 BP was obtained</td>
</tr>
<tr>
<td></td>
<td>35MW6</td>
<td>Testing</td>
<td></td>
<td>Sixmile Canyon Site; only scattered evidence of occupation was found, all near the ground surface</td>
</tr>
<tr>
<td>1965</td>
<td>35GM14</td>
<td>Testing</td>
<td>Cole 1966</td>
<td>The Willows Site; only sparse evidence of occupation was found</td>
</tr>
<tr>
<td></td>
<td>35GM15</td>
<td>Excavation</td>
<td></td>
<td>The Purgatory Site; house pit site with rich cultural deposits</td>
</tr>
<tr>
<td>1966</td>
<td>35GM9</td>
<td>Excavation</td>
<td>Cole 1967a</td>
<td>Wildcat Canyon Site, Area 5; early radiocarbon dates of 10,600 BP, 8100 BP, 9860 BP, and 7370 BP from below Mazama ash layer</td>
</tr>
<tr>
<td>Season</td>
<td>Site</td>
<td>Type of Investigation</td>
<td>Reference</td>
<td>Comments</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
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<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1966</td>
<td>45KL5</td>
<td>Excavation</td>
<td></td>
<td>Alderdale Site; house pit site containing rich cultural deposits</td>
</tr>
<tr>
<td></td>
<td>35GM15</td>
<td>Excavation</td>
<td></td>
<td>The Purgatory Site; house pit site with rich cultural deposits</td>
</tr>
<tr>
<td>1967</td>
<td>45BN83</td>
<td>Excavation</td>
<td>Cole 1968a</td>
<td>The Lower Blalock Island Site; house pit site</td>
</tr>
<tr>
<td></td>
<td>35MW4</td>
<td>Testing</td>
<td></td>
<td>The Threemile Canyon Site; interpreted as an area where river mussels</td>
</tr>
<tr>
<td></td>
<td>35MW10</td>
<td>Excavation</td>
<td></td>
<td>were prepared for food</td>
</tr>
<tr>
<td></td>
<td>35GM9</td>
<td>Area 2 Excavation</td>
<td></td>
<td>The Tom's Camp Site; house pit site from which a radiocarbon date of 1800</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area 5 Excavation</td>
<td></td>
<td>BP was obtained</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area 6 Excavation</td>
<td></td>
<td>Wildcat Canyon Site, Areas 2, 5, and 6</td>
</tr>
<tr>
<td>1968</td>
<td>35GM9</td>
<td>Area 6 Excavation</td>
<td>Cole 1968b</td>
<td>Wildcat Canyon Site, Area 6; 1968 excavations confined to cultural</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>deposits below Mazama ash</td>
</tr>
</tbody>
</table>
was defined. The earliest evidence of occupation was found in Cultural Level 1, which consisted of artifacts resting on gravels immediately above bedrock. These artifacts included large projectile points and bifacially-flaked knives similar to specimens dating from before 8,000 years ago at Five mile Rapids (35WS8).

Features exposed during the excavations in Area 2 included several house floors, a stone-lined hearth, several occupation levels with associated fire lenses, artifacts and food remains, and a single burial. An early radiocarbon date of 3380 B.P. was obtained from bison bone recovered on one of the occupation floors; a small stone-lined pit and the single burial from Area 2 were also associated with this occupation floor. Charcoal from charred timbers, planks, and posts found in the earliest house in Area 2 produced radiocarbon dates of 1860 B.P., 2460 B.P., and 2950 B.P. Charcoal from a firelense on the floor of another house produced a radiocarbon date of 1400 B.P.; another radiocarbon date of 1430 B.P. was obtained from a stone-lined hearth adjacent to this occupation floor, suggesting that this hearth was part of the house.

Animal bones were found in all levels of Area 2. Deer and mountain sheep were the most common animals represented in the faunal collection, but the remains of elk and a species of large goat were also numerous. Bison bones from Area 2 were all from a single animal. Fish vertebrae were scattered throughout the cultural deposit, and mussel shell was also common, especially in the lower levels.

Area 3 was investigated during the 1959 field season (Cole and Cressman 1960). A cemetery covering an area of approximately 100 square meters was excavated to depths of more than two meters. Seventy-four burials were removed, which included the remains of at least eighty-one separate individuals. In most cases it appeared the remains had been placed in simple pits, but in a few instances cyst burials at least partially lined with rock were found. A majority of the burials had been placed in a flexed position, usually on their left sides, with the remains oriented to the northeast or east (upstream). Grave goods were found with fifty per cent of the burials. Dentalia was the most common item associated with burials, but other grave goods included beads, blades, pestles, shaft smoothers, and projectile points.

Area 4 of the Wildcat Canyon Site was tested during the 1959 field season (Cole and Cressman 1960). Only sparse evidence of occupation was found, and the area was not examined further.

Area 5 was first tested in 1960 (Cole and Cressman 1961) and further excavations were conducted during the summers of 1961-1964 and again in 1966-1967 (Cressman and Cole 1962; Cole 1963a, 1964, 1965, 1967a, 1968a). The cultural deposit in Area 5 ranged from one to three meters in depth.
During the 1961 field season, a total of seventy-six features were recorded in Area 2, including numerous pits, rock clusters and living areas which in turn contained several separate features consisting of artifact concentrations, fire pits, a hearth, and the remains of wooden planks (Cressman and Cole 1962). A single human burial and one dog burial also were found. The following summer (1962) several kinds of houses, another human burial, and several additional dog burials were uncovered in Area 2 (Cole 1963a). Distinctive artifacts found associated with one house floor included two toggle harpoons similar to those known from the Northwest Coast culture area.

During the 1963 field season, another eighty-two features were recorded, including small pits, fire lenses, a stone oven, several dog burials, and living floors consisting of scattered rock, shell and bone artifacts (Cole 1964). The following summer (1964) yet another thirty-six features were exposed in Area 5 of the Wildcat Canyon Site (Cole 1965). Approximately 65 per cent of the 1964 excavations were beneath a layer of volcanic ash attributed to the eruption of Mt. Mazama around 7,000 years ago. Artifacts recovered from these lower levels are similar to specimens found at Fivemile Rapids (35W568) in The Dalles area which are known to date from around 10,000 years ago.

During the 1966 field season, another seventy-six features were recorded, including a house pit, two more human burials, and eight wells (Cole 1967a). Carbon materials recovered from these wells produced four radiocarbon dates: 10,600 B.P., 8100 B.P., 9860 B.P., and 7370 B.P. The seventh and final season of fieldwork in Area 5 took place during the summer of 1967 (Cole 1968a). Four new features were exposed, including an occupation level, two pits, and the remains of a small house. The stratigraphic position of this house, as well as the cultural materials from within it, suggest it was occupied during the same cultural period as a house excavated in 1962 from which a radiocarbon date of 1790 B.P. was obtained (see Cole 1964).

Area 6 of the Wildcat Canyon Site was located approximately twenty-five meters east of Area 5; excavations were begun there during the summer of 1967 in an attempt to increase the size of the artifact sample recovered from below the Mazama ash layer (Cole 1968a). Additional fieldwork was conducted in Area 6 during the spring of 1968 (Cole 1968b). In all, twenty-eight features were recorded during the two excavation periods.

A comparison of the classes of artifacts from Area 6 recovered from above and below the volcanic ash indicates some interesting changes in the artifact assemblage. For example, pestles, hopper mortars, notched sinkers, bone beads, and triangular bifaces are all characteristic of later time periods, while burins and side polishers appear
to be early artifact types. All projectile points recovered from below the volcanic ash are modifications of the lanceolate form, with the edge of the blade convex in outline. The presence of this style of projectile point in these early deposits is consistent with occurrences of similar specimens elsewhere on the Columbia Plateau (Cressman et al 1960:59; Daugherty 1962:145).

Faunal remains from below the volcanic ash layer in Area 6 were scarce. Several bone fragments were of a shape and thickness that would suggest they were from large mammals such as deer, mountain sheep, or elk. Bones of immature bison were also recovered in Area 6, but from above the volcanic ash layer.

In summary, archaeological fieldwork conducted during portions of nine field seasons has shown that the Wildcat Canyon Site has been occupied for at least 10,000 years, with the periods earlier than 7000 B.P. and later than 2500 B.P. best represented. Areas 5 and 6 contained extensive cultural deposits below a layer of volcanic ash attributed to the eruption of Mt. Mazama about 7000 years ago. This places the Wildcat Canyon Site within a select group of less than a dozen archaeological sites in the Pacific Northwest known to have been occupied during this early period. Preliminary analysis of the faunal remains from the site indicate that deer, elk, and mountain sheep were very important in the diet of the aboriginal inhabitants of the site. The analysis also indicates that a large variety of fish were eaten by the site's occupants. This fact suggests that fishing may have been a year-round activity and that a variety of methods may have been employed to catch fish. Finally, the presence of a large number of occupation floors and house pits suggests that the Wildcat Canyon Site served as a major village over much of the last 10,000 years.

The McNary Reservoir Project

Salvage excavations also took place in the McNary Dam Reservoir at the bend in the Columbia River near Umatilla, Oregon. Archaeological reconnaissance and excavations at several sites, including Hat Creek (35UM5) and Cold Springs (35UM7), were conducted during the 1950's under the auspices of the Smithsonian Institution River Basin Surveys program. In addition to several River Basin Surveys reports (Osborne 1957; Osborne and Shiner 1950; Osborne et al 1961; Shiner 1951, 1961), research in the area resulted in a doctoral dissertation by Shiner (1954) on the archaeology of the McNary Dam Reservoir area. Although no radiocarbon dates were obtained from the sites excavated in this area, the presence of leaf-shaped and large triangular side-notched projectile points indicates that prehistoric peoples were inhabiting the area 7000 to 10,000 years ago.
The Bonneville Dam Reservoir Area

The Bonneville Dam Reservoir is within the Columbia River Gorge, a term which refers to the constriction of the Columbia River as it passes through the Cascade Range. The eastern boundary of the gorge lies in the vicinity of The Dalles, and the western boundary is located just east of the Sandy River, a distance of about sixty miles. As was the case at other dam sites along the Columbia River, archaeological research has also been conducted in conjunction with construction of Bonneville Dam.

The earliest archaeological work in the Bonneville Dam Reservoir area was undertaken by Herbert W. Krieger, Curator of Ethnology, at the U.S. National Museum. Krieger conducted excavations at a number of archaeological sites along the Columbia River in the area from Prindle, Washington to The Dalles, Oregon. Unfortunately, Krieger produced only one brief two-page publication on his activities during this project (Krieger 1935). However, valuable information on this early archaeological fieldwork has been assembled by Phebus (1978), who reconstructed Krieger's activities and published a catalogue of the cultural materials from the area, which Krieger had deposited in the U.S. National Museum.

Also in 1934, a small field crew under the direction of Luther S. Cressman of the University of Oregon conducted excavations on Bradford Island within the Bonneville Dam project area. The results of this fieldwork have never been formally written up, but Cole (Cole and Southard 1971; Cole 1974) provides a brief description of the project. An unspecified number of burials were encountered. Euro-American artifacts were also recovered at the site, suggesting a relatively late date for aboriginal use of the island.

The next archaeological fieldwork in the Bonneville Dam Reservoir area was not conducted until 1971, when a survey was done for locating archaeological sites that would be affected by raising the level of the pool (Cole and Southard 1971). Four sites that had been excavated by Krieger (1935) were re-examined. Seven additional sites, all threatened by an increase in the pool level, were recommended for testing or excavation.

In 1972, fieldwork was conducted at four of these seven threatened sites (Cole 1974). The Lyle Site, located at Lyle, Washington, produced a complex of artifacts including cobble scrapers, grooved stones and reamers which is estimated to date from the period between 6000 and 3000 B.P. The Friendly Village Site, located about two and a half miles east of Lyle, Washington, contained a disturbed occupation layer estimated to date from around A.D. 1780. The Old Building Site, located near Dallesport, Washington, contained a series of house floors and projectile points estimated to date from the period after A.D. 1400. The Bad Place Site (35WS14), located four miles north of The Dalles, Oregon, also is estimated to date from the period after A.D. 1400.
The Deschutes River

The Deschutes River is the first major tributary of the Columbia River east of the Cascade Mountain Range in Oregon. The river flows from the flat expanse of lava plains in the south through deep canyons in the more mountainous terrain closer to its mouth in the north. Archaeological evidence from this region indicates that the banks of the Deschutes River have been inhabited by prehistoric peoples from a very early time. As is the case along the Columbia River, most of the archaeological research in the Deschutes drainage has been conducted in conjunction with various construction or development projects.

Early Projects

The first archaeological research in the Deschutes River region was conducted in 1934 when L.S. Cressman of the University of Oregon was called in to examine a site where two knives or side scrapers had been found (Cressman 1937a). The artifacts had been uncovered during construction activities at Wiltup Damsite No. 1 on the upper Deschutes River within the Deschutes National Forest. The knives, one of obsidian and one of fine-grained basalt, were thick ovate forms with blunt, un-retouched ends. The artifacts were shaped primarily by the removal of large thin flakes, rather than by smaller controlled-pressure flaking, which suggests that they are an early form. This is confirmed by the fact that the artifacts were discovered below deposits of volcanic pumice from the eruption of Mount Mazama. Since the eruption of Mount Mazama has recently been radiocarbon dated to approximately 7000 B.P. (Kittleman 1973), the knives must be at least that ancient. Although additional excavations were conducted in the area where the knives were discovered, no additional cultural material was recovered.

An archaeological survey of north-central Oregon was conducted by Alex D. Krieger in 1938 for the Department of Anthropology at the University of Oregon. A rather casual inspection of the Deschutes drainage was undertaken, consisting primarily of investigation of sites reported by a few informants. Limited excavations were made and the artifact collections of amateurs were inspected; however, no analysis of the artifact assemblages was made, and only an informal, unpublished report of the project was written (Krieger 1938).

In 1947, at the south end of Odell Lake, fifteen miles away from the first finds, artifacts were again found beneath a layer of Mount Mazama pumice during construction excavations for a resort lodge (Cressman 1948). Several flakes and projectile points were found by the construction workers in the decomposed glacial till under the pumice. Further excavations by archaeologists recovered a large number of flakes,
several more projectile points, scrapers, a hammerstone, and charcoal. The large size and generalized leaf-shaped form of the points, as well as their position below the 7000-year-old pumice, indicates that they are of some antiquity. On the basis of the artifact inventory and the altitude of the site, Cressman (1948:58) suggested that the cultural remains represented a summer hunting camp. He also posited that the Odell Lake site was culturally tied with the Klamath Basin further south (Cressman 1942) due to the similarities in the projectile points from both places.

The next archaeological project in the upper Deschutes River drainage was an archaeological survey of the proposed Benham Falls Reservoir, some eighteen miles south of Bend. The survey was conducted by Douglas Osborne (1950) of the Smithsonian Institution River Basin Surveys program. Thirty-one sites were reported during the survey, all of which were surface scatters. No caves, burials, petroglyphs, nor sites with midden deposit were located. A vast majority of the sites were located on the first gravelly terrace above the grassy meadows of the floodplain; a few were on the second terrace. A surface collection of the sites yielded 138 artifacts, including points, knives, blades, scrapers, choppers, ground stone items, and lithic debitage. Almost all of the artifacts were made of obsidian, but items of chalcedony and basalt were also found. The superficial nature of the sites led Osborne to conclude that "the obvious deduction is that the area was inhabited only sparsely, presumably by small gathering and hunting bands, which set up temporary camps in preferred spots along the river" (1950:115). The similarities between the Benham Falls artifacts and the specimens from the Wilkup Damsite (Cressman 1937a), Odell Lake (Cressman 1948), Lower Klamath Lake (Cressman 1942), and the Northern Great Basin (Cressman 1936; Cressman et al. 1940) indicate that the Benham Falls inhabitants may well have been transhumane, traveling between the semi-desert on the east of the Deschutes and the mountains on the west.

The Lava Butte Site

During the summers of 1960 and 1961, Washington State University conducted an archaeological survey along the route of a proposed natural gas pipeline right-of-way from Canada to California (Daugherty and Malloy 1961; Combes 1962). A portion of the pipeline angled through the Deschutes River Valley where six sites were recorded in Jefferson and Deschutes counties. Limited test excavations at these sites showed that four of the sites were surface concentrations but that the other two contained rich midden deposits. The few artifacts recovered during the testing phase of the project bore some resemblance to those found in the nearby Benham Falls area and in the Northern Great Basin.
Full scale salvage excavations were subsequently carried out during the summer of 1961 at the Lava Butte Site (35JE33), ten miles south of Bend (Ice 1962). The midden deposit at this site proved to be almost one meter in depth, and was stratified into three unconsolidated layers of wind-deposited sediment overlying basalt bedrock. The extensive excavations yielded 1742 artifacts, including projectile points, scrapers, knives, drills, milling and abrading stones, choppers, bone awls, and hammerstones. Since the site could not be dated geologically, the author suggested an occupation period from 200 to 500 BP on the basis of comparisons of cultural materials with other dated sites (Ice 1962:50). The formal characteristics of the artifactual materials from the Lava Butte Site show affiliations with those from the Northern Great Basin as well as from the Columbia Plateau (Ice 1962:51). The overwhelming number of points and scrapers in the site's assemblage suggests that its occupants were primarily concerned with hunting and butchering game animals, but other activities at the site included collecting and processing plant foods and preparing hides, as evidenced by the presence of some milling stones and awls.

The Round Butte Dam Project

Another major archaeological and survey project was conducted by the University of Oregon in the Round Butte Dam Reservoir area in Jefferson County (Cressman 1963). The reservoir area is located approximately fifteen miles west of Madras where the Metolius and Crooked rivers join the Deschutes River. During the 1961 and 1962 field seasons, 48 sites were located and recorded, of which all but four were either surface deposits or so shallow that no time-depth information could be obtained from them. Excavations were made at all sites extending below the surface, while many of the others were surface collected for diagnostic artifacts. Ross (1963) provides a detailed account of the fieldwork at these sites.

Thirty-two of the 48 sites were surface collected and/or excavated. The more ancient sites tended to be located in rockshelters or lava tubes in places which were hidden from view and difficult to reach, while the more recent sites were found more often in open areas. The length of aboriginal occupation along the Deschutes is indicated by a radiocarbon date of 7990 BP from a large rockshelter (35JE41) on the west bank of the river. This date confirms the antiquity of man's presence in the Deschutes River Valley as suggested by the finds at the W Kitty Dam site and Odell Lake. More recent C-14 dates of 2675 BP and 2650 BP were obtained from small rockshelters (35JE1 and 35JE2 respectively).
On the basis of the research in the Round Butte area. It is likely that the Deschutes River served as a territorial and/or geographical boundary in early prehistoric times. Sites on the west side of the river appear to show strong affinities to the cultures of the Klamath Lake and Great Basin areas to the south, especially in the preponderance of obsidian used in manufacturing projectile points. Ross suggests that the west side of the river was "part of a northern extension of a Basin-oriented peripheral group who ranged the Cascade foothills to the west" (Ross 1963:115-6). The sites on the east side of the river, however, show a common orientation toward the Columbia Plateau to the north. These cultural ties with the Plateau are expressed in the forms of the projectile points, in a reliance on chert instead of obsidian for making stone tools, and in the presence of hopper mortars on the east bank of the river. The people on this side of the Deschutes probably visited the area seasonally from further north and east for hunting, gathering, and collecting river foods. Roscoe's analysis (1967) of the shells recovered from the Round Butte excavations show that the freshwater mussel Margaritifera was a primary food resource for the Round Butte inhabitants on both sides of the river. Although the evidence suggests that the two sides of the river were occupied by different cultural groups during earlier times, Cressman (1963:30) cautions that the more recent artifact assemblages do not mark such a clear separation. Instead, he suggests that in later times, within the last 4000 years, a generalized Plateau culture developed in the region which drew traits both from the Columbia Plateau and from the Northern Great Basin.

The Mack Canyon Site

One of the most important archaeological sites on the southern Columbia Plateau is the Mack Canyon Site (35SH23) located near the junction of Mack Canyon and the Deschutes River. The site features twenty-nine housepit depressions distributed along a terrace above the river. Fieldwork was conducted at the site by archaeologists from the University of Oregon from 1965 to 1968 supported by funds provided by the Bureau of Land Management (Cole 1967b, 1969a).

Five geologic strata were encountered at the site; only the topmost three strata contained cultural materials, however. The earliest cultural remains were recovered from Stratum 3. Volcanic ash deposited at the bottom of this stratum originated with the eruption of Mt. Mazama, indicating that the first occupation of the site did not take place until sometime after 7000 years ago. Stratum 2 produced the bulk of the cultural materials from the site; this stratum is recognized primarily as the fill within the housepits. The most recent occupation by aboriginal peoples is correlated with Stratum 1. The presence of
artifacts of Euro-American manufacture in this stratum indicates the site was still being inhabited during the 19th century.

Excavations were conducted in three of the twenty-nine house pit depressions at the Mack Canyon Site. House Pit 1 proved to be a semi-subterranean stepped house typical of those constructed by the prehistoric inhabitants of the intermontane area of eastern Oregon. Such houses were circular in shape with floors on two levels. The lower floor, or central depression, usually contains the remains of fires and artifacts associated with the task of food preparation. The upper floor, or bench, usually contains fewer artifacts, and is assumed to have served as a place for storage, sleeping, and other functions. Artifacts on the floor of House Pit 1 included choppers, pounding stones, pestles, projectile point fragments, a drill fragment, a stone pipe fragment, and three hopper mortars. Other debris on the floor included mussel shells, specks of red ochre, fire cracked rocks, scattered flakes, and two clusters of unmodified basalt cobbles. Charcoal recovered from the floor of House Pit 1 produced a radiocarbon date of 1880 BP.

In House Pit 2, three floors were encountered during the excavations. The earliest and latest floors have not been dated, but the occupation of the middle floor was dated by the radiocarbon method as occurring sometime around 700 BP. Artifacts found on these three house floors were basically similar to those found in House Pit 1, although some stylistic differences were observed in the artifacts from the two different time periods.

House Pit 3 was another stepped house. Two small fire areas were noted in the central depression, where a few lithic flakes, three broken cobbles, a mussel shell, a projectile point, and a few broken rocks were found. The only real concentration of artifacts and debris in the house, however, occurred on the bench on the east side of the structure, where several pestles, a large grinding stone, mussel shells, broken basalt rocks and cobbles, and pieces of charcoal were found. No radiocarbon dates are available from this house pit.

A wide variety of artifacts was recovered from the Mack Canyon Site. Chipped stone artifacts included projectile points in several styles, scrapers, knives, drills, and gravers. Side-notched and base-notched projectile points were the most numerous at the site. Ground stone artifacts included pestles, hopper mortars, and metates. Worked bone and antler items were also recovered from the site, although only a few specimens could be assigned to a specific artifact type. These included bone awls, bone beads, and a fragment of the socket of a composite harpoon.
Faunal remains from the Mack Canyon Site consisted of non-utilized fragments of bone and antler and pieces of river mussel shell. The vast majority of the bone and antler fragments represent the remains of large mammals such as deer, mountain sheep, and elk. Smaller mammals also represented included coyote, bobcat, beaver, and rabbit. Only eight fish bones were recovered which, together with the absence of tools associated with fishing, suggests that fish were not an important item in the aboriginal diet. The freshwater mussel Margaritifera appears to be the only species represented, and this occurred only in very small quantities, indicating that river mussel was also a relatively unimportant aspect of the diet of the site's inhabitants.

In summary, excavations indicate that the Mack Canyon Site was first occupied sometime after 7,000 years ago. Most of the evidence of aboriginal lifeways, including cultural materials associated with the three excavated house pits, dates from the last 2,000 years or so, however. Analysis of the faunal remains indicates that large mammals were the most important items in the aboriginal diet. The paucity of small mammal remains, fish bones, and mussel shells suggests that the site was most likely occupied at a time when these items were not as readily available, such as during winter.

At the conclusion of the excavations, a crew from the Prineville Office of the Bureau of Land Management constructed a fence around the Mack Canyon Site in order to protect it from the vandalism caused by relic collectors. This action was necessary in order to insure that the cultural deposits at the site will still be available to be investigated by archaeologists again in the future.

Recent Survey Projects

Following the work at the Mack Canyon Site, Chance (1968) recorded eighteen archaeological sites within the Prineville BLM District while conducting a study of Bureau of Land Management practices regarding cultural resources. Five of these sites are located along the Deschutes River in Jefferson County, near the southern boundary of the Warm Springs Reservation. These five sites were subsequently re-examined for archaeological potential by Cole (1969b) when they came under consideration for recreational development by the BLM. Four of the sites exhibited only sparse evidence of occupation. The remaining site contained numerous flakes and artifacts, as well as several possible housepit depressions.

The next archaeological project in the Deschutes River region consisted of a cultural resource inventory of Bureau of Land Management
lands along the lower Deschutes River, from Warm Springs bridge to Mack Canyon (Hibbs et al 1976). In the course of the project, 135 aboriginal sites were recorded on the present-day floodplain and adjacent terraces. A variety of sites were located in the area, including village sites marked by house depressions, rockshelters, open camps, shell middens, quarries, flaking stations, talus depressions, rock cairns, pictographs, and petroglyphs. Over 75 per cent of the sites were within 200 meters of the river, with most of the remaining sites located in tributary canyons. The sites discovered in this area appear to cluster into three geographic zones, each of which was centered upon one or more major village sites. On the basis of limited ethnological evidence, Hibbs et al (1976) proposed that the three geographical clusterings of sites correspond to distinct aboriginal groups: (1) areas south of the Mutton Mountains were primarily utilized by the Northern Paiute; (2) the Molala supposedly were the main occupants of the territory between the Mutton Mountains downstream to Sherars Bridge; and (3) the Tenino inhabited the areas downstream from Sherars Bridge. Similar geographic concentrations of sites were noted by Osborne (1950:115). Whether these clusterings are actually the result of the subsistence patterns of separate aboriginal peoples as suggested, or whether they relate to resource utilization patterns of the same basic group, remains to be answered by further research.

A cultural resource survey was also carried out along the route of the Bonneville Power Administration's proposed 500 KV transmission line (Peterson et al 1976). The transmission line right-of-way extends for 84 miles across Wasco, Sherman and Gilliam counties. Ten historic sites, including old homesites, old schools, the Oregon Trunk Railway, and the Oregon Trail are located within or near the transmission line corridor. Six archaeological sites were recorded, including one knapping station, two campsites, two quarry sites, and one possible village site.

The most recent project in the Deschutes River region was a re-examination of an extensive flake scatter in the vicinity of Sun River in Deschutes County (Cole 1977a). The site (35DS39) was discovered during a reconnaissance survey for a proposed land exchange between the Deschutes National Forest and private land holdings (Cole 1975b). A surface collection and test excavation of the site yielded a small collection of 20 stone artifacts, including projectile points, scrapers, and utilized flakes. The formal characteristics of the artifacts and lithic debris indicate that the site was a manufacturing area which may have been used at various times by both Deschutes River and Great Basin peoples.
The John Day River

The John Day River is the second major tributary on the Oregon side of the Columbia River east of the Cascades. The river descends south from the Columbia River into the Ochoco Mountain chain where it juts to the east and fans out into many smaller tributaries. Like much of the rest of central Oregon, the John Day region consists of a lava-flow plateau with gently rolling hills. The little archaeological research in the region indicates, however, that the ancient inhabitants preferred to occupy sites in the rugged canyons which follow the few perennial water courses, rather than sites in the lava uplands.

The first archaeological research in the John Day River drainage was conducted as part of Luther S. Cressman's statewide study of petroglyphs and pictographs in Oregon (Cressman 1937b). Seven rock art sites were recorded by Cressman in the John Day River area (Cressman's sites 17-23), and several others were located along the Deschutes River drainage (Cressman's sites 5-16). More recent research in these regions has shown that many other rock art sites exist as well. Cressman's study indicated that north-central Oregon is primarily an area where pictographs, rather than petroglyphs, are found.

The next archaeological project to be undertaken in the John Day drainage area was a survey under the direction of Alex D. Krieger for the Department of Anthropology at the University of Oregon, which was carried out in June of 1938. The survey party located three sites in the Spray-Service Creek area and one rockshelter in the Fossil-Butte Creek Cave area with the aid of local informants. The survey crew made limited excavations at all sites, but no analysis of the artifact collections was made and only an informal report of the project was written (Krieger 1938).

The John Day drainage was revisited in 1946 by a small University of Oregon crew under the direction of L.S. Cressman. During the month of August, the party excavated portions of Butte Creek Cave and a cremation pit above Hoover Creek near Fossil. The most productive of these sites was Butte Creek Cave, despite the fact that it had been extensively "pot-hunted" by that time. Excavations in the cave uncovered a grass-lined pit with an extended burial (Stewart 1950; Laughlin 1950). The skeleton was partially covered with a cape or blanket of wolverine fur, rabbit skin, feather-wrapped string, and the tip of a coyote tail. Seven unusual triangular gray chert scrapers were located beneath the skele-
ton, in uncertain association with the burial complex which was not datable. Basketry specimens from the site included Catlow Twine and an open twined ware. In general, Cressman was of the opinion that while the specimens were typical of a "North Basin-Plateau basic culture" (1950:381), they also showed some affinities to the Pueblo I culture of the Southwest.

The other significant site was a cremation pit located on a talus slope above Hoover Creek near Butte Creek. A broken pestle, several dentalium shell beads, two fragments of tubular sandstone pipes, a crescent-shaped copper pendant, and two pieces of carved stone were found in association with the cremation burial. The heat from the cremation fires was so intense that it fused together pieces of basalt in the vicinity of the cremation pit. The artifacts point directly toward cultural ties with the Columbia River and its cremation practices as described by Strong et al (1930). The copper pendant also indicates that the cremation was a relatively recent, post-contact occurrence. It appears that the Hoover Creek cremation represents a southerly extension of the Columbia River culture.

No further archaeological research was conducted in the John Day drainage until 1967, when a limited program of survey and excavation was begun in the Clarno Basin under the sponsorship of the Oregon Museum of Science and Industry. As part of this program, Jim Riggs of Oregon State University carried out excavations at the Pentecost Site (35WH2), the results of which have not been reported. Also as part of this program, excavations were carried out under the direction of Brian L. Gannon at three archaeological sites in the Clarno Basin. The Cove Creek-2 Site (35WH7) was a seasonal camp with three associated pictographs. Radiocarbon dates of $468 \pm 80$ B.P., $580 \pm 120$ B.P., $350 \pm 90$ B.P., and $1160 \pm 90$ B.P. were obtained from charcoal recovered from features at this site (Gannon 1968, 1970). In the cliff above this site, a cache of atlatl dart fragments was found. Radiocarbon dates of $2380 \pm 100$ B.P. and $2230 \pm 90$ B.P. were obtained from these shafts (Gannon 1970). A brief report describing the method used in identifying the kind of wood from which these specimens were made was published by Smith and Gannon (1973). The Jones Canyon-2 Site (35WH21) features two housepit depressions. A radiocarbon date of $360 \pm 80$ B.P. was obtained from burned wood found in one of the housepits (Gannon 1972). The results of archaeological fieldwork at a third locality, the Indian Canyon-2 Site (35WH13), have not been reported.

In 1973 the University of Oregon Museum of Natural History carried out an archaeological survey along the right-of-way for a pipeline planned by the Pacific Gas Transmission Company in the Thirty Mile Creek area (Cole 1972). Excavation was conducted at
one Site (35GM25) which was to be impacted by the proposed project. This site contained side-notched projectile points, which on typological grounds are estimated to date from the period around 1500 to 2500 years ago (Cole 1973a).

Archaeological fieldwork was also conducted by the University of Oregon Museum of Natural History in connection with construction of two nuclear power plants at Boardman and Pebble Springs, which were planned by the Portland General Electric Company (Cole 1973b, 1977b, Cole et al 1975). Six sites found in the project areas were tested. Three of these sites exhibited only scattered evidence of occupation. Two other sites contained artifacts which on typological grounds appear to date from the period around 8000 to 11,000 B.P. The fifth site was a knapping station; a radiocarbon date of 410 ± 110 B.P. was obtained from this site.

In 1975 a cultural resource survey was conducted in the proposed Ghost Camp Reservoir and the proposed Shutler Flat Irrigation Project in Gilliam County by the University of Oregon Museum of Natural History (Cole 1975b). No archaeological sites were discovered at Shutler Flat, but ten sites were found within the Ghost Camp Reservoir area. Two were rockshelters, another was a rockshelter in association with housepits, four contained visible housepits, and the remaining three were open lithic scatters.

In 1975 and 1976, the Bureau of Land Management, Prineville District, sponsored a cultural resource inventory of federal lands in the John Day River canyon for purposes of future management and protection (Polk 1976). This inventory both summarized previously known archaeological sites and research within the region and described additional archaeological sites located during a reconnaissance of portions of the John Day River canyon by Michael R. Polk. On the basis of a 10% stratified random sampling of a 500-meter stretch of land on both sides of the John Day River, Polk predicted that a total of 160 prehistoric sites would be found within the 160 mile-long survey area; 87 sites have been identified at present (1976:68).

Sites were classified into two main categories--limited activity sites and habitation sites. Limited activity sites "display surficial characteristics indicating only limited cultural activities over a limited amount of time"(Polk 1976:23). Although few in number, the following limited activity site types were reported: rock art sites, quarry sites, biotic exploitation sites, and rock features (talus pits, rock piles, and rock alignments). Habitation sites, on the other hand, comprised a vast majority of the located areas and showed evidence of multiple activities (e.g., tool-making and food processing), long term use, and more intensive activities. This category includes housepit sites, rock-
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Figure 22. Proposed Cultural Development Frameworks for the Columbia Plateau.
shelters, and open sites. As mentioned by Polk (1976:74), it is important to note that only house pits utilized in the last 600 years or so will leave surface depressions; older structures cannot be expected to leave surficial indications.

Since no artifact collections were made and no excavation was conducted, little is yet known of the cultural chronology of the region. Much work remains to be done if anything is to be learned about the ancient aboriginal occupants of the John Day River drainage.

Theories of Cultural Development on the Columbia Plateau

A number of regional frameworks for conceptualizing the cultural sequences on the Columbia Plateau have been proposed, most of them the result of research conducted in the state of Washington. Familiarity with the various cultural syntheses should prove helpful for better understanding and interpreting the prehistory of north-central Oregon. Due to the indirect relevance of these models for the project area, however, only the major tenets of selected cultural theories will be presented below.

Among the more significant of the sequences proposed for the Columbia Plateau are those of Butler (1959), Daugherty (1962), Swanson (1962b), Nelson (1969), Browman and Munsell (1969), and Leonhardy and Rice (1970). It should be noted that the frameworks are generally based on the research area of the particular author; therefore, some variation due to local circumstances is to be expected among them. Nonetheless, the proposed syntheses show several areas of agreement (see Figure 10). Due to the paucity of information from sites with components older than 8000 years, all of the sequences are vague as to typical artifacts or possible life patterns for this time period. Most chronologies reflect considerable Great Basin influence on the Plateau artifact inventories during the period from 8000 to 4000 B.P. Local variations in the artifact assemblages begin to develop around the end of this period, with the rich inventories of the ethnographic culture pattern emerging by 2000 to 1500 B.P. It is thought that the enrichment of the later cultural assemblages is due to the eastward expansion of the Salishan speakers from the Pacific Coast into the Plateau (Suttles and Elmendorf 1962).

One of the first schemes proposed for early Plateau culture was by Butler (1958b, 1961, 1962, 1965b), who developed the concept of the Old Cordilleran where from the cultural evidence for the early period from sites on the north bank of the Columbia River near the Dalles. The carriers of this early culture supposedly exploited the stream and valley resources of the Pacific Northwest between the western cordilleras following the last glaciation. Butler (1965b:1126-27) describes the sequence of events as follows:
The Old Cordilleran culture arrived in the Pacific Northwest no more than 12,000 years ago, and its oldest manifestations are to be found along the Pacific Cordilleras at or near the major fall lines of rivers draining into the Pacific. Between 9-7,000 years ago, the culture spread eastward across the Columbia Plateau to the Northern Rockies; between 8-7,000 years ago it spread westward into the Puget Tittoral and offshore islands. Subsequently, in those regions of the Columbia Plateau closest to the Great Basin, the Old Cordilleran culture was modified by Desert culture influences and/or the Cold Springs Horizon. The hallmarks of the Desert culture are those specified by Jennings (1957). The index artifact of the Cold Springs Horizon is a type of point that has been identified as the Bitterroot side-notched, a type characteristic of the Bitterroot culture of eastern Idaho (Swanson 1962a). The Desert culture influences and/or the Cold Springs Horizon were more or less synchronous with the xerothermic maximum and the deposition of Mt. Mazama ash in the Northwest. In those regions more remote from the Great Basin and from Desert culture influences, the Old Cordilleran culture continued relatively unchanged until the end of the xerothermic (Altithermal) period. On the Coast, the Old Cordilleran culture gave way to a maritime tradition; in the Southern Plateau, it was the ancestral culture of such groups as the Nez Perce.

The item which is considered diagnostic of the Old Cordilleran culture is the Cascade point. These points are loosely defined as being "generally long, narrow, leaf-shaped or bi-pointed items which tend to be quite thick in proportion to their width" (Butler 1961:28) (see Figure 19). A majority of the points are diamond-shaped in cross section, and most are made of cryptocrystalline materials. Their average length is six to seven centimeters. As defined by Butler, Cascade points have a widespread distribution which extends beyond the Plateau.

In addition to Cascade points, the Old Cordilleran assemblages are generally characterized by a variety of items which relate to the economic patterns of the prehistoric inhabitants. While Butler states that one would obviously expect to find distinctive artifact complexes in different microenvironments where various economic activities occurred (1965b:1129), he makes the following observations on the general material culture and economic patterns associated with the Old Cordilleran culture (1965b:1127):

In the Northwest, the Old Cordilleran culture assemblage comprises a locally distinctive point type, the Cascade
Figure 24. Bitterroot or Northern Side-Notched Points (after Swanson 1972).

Figure 23. Cascade Projectile Points (after Jennings 1974).
point, which is often made on a blade, other blade tools, a variety of oval knives, and a generally nondistinctive assortment of cutting, chopping, and scraping implements, all made of stone. To this can now be added unifacially beveled antler wedges, as well as a number of other bone and antler tools, and the edge-ground cobbles complex (Butler 1962b). The economic modes or sets include: hunting of modern species of artiodactyla, such as deer, elk, antelope and sheep; snaring, or trapping of birds; collecting and processing of such root crops as camas and kouse (as opposed to gathering of hard seeds by Desert culture peoples); fishing; and the collecting of mussels and snails. It is in connection with the processing of the root crops that the edge-ground cobbles complex may have particular significance to the Old Cordilleran culture concept.

The Old Cordilleran culture is posited by Butler as one of several distinct cultures or traditions in the Pacific Northwest, including the Desert culture and the Big Game Hunters, which initially developed in separate areas. These cultures gradually met and merged with each other to result in the cultural patterns which characterized the Plateau and other Pacific Northwest peoples in ethnographic times. The concept of the Old Cordilleran culture has since been critically examined (Carlson 1962; Daugherty 1962; Grunn 1962; Nelson 1969; Osborne 1963), and several variations on the same basic theme have been proposed (Swanson 1962b; Shiner 1961; Nelson 1969; Warren 1968).

On the basis of his research in the Lower Snake River area, Daugherty (1962) offers another scheme for Plateau prehistory, which involves what he refers to as the Intermontane Western Tradition. This tradition is all-encompassing, extending "geographically between the Rockies and Sierras from southern British Columbia to northern Mexico, and chronologically from the early Postglacial time to the ethnographic present" (1962:144). The Intermontane Western Tradition is characterized by: (1) a diversified economy, which was not primarily oriented toward big game hunting; (2) similar artifact traditions and cultural practices; and (3) strong cultural continuity with gradual change consisting of acquiring new elements rather than losing the old. The purpose of Daugherty's concept is to explain "the interlocking relationships and developments characterizing the prehistory of the Intermontane West (1962:149), and he sees the five developmental stages closely tied to the environmental changes following the last glacial recession.
The Early period lasted from 11,000 to 8000 BP, coincident with the Anathermal period in the Great Basin. At this time in the Intermontane West, a diversified economic orientation of hunting, fishing, and food gathering was practiced as permitted by local conditions. The artifact assemblage included projectile points based on a lanceolate form; crescentic blades and varieties of scrapers were also common for this period. The inhabitants probably moved about in small nomadic bands of several families, living in temporary shelters and rockshelters.

The Transitional period, from 8000 to 4500 BP, was approximately coeval with the arid Altithermal period. Populations shifted from the more arid regions to congregate in river valleys and lake areas in response to the reduction in water resources and game animals and the accompanying change in vegetation. Daugherty (1962:145) describes the developments on the Plateau where,

there was likely a concentration of the population along the major streams and their larger tributaries. The resources of these streams, salmon, steelhead, and other types of fish, as well as river mussels, now became the basis of the economy, with food-gathering activities of secondary importance, and hunting a poor third. There is no question that the basic techniques of fishing were already known; cultural remains simply reflect a shift in economic emphasis with, no doubt, some refinement in the implements and techniques of fishing.

Social groupings apparently remained small during the Transitional period, and habitations were still of a temporary sort. The lanceolate points of the Early period shifted to a basically triangular style which was often side-notched (Bitterroot Side-notched). The triangular side-notched point complex persisted until historic times, with the points becoming smaller in size with the passage of time. Storage cists in caves and talus slopes became important during this period and continued to be used into the Historic period. Food-grinding implements, particularly basket hoppers with cobble bases and conical mullers, also came into use on the Plateau at this time.

The Development period, from 4500 to 2000 BP, saw the establishment of the basic patterns for the several distinct culture area traditions which finally culminated in the Late period. An expanding population during this period appears to be the result of the milder climatic conditions of the Medithermal coupled with developments in fishing techniques plus better food production conditions on the Plateau. The persistence of many elements of social structure and artifact form from the
previous period and the development of area traditions mark the Developmental period.

The Late period, from 2000 BP to historic times, witnessed the fruition of fully developed area traditions: the Southwest Agricultural Area tradition, the Desert Area tradition, the Northwest Riverine Area tradition, and the Northwestern Cordilleran Area tradition (after Butler 1959). The Plateau showed little change in social structure until late in the period when several distinctive changes were introduced from the Great Plains. Although there was a strong trend toward regional specialization, external influences increased due to greater mobility, increased contacts, more trade, and increasing population. Old elements, such as triangular side-notched points in a variety of styles, grinding implements, and storage cists, continued to be used, while semisubterranean houses first appeared on the Plateau at this time.

The Historic period saw the continuation of the basic elements of the Late period until Euro-American patterns were adopted by a drastically reduced and displaced aboriginal population.

As is evident from the above sequence, Daugherty's Intermontane Western Tradition traces the development of separate "areal cultural traditions" from a single widespread tradition, as opposed to Butler's Old Cordilleran culture which sees separate cultural foci eventually blending into one common tradition. Daugherty's model is a very broad areal interpretation, broader in scope than that of any other Plateau theories. Although such a broad approach can be useful, it must be remembered that this particular scheme is formed primarily on evidence from the Lower Snake River, which is hardly an adequate basis for hypothesizing about cultural developments in the entire Intermontane West. The utility of Daugherty's model will have to depend upon gaining more support from other areas.

Swanson's work in the Vantage region of the Middle Columbia River resulted in an alternative model to Daugherty's Intermontane Western Tradition, which he has presented as The Emergence of Plateau Culture (1962b). Swanson saw a great amount of continuity between the ethnographic Plateau pattern as described by Ray (1939) and the lifeways represented in the archaeological remains near Vantage. This similarity enabled Swanson to use the "direct historical approach," which assumes some continuity between the ethnographic present and the archaeological past. In his opinion, the ethnographic culture elements were simply organized in a different fashion in early prehistoric times (1962b:81); the difference between the early and later cultures is more a re-patternning of the same elements than a change in formal content.
The earliest phase proposed by Swanson is the Vantage Phase, which dates from approximately 8000 to 3500 BP. Due to the scarcity of artifacts from deposits associated with this phase in the Vantage area, Swanson does not elaborate on the material culture or lifeways of the inhabitants during this time. He does, however, go so far as to suggest that the Plateau housed at least two early cultural traditions during this time: the Bitterroot culture in the eastern portion of the Plateau and the Old Cordilleran culture (following Butler 1961) to the west in the vicinity of the Cascade Range. The Bitterroot culture is supposedly characterized by the presence of large triangular side-notched points (Figure 20) which persist from the Anathermal to historic times, while the Old Cordilleran culture is identified by the Cascade point. Both cultures are associated with a generalized hunting and gathering economy (Swanson 1962a).

The Frenchman Springs Phase, from approximately 3500 to 700 BP, marked the establishment of a "forest-hunting culture" on both sides of the Cascade Range, which Swanson refers to as the Northern Forest Culture (1962b:81). Tools include burins, blades, and tanged and rectangular stemmed projectile points. Swanson suggests that "the isolated houses, more sophisticated flaking techniques, the established practice of hunting mountain sheep, and the taking of waterfowl all provide an impression of diversified hunting by a culture based on family bands" (1962b:83). The appearance of this lifeway seems to be associated with the onset of the milder climatic conditions of the Medithermal period.

The ethnographic pattern appears approximately 700 years ago and constitutes the Cayuse Phase. This phase began with an emphasis on fishing, the establishment of semipermanent riverside villages, development of trade relations with coastal groups, and a diversification of tools, techniques, and materials. Also during this phase lithic manufacturing techniques show a general decline, gravers replace burins, circular rock pits appear, and the manufacture of twines becomes more sophisticated. The alternating winter village-summer camp life of the ethnographic period was practiced during this time.

Using additional data from the Vantage area, Nelson (1969) further developed Swanson's (1962b) scheme for Plateau prehistory. In addition to more tightly defining the different cultural periods, Nelson rejects Swanson's unsupported date of 700 BP for the appearance of ethnographic Plateau culture. Instead, Nelson proposes a date of 2000 BP for the beginning of the Cayuse Phase, which is based on more than 15 radiocarbon determinations from components of that phase. Nelson divides Plateau prehistory into seven periods:
Period I, from 11,000 to 8000 BP, represents the earliest known hunting and gathering economies, about which little is known. Stemmed-lanceolate projectile points are representative of this period. The Plateau may have been influenced by areas to the south and east at this time. Only four major sites contain components from this period: Lind Coulee (Daugherty 1956), 35WS8 (Cressman et al 1960), Windust Cave (H.S. Rice 1965), and Marmes Rockshelter (D.G. Rice 1972).

Period II, from 8000 to 6500 BP, is indicated by a restriction in hunting big game animals due to the dessicating effects of the onset of the Altithermal. A generalized hunting and gathering pattern was practiced. There is no evidence of outside influences in Plateau assemblages.

Period III, from 6500 to 4500 BP, is represented by heavy diffusion or out-migration from the Great Basin, as indicated by the appearance of side-notched projectile points, manos, and large quantities of obsidian. The economic system of the region was marked by a shift in emphasis from hunting to food gathering.

Period IV, from 4500 to 2000 BP, is characterized by the maintenance of the earlier economic pattern, along with the development of regional variation in material culture. Connections with the Pacific coast are indicated, although evidence suggests that these ties had limited influence.

Period V, from 2000 to 300 BP (A.D.1650) shows great influence from the coast through the trade items, fishing tools, and art styles. Nelson therefore suggested that "many of the strong riverine characteristics evident in the ethnographic expression of Plateau culture were developed in the riverine economies of western Washington and then introduced into the Plateau" (1969:105). Trade with the Great Basin is less significant than before, and regional stylistic variation continues to occur.

Period VI, from 300 to 140 BP (AD 1650 to 1810) shows the indirect effects of the "expanding American frontier." Heavy influence from the Great Plains is discernible at this time, and contacts with the coast and the Great Basin continue. Artifact styles tend to become more homogeneous, while material culture becomes more elaborate.

Period VII includes the last 170 years of direct contact between Plateau peoples and the Euro-American way of life. Cultural efflorescence continued for a brief time, followed by the rapid decline in aboriginal populations and the abandonment of traditional Plateau lifeways.
Another general cultural sequence for the Columbia Plateau was outlined by Browman and Munsell (1969). Their model deserves mention in that it is an attempt to integrate the two previously opposed approaches of Daugherty (1962) and Butler (1959, 1965b). They describe the intent of their seven-phase model as follows (1969:249):

This new scheme attempts to combine the concepts of Daugherty and Butler and to also incorporate the new information. Provisionally, seven major periods are distinguished, each with outside influences from different directions yet each with considerable cultural continuity from earlier periods. It is argued that it is too simplistic either to look at the Northwest as a region where only three or four separate cultures evolved independently of each other and then merged (Butler 1965b) or to look at it as a region in which there was a basic conservative stability with changes determined only by changing environmental conditions (Daugherty 1962).

Thus, Browman and Munsell view Plateau prehistory as a single area-based cultural continuum, which experienced "sporadic outside influences" through time. Although the authors succeeded in accommodating previous theories, this model has generally been disregarded, partly because it was primarily a reworking of existing constructs and offered little that was new.

The final scheme to be considered here is the cultural chronology submitted by Leonhardy and Rice (1970) for the Lower Snake River region in southeastern Washington. Although that area is removed from north-central Oregon, this interpretive model is significant as it is based on the most continuous and best documented archaeological sequence on the Plateau. It is also unique in that it is limited to only one region of the Plateau and therefore provides a rare means for comparative inter-area studies.

Leonhardy and Rice delineate four main cultural periods based on the six archaeological phases they defined for the Lower Snake River region. These periods closely follow those defined earlier by Daugherty (1962) for the same region. The following summaries of these periods are abstracted from Leonhardy and Rice (1970) (see also Bicchieri 1975: 261-62).
The Pioneer Period includes the two earliest archaeological phases, the Windust and Cascade phases, which date between 10,000 to 5000 BP. The continuity in general content and basic economy between the two phases has led Leonhardt (1970) to conclude that the latter probably developed from the former. The Pioneer Period embodies the first of two distinct cultural traditions which the authors hypothesize for the region. Diagnostic artifacts include stemmed lanceolate projectile points, Cascade points, Bitterroot Side-notched points, lanceolate and ovate knives, large scrapers, burins, choppers, edge-ground cobbles, bone awls, needles, and atlatls. Grinding stones associated with food processing appear during the latter period. Food refuse includes remains of deer, elk, pronghorn antelope, rabbit, beaver, river mussel, salmon, and steelhead trout. Knapping techniques were adapted to the differential use of lithic material for each phase; cryptocrystalline silicates predominate in the Windust Phase, while fine-grained basalt was relied upon in the Cascade Phase.

The Initial Snake River Period coincides with the Tucannon Phase, which extends from 5000 BP, although the initial date of the phase has not been firmly established. This period marks the beginning of the second cultural tradition in the Snake River region, one which continued through the Ethnographic Period. Triangular, contracting-stemmed and corner-notched points characterize the artifact assemblages, along with small side scrapers and end scrapers, hammerstones, net sinkers, hopper mortar bases, pestles, and utilized cobble spalls. Bone and antler artifacts include awls, wedges, and a bone shuttle for net making. Faunal remains indicate that river mussels were an important dietary item; remains of deer, elk, pronghorn antelope, mountain sheep, small mammals, and fish were also a part of the aboriginal diet.

The Snake River Period, from 2500 to 250 BP, includes the Harder and Piquinin phases. A change in settlement is indicated by the appearance of substantial house pit villages in the region. Artifact assemblages are characterized by large basal- and corner-notched projectile points in the early stages of the period and smaller points of similar form in the later stages. Small end scrapers, lanceolate and pentagonal knives, sinkers, hopper mortars, pestles, and bone awls, needles, beads, and incised gaming pieces are also present. The faunal assemblage remains similar to the preceding period with the addition of bison bones. Fishing becomes increasingly important.

The Ethnographic period is coextensive with the Numipu Phase, which begins with the introduction of the horse around 250 BP and continues into the reservation period. This period is characterized by contact with whites and the appearance of Euro-American trade goods after 1840, as well as significant structural changes in traditional life patterns. This period ended when the aboriginal pattern was finally discarded.
FUTURE RESEARCH DIRECTIONS

Most of the archaeological research on the Columbia Plateau has been conducted in connection with reservoir construction projects on the Columbia River and its tributary streams. This research has resulted in the collection of an abundance of information on the aboriginal utilization of riverine sites. Although the aboriginal inhabitants of the Columbia Plateau are known from ethnographic sources to have been concentrated for much of the year along the major rivers and streams, some of their subsistence activities were also carried out in the adjacent upland areas. But to date very little effort has been made by archaeologists to obtain information on activity areas away from the river valleys, and so the available information on aboriginal lifeways in this region remains somewhat biased. Archaeological sites in upland areas away from the river valleys will have to be investigated before a more balanced view of prehistoric lifeways on the Columbia Plateau can be obtained.

Although a number of theoretical models have been proposed for the development of aboriginal culture patterns on the Columbia Plateau, the time depth of the ethnographic Plateau way of life has never been satisfactorily determined. The lack of evidence for early pithouse villages has led some archaeologists to conclude that the basic ethnographic pattern of summer fishing, winter settlement in sheltered canyons away from the main rivers, and spring and fall hunting and gathering in the higher elevations, did not appear until 2000 or 3000 years ago. It seems highly likely, however, that most of the evidence for early pithouse villages has been washed away by periodic floods; this idea is supported by the fact that semi-subterranean pithouses have recently been found in a Cascade Phase component on the Lower Snake River dating from prior to 6000 BP (Brauner 1976).

At the same time, village sites in and of themselves should not necessarily be taken as evidence of the ethnographic Plateau culture pattern. It has usually been assumed that pithouse villages represent winter habitation sites, while smaller campsites represent sites occupied at other times of the year. This assumption must be tested archaeologically, however, before the ethnographic culture pattern can accurately be traced back in time into the prehistoric past. It must also be remembered that sites in the upland areas away from the main river channels can also contribute information as to the antiquity of the ethnographic Plateau culture pattern.

Perhaps the most pressing research problem in north-central Oregon is the need to determine the cultural affiliation of the prehistoric inhabitants of the region at various points in time. Since north-central Oregon is somewhat set off from the remainder of the Columbia Plateau
by the Columbia River, it seems possible that the region could have been occupied at various times by either Plateau or Great Basin peoples, or by both.

One possible interpretation is that Plateau peoples occupied north-central Oregon until the arrival of the Northern Paiute 1-2000 years ago. For example, Ross' research (1963) in the Round Butte area indicates that artifact assemblages from the east side of the Deschutes River show evidence of affiliations with the Plateau. The artifact assemblages from the east bank of the river are distinct from those on the west bank, which were interpreted as related to Klamath Lake and Great Basin peoples. The presence of aboriginal people with Plateau culture traits in the Round Butte region makes it seem quite likely that the Plateau lifeway once extended further upstream along the Deschutes and Crooked Rivers as long as 8-10,000 years ago. Between 4-8000 years ago, when apparent Great Basin influences were being exhibited in many artifact inventories from the Plateau, the occupants of north-central Oregon may have developed a generalized Plateau culture incorporating traits from both the Columbia Plateau and the Northern Great Basin, as suggested by Cressman (1963) for the Round Butte area. Presumably, these Plateau people would have been removed or replaced with the arrival of the Northern Paiute in the area 1-2000 years ago during the Numic expansion.

A second possible interpretation is that north-central Oregon, due to its separation from the remainder of the Columbia Plateau and its general similarity to the Great Basin environs, has always been occupied by Great Basin groups, most recently by the Northern Paiute. The presence of Plateau culture in the Round Butte area 8000 years ago does not necessarily entail the occupation of lands further south by Plateau peoples. The Round Butte area may well represent the southernmost extent of prehistoric Plateau culture.

A third alternative is that Columbia Plateau peoples initially occupied north-central Oregon as suggested in the first alternative, but were removed, instead of simply influenced, by Great Basin groups between 4-8000 years ago when Great Basin influences became evident in the rest of the Plateau. A movement of Great Basin peoples into north-central Oregon at this time may have been brought about in response to the aridity of the Altithermal climatic interval. These peoples would have been replaced a thousand or more years ago by the Northern Paiute for some unknown reason in accordance with the Numic expansion theory.

Unfortunately, all of these alternative interpretations concerning the origins and cultural affiliations of the prehistoric inhabitants of north-central Oregon are based in large measure on logic and limited evidence from peripheral areas, with little archaeological support presently available for any of these interpretations. This matter can only be resolved through studies of human occupation patterns in the region in order
to learn how human use may have shifted through time, fluctuated in re-
sponse to seasonal and climatic changes, or varied in different environ-
mental zones. It is these kinds of changes and variations in the life-
ways of prehistoric cultures that archaeologists seek to discern in the
archaeological record of north-central Oregon.

**SUMMARY**

Archaeological evidence indicates that north-central Oregon has
been inhabited by prehistoric peoples since at least the end of the Pleis-
tocene Epoch 10,000 to 12,000 years ago. The early cultures of the Co-
lumbia Plateau, as yet only poorly known, appear to have followed a way
of life similar to that in other regions of the intermontane west, as
evidenced in the widespread and relatively uniform artifact assemblages
of the Fluted Point Horizon and the San Dieguito-Windust-Milliken Horizon.

After about 8000 years ago, however, the archaeological record in
the intermontane west becomes more complex, as the prehistoric inhabitants
began to follow lifeways more closely dependent on the exploitation of the
natural resources available in each region. On the Columbia Plateau, the
prehistoric peoples developed a way of life closely geared to exploiting
the resources of the Columbia River and its tributary streams. The arch-
aeological evidence suggests that cultural development on the Columbia
Plateau progressed from a generalized hunting-gathering-fishing tradition
followed by small nomadic bands, to the semi-sedentary culture dependent
on abundant anadromous fish resources which was followed in ethnographic
times.
CHAPTER IV
HISTORICAL OVERVIEW

The lands of the planning units comprising the study area have a rich and varied history of human activity which reflects many of the central themes of the history of the American West. Fur trappers, explorers, overland emigrants, soldiers, cattlemen, sheepmen, miners, homesteaders, townsmen, and lumbermen have all left their mark on the area. The following narrative highlights the major themes and events in the district and links them to the historical trends of the region of which they are a part.

EXPLORATION

The earliest exploration of the north-central Oregon portion of the Pacific Northwest was the result of international rivalry over the fur trade, potentially lucrative commerce between Western nation-states and China, and political hegemony. In order to forestall the British and determine the commercial prospects of the newly acquired Louisiana Territory, Jefferson dispatched Meriwether Lewis and William Clark to explore the region and find the best water route across the continent. In traversing the Columbia River, they noted the mouths of both the Deschutes and John Day rivers but did not investigate the region drained by these streams (Johansen 1967).

Between 1810-12, John Jacob Astor, the American fur magnate, sent land and sea parties to establish a trading base at the mouth of the Columbia and to locate sites for a series of posts between that base and St. Louis. Although Astor's employees traveled along the Columbia River and gave the name of one of their party—John Day—to a stream in the region, they did not pass any distance into the territory of north-central Oregon (Porter 1931).

Astor sold his Oregon interests to the Canadian based North West Company in 1814, which in turn sold out to the Hudson's Bay Company in 1821. For the next twenty years, under the aggressive leadership of George Simpson and his subordinates, the Hudson's Bay Company dominated the fur trade of the Oregon Country. One result of the company's efforts to monopolize the fur trade was exploration and trapping in Central Oregon. To discourage American trappers from entering the area, the Hudson's Bay Company adopted a policy of trapping out the lands of the Snake River country so that it would serve as a barrier to the Americans.

Peter Skene Ogden vigorously implemented company policy and between 1824 and 1831 made numerous trapping expeditions through central Oregon. Although Ogden complained of the rough terrain, he did note the luxuriant

Few American trappers challenged the Hudson's Bay Company in the Pacific Northwest in the 1820s and 1830s, but one who did also worked in north-central Oregon. Nathaniel J. Wyeth, the founder of the Pacific Trading Company, trapped along the Deschutes River from December 1834 to February 1835. Like Ogden, Wyeth noted the broad expanse of bunch grass and suggested that the region had great potential for grazing. While arguing that the area was "capable of producing large quantities of hides, tallow, beef, and wool," Wyeth was not so sanguine about its crop value. Still, he admitted that "some of the bottoms of the rivers are good soil, and the lower slopes of the mountains generally so; in both, irrigation could be easily applied, and the agricultural wants of a pastoral people abundantly supplied" (Wyeth 1969).

Wyeth's appraisal of the settlement potential of the area comprising the study area had no impact on the emigrants who would pass through the area on the way to the Willamette Valley in the 1840s. His views were not published until the end of the nineteenth century. For the early emigrants, it was the lure of the cool, verdant valley of the Willamette River—not the hot, rugged grasslands east of the Cascade Mountains—that pulled them to Oregon.

The last important investigation of the land now included in north-central Oregon before the large-scale invasion of overland emigrants was that of John C. Fremont. In the fall of 1843, this bold explorer traveled along the high hills south of the Columbia River, crossing the John Day and Deschutes rivers before stopping at The Dalles. After obtaining supplies at Fort Vancouver, Fremont returned to The Dalles and headed south along the Deschutes, eventually reaching Klamath Lake and California. His enthusiastic account of the central Oregon region also took note of the "excellent grass" and good soil. As historian William Goetzmann has stated, Fremont's published report of his exploration was "comprehensive in scope and monumental in its breadth....(and) most important of all, it was widely influential. To would-be emigrants....it provided a guide and inspiration" (Goetzmann 1966; Fremont 1845).

At the very time Fremont journeyed west in 1843, the first of the great migrations to Oregon had already begun. The route of the emigrants to the Willamette Valley, known as the Oregon Trail, took them through the upper portion of the study area. After crossing the Blue Mountains, the trail paralleled the Columbia River on the high plateau south of the river until it reached The Dalles. At this point the emigrants boated rafts and floated to the Upper Cascades, and after a short portage, they resumed floating down river to Fort Vancouver. Having crossed the Columbia at Vancouver, the pioneers were finally at the northern entrance of the Willamette Valley.
many of the same hardships that Meek's group had undergone, with similar loss of life, animals, and possessions. The passage between the Crooked and Deschutes river was particularly difficult, and when the party finally reached the Cascades, heavy snows nearly prevented their crossing (Menefee and Tiller 1977).

The difficulties experienced by the Meek and Elliott parties discouraged emigrants in the 1850s from using the central Oregon route to the Willamette Valley. With the establishment of Fort Dalles by the United States Army in 1855, the Oregon Trail gained renewed acceptance by wagon trains. This military post provided army protection along the Columbia route at a time of friction between whites and Indians. The Meek and Elliott cutoff, on the other hand, ran unprotected through lands roamed by hostile Northern Paiutes (Knuth 1966).

Further exploration of north-central Oregon occurred in the second half of the 1850s under the auspices of the federal government. Pursuant to a Congressional directive ordering a survey of the West to locate feasible railway routes in that region, the United States Army sent an expedition in 1855 to scout possible routes between the Sacramento Valley and the Columbia River. The party commanded by Lieutenants Robert Williamson and Henry Abbot painstakingly traversed the length of the Deschutes watershed, moving from the Klamath Basin to Fort Dalles. Although the expedition did not venture beyond the east bank of the Deschutes River, their thorough coverage and scientific reportage on the area west of the river to the Cascades added greatly to the available knowledge of the region. The records of the expedition, like those of Fremont's, were later published by Congress (Abbot 1857, Goetzmann 1966, Sawyer 1932).

While most civilians had given up on finding a short cut for the Oregon Trail through central Oregon, the U.S. Army had not. In the spring of 1859, Captain Henry Wallen was ordered to locate a wagon route through the region. Wallen and a well-equipped detachment of 192 soldiers left Fort Dalles, traveling south through the Tygh Valley, crossing the Deschutes just below its junction with the Warm Springs River. After following Trout Creek and Willow Creek to the Crooked River, Wallen divided his command. While he proceeded on eastward, at times using the trail left by the Meek and Elliott parties, Lieutenant Bonnycastle returned to Fort Dalles, going directly north from Trout Creek to the Columbia through present Sherman County and crossing the Deschutes at its mouth. Wallen's topographical engineer, Lieutenant Joseph Dixon, mapped the route (Clark 1932).

In 1860 another army expedition penetrated central Oregon when troops under Captain Andrew Smith and Major Enoch Steen set out to survey a road from Eugene to the California Trail in the Great Basin via Harney Lake. Steen traced the Bonnycastle route to the Crooked River and then followed the old emigrant cutoff southeast up Camp Creek and across Steens Ridge.
to Harney Lake. Steen reported that any prospective wagon road straight west from the Harney Basin was "impracticable...on account of the great scarcity of water which rendered it impossible...to pass over it without great suffering." Steen did survey another route along Buck Creek and then westward across the desert to the Deschutes River. Before Steen could finish his survey to Eugene, Indian hostilities forced him to hurry eastward to assist the soldiers under Smith's command (Clark 1932).

While prospectors and soldiers continued to cross back and forth through north-central Oregon in the 1860s, the final investigations of the region resulted from the laying out of so-called military wagon roads during that decade. In 1864, Congress, to satisfy the demand for internal improvements, had authorized generous land grants to private companies for road and railroad building. Two of the five military wagon roads built in Oregon with land grant subsidies passed through the study area (Jackson 1949).

The first of these private road concerns, the Willamette Valley and Cascade Mountain Wagon Road Company, laid out a route in 1866 connecting Albany with Idaho by a route through the Santiam Pass and on across central Oregon. A rough but passable road was constructed to the Deschutes but the route beyond, which followed an easterly course from the Crooked River up Ochoco Creek and on to the Snake River, was never finished. The Dalles Military Road received a land grant for an improved route from The Dalles via Canyon City to the Snake River, but it did virtually nothing to develop the road. This route simply followed existing trails between The Dalles and the gold fields at Canyon City. It crossed the Deschutes four miles below its mouth, passed south to Cross Hollows, and then continued to Canyon City via Burnt Ranch, Camp Watson and the John Day River. Neglect and collapse of a bridge over the Deschutes made the portion of the road north of Cross Hollows unusable after 1870 (Loy 1976, Juris and Due 1968). The actual settlement of north-central Oregon would be part of the final act in the closing of the Frontier in the United States.

TRANSPORTATION

Transportation routes in the study area evolved as a product of the various human activities conducted in the region. Fur traders and explorers discovered the basic routes through the area and military men, overland emigrants, stockmen, and freighters improved and extended them. By the 1870s, several main routes carried the bulk of the horse and wagon traffic; during the remainder of the era of settlement, the railroads—through the main line along the Columbia River and branch lines into the interior—increased the circulation and efficiency of the region's
transportation network. The early roads and trails of north-central Oregon, listed in Table 7, are shown in Figure 21.

Oregon Trail and Barlow Cutoff

For nearly thirty years, the Oregon Trail was the chief route for the thousands of pioneers who sought a new life in the Oregon Country. This trail entered present Gilliam County from the east at Willow Creek about twelve miles south of the Columbia. It then continued westerly, crossing Fourmile and Eightmile canyons to a point in Alkali Canyon about seven miles south of Arlington. It then followed Alkali Canyon for several miles to the John Day River where it entered Sherman County below the mouth of Rock Creek. Proceeding along Spanish Hollow, it passed 1½ miles north of present Wasco to the Columbia west of present Biggs and then crossed the Deschutes at its mouth. After entering Wasco County, the trail climbed nearly one thousand feet and continued over ridges toward The Dalles. It crossed Fifteenmile Creek, Company Hollow, and Eightmile Creek before returning to the Columbia at The Dalles. Emigrants choosing to float their wagons down the Columbia continued six miles farther along the river to Rowena before disembarking.

In 1845-46, Samuel Barlow blazed an alternate route thirty miles south from The Dalles to Tygh Valley and then westerly along Frog Creek, leaving Wasco County near Wamic. After the mid-1850s, a cutoff joined the Barlow Road at Tygh Valley with the main Oregon Trail to the east at Grass Valley Canyon in Sherman County. The short cut passed south-westerly from Grass Valley Canyon to present Grass Valley, continuing to Buck Hollow and then westerly. It ferried the Deschutes River one mile north of Sherar's Bridge, crossed the Tygh Valley, and joined the Barlow Road at Wamic (Shaver 1905, French 1958).

Meek Cutoff

This trail was opened in 1845 and entered north-central Oregon by two separate routes, since the Meek party had split into two groups. The southern loop entered the study area east of present Bend near Alfalfa. At Bend, they turned north, passing near present Redmond and Smith Rock. On the plains south of Madras, the trails of the two parties came together, although the separate trains did not rejoin until Sagebrush Springs. The other group reached the region west of Grizzly Mountain near Rim Rock Spring and then, a short way north, united with the first train. From Sagebrush Springs, the reunited party traveled north through Lyle Gap, Shaniko Flats, and Buck Hollow. At the latter place, they descended to the Deschutes, crossed near Sherar's Bridge, ascended Tygh Ridge, and proceeded to The Dalles (Clark and Tiller 1967).
Table 7.
Known Historic Trails in North-Central Oregon

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<tr>
<th>Map Reference Number</th>
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<th>References</th>
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<tr>
<td>1</td>
<td>Oregon Trail (The Dalles-Walla Walla Wagon Road)</td>
<td>Shaver 1905; French 1958; Oregon Trail; BLM Original Survey Maps</td>
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<tr>
<td>2</td>
<td>Barlow Trail (Tygh &amp; Grass Valley Road)</td>
<td>Shaver 1905; French 1958; Oregon Trail; BLM Original Survey Maps</td>
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<td>3</td>
<td>The Dalles Military Wagon Road</td>
<td>French 1958; Jackson 1949; Corning 1956; Anon. 1902; BLM Original Survey Maps</td>
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<tr>
<td>4</td>
<td>Willamette Valley &amp; Cascade Mountain Wagon Road</td>
<td>Shaver 1905; Jackson 1949; Corning 1956; Warner 1868; BLM Original Survey Maps</td>
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<tr>
<td>5</td>
<td>Old Immigrant Road (Meek's)</td>
<td>Clark &amp; Tiller 1967; Wojcik 1976; BLM Original Survey Maps</td>
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<td>6</td>
<td>Stein's Wagon Road (The Dalles Ochoco Stage Road)</td>
<td>BLM Original Survey Maps</td>
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<td>7</td>
<td>Huntington's Wagon Road</td>
<td>Juris and Due 1968; BLM Original Survey Maps</td>
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<td>8</td>
<td>The Dalles Wagon Road</td>
<td>BLM Original Survey Maps</td>
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<tr>
<td>9</td>
<td>Tilkeny Wagon Road (The Dalles-Canyon City-Prineville Stage Road)</td>
<td>BLM Original Survey Maps; Juris &amp; Due 1968</td>
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<td>10</td>
<td>Cross Keys &amp; Antelope Wagon Road</td>
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<td>The Dalles &amp; Prineville Wagon Road</td>
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Table 7.
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<td>Prineville &amp; Deschutes Road</td>
<td>BLM Original Survey Maps</td>
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<td>13</td>
<td>Warm Springs Road</td>
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<td>Daily's Road</td>
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<td>Long Creek &amp; Susanville Road</td>
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<td>Long Creek &amp; Canyon City Road</td>
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<td>17</td>
<td>Canyon City &amp; Ochoco Road</td>
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<td>18</td>
<td>Canyon City &amp; Harney Road</td>
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Figure 25. Major Trails and Roads on BLM Lands within North-Central Oregon as Shown on Original General Land Office Survey Plats (Key, Table 7).
The expense and dangers of the journey down river from The Dalles caused some intrepid emigrants to seek an alternative route. In 1844 alone, emigrants lost over half their stock in the treacherous trip down the Columbia. In 1845, Samuel K. Barlow and a small group of adventurous souls blazed a wagon trail south from The Dalles through the Tygh Valley and around the rough southern slope of Mount Hood to Oregon City. This route, known as the Barlow Trail, proved an almost equally arduous approach to the Willamette Valley. Nevertheless, thousands of pioneers continued to use it in preference to the river. After the mid-1850s, a cutoff from the Tygh Valley bypassed The Dalles and connected the Barlow Road more directly with the Oregon Trail at a point just east of present-day Wasco in Sherman County (Johansen 1967; Menefee and Tiller 1976).

In 1845, overland emigrants, seeking to by-pass the rigors of the Blue Mountains, hoped to reach The Dalles by traveling west after crossing the Snake River and then north through central Oregon. Led by Stephen Meek, a veteran mountain man who had once trapped in eastern Oregon, approximately 1,500 emigrants left the Oregon Trail and pushed westward through the Malheur watershed. Meek's knowledge of the region proved deficient and after much aimless wandering, the suffering party reached the head of the Crooked River's south fork and much-needed water. At this point (G. I. Ranch), the wagon party divided. The largest segment descended the Crooked River, cutting north down Camp Creek and finally moving west toward the Deschutes River. The smaller group moved westward, passing north of Hampton Butte and south of the Maury Mountains along Bear Creek. After reaching the Deschutes at a point near Pilot Butte, the smaller group turned north and eventually rejoined the larger party at Sagebrush Spring. The reunited train traveled north, crossing the Deschutes at Sherars Bridge and arriving at The Dalles in the fall of 1845. At least twenty-four died on the cutoff trail before the ill-fated Meek's party reached safety at The Dalles (Clark and Tiller 1967).

While the vast majority of Oregon-bound pioneers reached their destination by the traditional route of the Oregon Trail, a few hardy migrants—undeterred by the tragic experience of the Meek party—tried to shorten the journey by crossing the high desert country of central Oregon. The explorers of this route ascended the Middle Fork of the Willamette, crossed the Deschutes near Pringle Falls, turned northeast in the vicinity of Lava Butte and eventually reached the Crooked River. From this point they retraced much of the Meek train's path to the Snake River (Menefee and Tiller 1976).

During the 1863 migration, one party containing more than 1,000 people and a large quantity of livestock agreed to attempt the newly explored route through north-central Oregon under the leadership of Elijah Elliott, an inexperienced guide. The Elliott cutoff party suffered
The 1853 emigration led by Elijah Elliott followed much of the route used by the southern branch of the Meek party, except at present Bend the Elliott party turned south along the Deschutes and Little Deschutes rivers until reaching present La Pine. The group then traveled west, passing south of Diamond Peak in entering the Cascades (Menefee and Tiller 1977).

Stein's Wagon Road

In an attempt to establish a shorter and easier road from Fort Dalles to Salt Lake, Major Enoch Steen led an expedition from The Dalles in 1860. He followed the Walla Walla Road from Fort Dalles, crossing the Deschutes at its mouth and turning south to Trout Creek, in the Hay Creek area. After passing Cow Canyon and fording Willow Creek, the route leaves the study area. Steen retraced much of the path Lieutenant Bonnycastle (of the Captain Wallen party) had explored the previous year (Brogan 1964).

Willamette Valley and Cascade Mountain Road

The Willamette Valley and Cascade Mountain Road Company was formed in 1864 to build a road from the Willamette Valley over the Santiam divide, down to the Deschutes River, into the Crooked River Valley, and on to the Idaho border via Paulina Valley, Fort Harney, and the Malheur Canyon. The route entered north-central Oregon at Camp Polk, crossed the Deschutes at Lower Bridge and left the District just east of Redmond, south of Smith Rock. The company received a federal land grant in 1866 amounting to 861,512 acres, of which only 107,942 were patented. Settlers along its route complained that the road was little more than a poorly maintained trail and tried to get the government to revoke the grant. The company was able to defeat all attempts by the government to reclaim the land (Shaver 1905, Jackson 1949, Corning 1956).

The Dalles Military Wagon Road

In 1867, Congress passed an act granting land to the state of Oregon to aid in construction of a military wagon road from The Dalles to Fort Boise via Canyon City. A company was formed ostensibly to carry out this task and received 556,627 acres for its efforts. Only 126,900 acres actually were patented by the road company. Some questioned the legality of the Governor's certification of the road and its land grant because the company was alleged to have used an established trail and made little or no improvements to it. Eventually public cutlures of fraud by the company forced the government to attempt to cancel the
grant through a court action. However, in 1890, the Supreme Court held for the company.

The route ran from The Dalles to Gordon's Bridge over the Deschutes, about four miles from the Columbia. The road turned south, proceeding to Cross Hollows, Antelope, and Cherry Creek. It then entered Wheeler County near Burnt Ranch and followed the John Day River to Bridge Creek. There it continued up Bridge Creek, turning easterly near present Mitchell towards Camp Watson. At Camp Watson, the road turned northeasterly to the John Day River near present Dayville and followed the river on to Canyon City. By 1879, with the collapse of the Gordon Bridge, The Dalles Military Wagon Road north of Cross Hollow was unusable, and traffic thereafter used a route over Sherars Bridge (French 1958, Jackson 1949, Corning 1956, Anonymous 1902).

The Dalles-Canyon City Stage Route

In 1860, John Y. Todd built a bridge across the Deschutes River near the Tygh Valley at a point later called Sherars. The bridge was subsequently sold and improved, finally becoming the property of Joseph Sherar in 1871. He continued to own and improve it and the road leading to it for the next forty years. Because of the neglect of the Gordon Bridge and the good maintenance of the Sherar route, the latter road displaced the Grass Valley section of The Dalles Military Wagon Road as the chief link between The Dalles and Canyon City west of Cross Hollows. At Cross Hollows, the stage road went northwesterly to Bake Oven and then on to Sherars Bridge. After crossing Sherars Bridge, the road traveled north through Chicken Spring, Boyd, and Eightmile before reaching The Dalles (Juris and Due 1968, French 1958, Brogan 1964).

The Dalles-Walla Walla Road

To meet the demand of wagon freight traffic between The Dalles and Walla Walla during the gold rush era, an improved road was developed. It actually followed the Oregon Trail through most of north-central Oregon. After leaving the study area, it passed northeasterly to Umatilla and continued on to Walla Walla (Winther 1950).

Yreka and Canyon City Wagon Road

The gold strikes of eastern Oregon attracted prospectors from California in the 1860s. The route these miners took ran from Red Bluff, California to Fort Klamath, northeast to the head of the south fork of the Crooked River and then northeast again to a junction with The Dalles and Canyon City Road just east of the mouth of the South Fork of the John Day River (Preston 1972, Stone 1964).
Figure 26. Freight wagons parked at the Bakeoven relay station on The Dalles-Canyon City Stage Road. Photograph courtesy of the Oregon Collection of the University of Oregon Library.

Figure 27. Freight teams arriving in Canyon City with merchandise for local merchants in 1910. Photograph courtesy of the Oregon Collection of the University of Oregon Library.
Figure 28. Stage coaches at trail crossing in central Oregon about 1915. Photograph courtesy of the Oregon Collection of the University of Oregon.

Figure 29. Stagecoach and horses in front of Elkhorn Hotel, Canyon City, Oregon in 1900. Photograph courtesy of the Oregon Collection of the University of Oregon Library.
Huntington's Wagon Road

The path referred to on early survey maps as Huntington's Wagon Road was the route J. W. Perit Huntington, Oregon Superintendent of Indian Affairs, used to haul treaty goods and other supplies from Fort Dalles to the Indians of the Klamath Reservation in 1864. The route continued in use for transporting supplies between Fort Dalles and Fort Klamath and the adjacent Indian reservation. The route generally paralleled the Deschutes River east of present Bend and Redmond, heading in a southerly direction through present La Pine towards Fort Klamath (Brogan 1964).

Railroads

When Henry Villard's transportation monopoly, the Oregon Railway and Navigation Company, completed its line along the south bank of the Columbia in 1882, central Oregon was at last in a position to develop its agricultural potential. The junction of the Northern Pacific in 1883 and of the Union Pacific's Oregon Short Line in 1884 with Villard's railway gave the region its long-sought transcontinental links (Juris and Due 1968, Johansen 1967).

As settlers poured into Wasco, Sherman, and Gilliam counties, shipping points along the railroad sprang up to receive the farmers' produce. Mosier, Biggs, Rufus, Blaylock, and Arlington were all railroad towns that served the agricultural populace of the interior. Soon residents of central Oregon clamored for lines to be built into the interior to end the need for expensive wagon transport (Shaver 1905, Juris and Due 1968).

Further growth in the region did bring lines into the hinterlands. In 1897, the Columbia Southern Railway built a road south from Biggs, reaching Shaniko seventy miles to the south in 1900. While the ultimate objective of this road was Prineville, engineers found themselves boxed in on the high Shaniko plateau. The benefits of extending the line did not justify the cost involved. Shaniko boomed as a major shipping depot, becoming the largest wool shipping point in the world for a time. Use of the Columbia Southern declined after main line railroads were built down the Deschutes River, and the line was abandoned eventually (Juris and Due 1968, Culp 1972).

The Great Southern Railroad was constructed forty miles south from The Dalles to Friend in 1904 to haul grain and forest products. The Union Pacific System completed a branch from Arlington to Condon in 1905, and the Mount Hood Railroad extended twenty-two miles from Hood River to Parkdale in 1910. In 1909, the narrow gauge Sumpter Valley Railroad extended its tracks into Prairie City on the eastern edge of the study area. This line was designed to exploit the timber, mineral, and livestock resources of the area (Juris and Due 1968, Culp 1972, Ferrell 1967).
Still, for one reason or another, none of these branch lines was able to push deeper into central Oregon. It took the competition between the Union Pacific and the Great Northern to provide through, main line service to the interior lands. By 1911, rails had reached Bend; and in the 1920s, the Great Northern extended tracks south to Klamath Falls. Prineville, denied main line service and afraid Bend would usurp its position as the trade center for the region, built its own municipal railway to connect with the Deschutes railroads in 1918 (Juris and Due 1968, Culp 1972).

By 1920, the chief transportation routes of north-central Oregon were established and the region was conveniently connected to the outside world. The livestock, wheat, and wool resources had been developed and the lumber industry was beginning its growth to prominence. After 1920, the railroads yielded some of their economic importance with the construction of several paved state and federal highways through the region.

MILITARY AND INDIAN AFFAIRS

The relationship between pioneers and Indians grew increasingly troublesome during the 1850s. The prior impact of maritime traders, explorers, beaver trappers, and missionaries on the Indian culture was relatively light in comparison to the pressures placed on the Indians by the white farmers and miners. The pioneers' relentless quest for farm and range land and precious metals led to a struggle with the Indians over land use. As the white man encroached on the traditional hunting and gathering preserves of the natives, incompatible land use patterns frequently led to war.

In 1848, Congress confirmed Indian land titles but negated the protective value of this act by passing the Donation Land Act which in effect encouraged whites to occupy lands not yet ceded by the Indians. An Oregon Superintendency of Indian Affairs was established in March, 1849 and an agency set up at The Dalles with responsibility for all of Oregon Territory east of the Cascades. A treaty policy soon developed along the lines recommended by regional politicians and in accord with the national policies of removal and segregation of Indians from white society. This policy produced the small Indian reservation (Kappler 1904; Shane 1950; Johansen 1967).

In 1855, the Indians of the area bounded by the present limits of the study area signed treaties ceding their lands and agreeing to settle upon the Warm Springs and Umatilla reservations. The Tain, Wyam, Tenino, and Dock-spu bands of Walla Wallas and the Dog River, Ki-gal-twal-la and Dalles bands of Wascos were gathered on the Warm Springs, while the
Umatilla, Cayuse, and other tribes outside of the north-central Oregon region removed to the Umatilla Reservation. While the reservations were presumed to consist of land unfit for cultivation, they were thought compatible with the historic fishing-hunting-gathering habits of the Indians. Although the reservation treaties were not ratified until 1859, most Indians had removed to their respective areas before that date (Kappler 1904).

The Indians on the Warm Springs Reservation suffered numerous raids by hostile Northern Paiute bands of central and southeastern Oregon, who coveted the horses and cattle of the reservation Indians. Between 1859 and 1868, Paiute raids produced retaliatory strikes by the reservation Indians which, in turn, led to still more raids by the Paiutes. The army considered the actions of the Northern Paiute dangerous not only to the reservation but also to travelers headed for the mines of eastern Oregon. Accordingly, a major offensive was mounted in 1864 under Captains George B. Currey and John E. Drake. Drake and his men operated in the Crooked River watershed, establishing depots named Camp Maury, Camp Gibbs, and Camp Dahlgen in the present Brothers EIS Area of the Prineville District, BLM (see Toepel & Beckham 1978). In addition, Camp Polk (about three miles northeast of Sisters), Camp Watson (about twenty miles southeast of Mitchell near the junction of Waterman Flat Road and present Highway 26), and Camp Logan (a few miles southeast of present Prairie City), were created as military bases during the Indian wars of the 1860s. Camp Watson was important especially for the protection of travelers and express on The Dalles-Canyon City Road. It housed over 100 infantry and cavalry in log buildings forming a stockade (Corning 1956, Fussner 1975, Oregon National Guard 1976).

Although the army fielded nearly 400 soldiers and Indian scouts during the summer campaign of 1864, little was accomplished. The wily Northern Paiute avoided any major contact with the soldiers while continuing their raids on livestock and miners in the John Day and Owyhee districts (Bancroft 1888).

Between 1866 and 1868, the army relentlessly pursued the Northern Paiute bands throughout central and southeastern Oregon. By the end of 1868, two-thirds of the Indians had been killed, and surviving Paiutes agreed to live upon whatever reservations might be designated. Until the Bannock War of 1878, they resided at the Malheur Indian Reservation. After their defeat in 1878, the Paiutes were scattered among several Northwest reservations, and the Malheur Reservation itself was dissolved in 1882. Eventually, the remaining Paiutes ended up on the Warm Springs and Duck Valley reservations, or as squatters near Burns, Oregon (Shane 1950).

The Bannock War of 1878 represented the last major Indian uprising to affect the lands now encompassing the study area. It resulted chiefly
from the failure of the Fort Hall Agency to provide adequate supplies for the Bannocks under its charge. Out of frustration and a feeling of betrayal over the Agency's broken promises, a large party of Bannocks led by Buffalo Horn swept out of the Snake River country and moved toward the Malheur Reservation to link up with dissident Paiutes under Egan. The united Indians then moved northeast, reaching the vicinity of Canyon City in June 1878 (Brimlow 1938, Anonymous 1902).

The settlers at Canyon City took refuge in the abandoned mine tunnels west of town, and the Indians did not attempt an assault. Instead, they veered westward, burning several ranches and murdering two sheep-herders. The Bannocks and Paiutes were pushing northward to seek support from the Indians on the Umatilla Reservation. As the Indians passed through the Long Creek Valley, they found the settlers, with their possessions and livestock, fortified in a hastily built log stockade. The Indians chose not to molest the homesteaders and hurried on north with the cavalry under General O. O. Howard in hot pursuit (Anonymous 1902, Brimlow 1938).

On July 7, 1878, Howard's troops caught up with Egan's forces near the head of Butter and Birch Creeks in the Blue Mountains about eighteen miles south of Pilot Rock. A major battle ensued and the Indians fled the field, heading in the direction of the Grande Ronde Valley. After a few days, following some skirmishing near Pendleton, Egan was betrayed and killed by loyal Indians on the Umatilla Reservation. His disheartened followers broke up into small bands and returned to their own reservations by the end of July (Anonymous 1902; Brimlow 1938).

The Indian troubles of the 1860s and 1870s momentarily slowed the growth of north-central Oregon. During a brief period of time, the hostile Indians had destroyed or dispersed large bands of sheep and cattle, burned homesteads, and killed a number of settlers and thoroughly frightened the rest. As a result, emigration slowed and the present settlers demanded further reductions of the reservation. Thus, as Johansen notes, "In the 1880s the Indians were gradually forced to accept the reservations as the limits of their freedom; conflict ceased, and the aboriginal possessors of the land were left with little hope of finding a place in the new owners' society" (Johansen 1967).

FEDERAL LAND POLICIES AND SETTLEMENT

Extensive settlement and development of the lands within north-central Oregon were delayed by a number of factors until the 1870s. Before that time, the forbidding topography, harsh climate, hostile Indians, and remoteness from centers of population discouraged settlement. As long as
fertile, well-watered lands were available in western Oregon, few pio-
near would brave the hazards of Indian attacks, rough terrain, limited
rainfall, and lonely isolation to permanently live in the region.

While some early explorers had noted a few fertile valleys and areas
suitable for cattle-grazing, the dominant impression of the central Oregon
region probably was that expressed by Lieutenant Henry L. Abbot in 1855:

> It will be seen that the Des Chutes valley is mostly a
> barren region, furrowed by immense canyons, and offering very
> few inducements to settlers. Its few fertile spots, except-
> ing those in the immediate vicinity of Fort Dalles, are sepa-
> rated from the rest of the world by almost impassable barriers,
> and Nature seems to have guaranteed it forever to the wandering
> savage and the lonely seeker after wild and sublime natural
> scenery (Abbot 1857).

By 1850, only one permanent settlement existed in the region. A
Methodist mission had been established at The Dalles in 1838 at the site
of a major Indian trading center and rest stop for early emigrants. The
importance of the location increased when the army built a post there in
1850 to provide protection against hostile Indians. In the early 1850s,
a few settlers began to trickle into the area south of The Dalles, reaching
the Tygh Valley by 1855. Homesteads were taken along the largest of
the "mile" creeks (Threemile, Fivemile, Eightmile, and Fifteenmile). The
1860 census listed the population of The Dalles and surrounding territory
at 1,340 with 6,057 acres of improved farm land (Meinig 1968).

During the decade of the sixties, a number of events occurred which
attracted potential settlers' attention to the lands comprising the study
area. The discovery of gold in 1862 at Canyon Creek, a tributary of the
John Day River, lured thousands of prospectors, suppliers, and camp fol-
nowers through the region to the gold camps. This event also stimulated
the building of roads through the area, helping provide easier access to
future markets as well as improving transportation for immediate needs.
In addition, the army was removing another barrier to settlement by re-
ducing Indian depredations. Finally, the growing scarcity of land in the
Willamette Valley, coupled with continued migration, was driving up land
prices. Farmers and stockmen looked at the region with a new interest
(Juris and Due 1968).

The actual settlement and development of north-central Oregon lands
have been strongly influenced by the land policies of the federal govern-
ment. The pre-emption provisions, homestead acts, desert land entries,
stock-raising homestead laws, reclamation projects, and the Bankhead-
Jones Act all served to stimulate human activity in the region. In simi-
lar fashion, federal timber and mineral edicts affected the rate of growth
in the region's population and economy.
The Homestead Act of 1862 promised free land, after payment of a nominal filing fee, to all who would reside upon and improve a farm on 160 acres of surveyed public lands for 5 years. It also guaranteed the right of pre-emption holders, on either surveyed or unsurveyed public lands, to secure 160 acres at $1.25 an acre or 80 acres for $2.50 an acre. The offer of free lands was in many ways incongruous with other aspects of the public land system which granted large chunks of land to the states (140 million acres), the railroads (125 million acres), and Indian reservations (175 million acres). Since these lands were sold subsequently at prices varying from $1.00 to $15.00 per acre and often included the best acreage available, homesteaders may well have wondered whether the Homestead Act was a boon after all (Gates 1968).

In addition to the lands available for pre-emption and homesteading in central and eastern Oregon, other properties were available for cash entry purchase in the 1870s. Upon statehood, Oregon received sections sixteen and thirty-six in each township for the support of education. The state also received swamp lands totaling 286,108 acres under the Swamp Land Act of 1850. In 1870, the state set a sale price of a minimum of $1.00 an acre for these lands, with liberal payment requirements. Purchasers needed to pay only 20 percent down, with the remaining 80 percent due over a 10 year period. The surveyors of the general land office designated those lands qualifying as swamp (Gates 1968, Oliphant 1968).

Filing upon alleged swamp land proved particularly attractive to cattlemen in the region during the nineteenth century. While such property might actually be unfit for cultivation even though it had water on it, it was often prime grazing land. Since such land might be the only source of water in the area, an enterprising cattle rancher could effectively block settlers from entering the area and thus graze his cattle on the surrounding public domain without competition (Oliphant 1968). William A. J. Sparks, Commissioner of Lands from 1885-87, accurately described the abuses of swamp land selection in Oregon:

The most unblushing frauds have been practiced in the selection of alleged swamp lands by parties claiming as purchasers of swamp lands from the State. By means of false affidavits, fraudulent surveys, and bribery of agents, these parties have managed to obtain control of most of the lands bordering on lakes and water courses, shutting out intending settlers from access to water, and illegally monopolizing for pasturage thousands of acres of public lands, without payment of a dollar to the Government...

The enactment of the Timber Culture Act in 1873 provided yet another way for a settler to file upon additional land. The measure allowed a settler to secure a quarter-section by planting forty acres in trees;
residence upon the tract was not required. A Timber Culture claim was valid for up to thirteen years before it lapsed for non-fulfillment and could be held simultaneously with either a pre-emption or homestead entry. To ease the means of ownership, subsequent amendments reduced the acreage in trees to ten. In practice, the chief value of the law for many settlers was the sale of the relinquishment, although this was illegal. Only a small proportion of the original timber culture claims went to patent.

To encourage people to homestead in the arid portions of the West, Congress passed the Desert Land Act of 1877. This measure allowed the purchase of 640 acres at $1.25 per acre upon proof that it had been placed in irrigation within three years after the original entry. This act was also abused by cattlemen anxious to gain ownership of water rights. Government officials found that little attempt had been made to irrigate the land being claimed under the act and that many of the entries were for land obviously not desert. The measure was tightened up in the General Revision Act of 1891 and acreage that could be acquired was reduced to 320 (Gates 1968).

Another measure influencing settlement in north-central Oregon was the Timber and Stone Act of 1878. This act, applying to the timberlands of Oregon, California, Nevada, and Washington territory, allowed an applicant to acquire 160 acres of uncultivable timbered land for $2.50 an acre. The purchasers of these unreserved, surveyed public lands had to swear that they were under no obligation to relinquish the claim to other persons. Commissioner Sparks asserted that widespread fraud was perpetrated under the act by timber speculators in the Pacific states. Some of these frauds were committed in central and eastern Oregon (Gates 1968, Putter 1908).

In assessing the success or failure of the land laws prior to 1900, it should be kept in mind that the stated goal of such legislation was to make land available to the "actual settler." Lax enforcement by officials and outright fraud by vested interests permeated the administration of the public land system, and much of the land available under the various laws never went to final patent. However, in spite of the problems, the system seems to have worked fairly well. According to Paul Gates, "by 1900 the public land states...boasted 2,404,968 farms, 70 percent of which were owner operated." Moreover, D. W. Meinig in his study, The Great Columbia Plain, argues that

How extensively the settlers evaded the technicalities of the law can never be measured, but it was not very fundamental. To the extent that they built homes, plowed the land, and raised crops they carried out the basic intent of the government policies anyway. That speculators, individual and corporate, reaped profits in this grandiose national transaction was certainly not
in accordance with the popular will, but, in this region at least, they do not seem to have impeded the progress of the legitimate land seeker. No considerable block of good farm and came under the control of such persons, and though they were no doubt much in evidence in every new district, they seem to have been no more than petty, parasitic intermediaries in the colonization process (Meinig 1968).

The Carey Act of 1894 proved important particularly to the settlement of portions of Crook County after 1900. The act provided that proceeds from the sale of arid lands in the western states be paid to these states for irrigation projects. The states could receive up to a million acres which they had to set aside for reclamation by water and then sell the lands only to actual settlers in tracts of 160 acres. The settler was required to cultivate twenty acres within ten years. The terms of the Carey Act were accepted by Oregon in 1901 and segregations of irrigable land were begun soon thereafter (Gates 1968).

After 1900, a series of land laws passed Congress encouraging settlement on the remaining arid areas of the West. The period between 1900 and 1920 was marked by unrealistic optimism and consequent discouragement on the part of settlers who flocked to the high desert sections east of the Cascades in order to take advantage of liberalized land policies. The measures encouraging the wild rush of settlers included the Enlarged Homestead Act of 1909, the Forest Homestead Act of 1906, and the Stock Raising Homestead Act of 1916.

The Enlarged Homestead Act authorized 320 acre homesteads on nonirrigable land containing no merchantable timber. The Forest Homestead Act permitted entry on 160 acres of tillable land valuable only for grazing and raising forage crops. Permanent improvements worth $1.25 an acre were required, and homesteaders falling under the Acts of 1862 and 1909 could make additional entries to bring their totals up to 640 acres. But, in spite of the generosity of these measures, the hopes and dreams of the last burst of homesteading in the region went largely unrealized (Gates 1968).

As previously indicated, placer mining and supply-related activities brought the initial thrust of white inhabitants into the study area, creating large population centers temporarily at either end of the region. The Dalles was estimated to contain a permanent population of 2,500 while Canyon City had 5,000 transients at the height of the boom. At one time during the gold rush, as many as 10,000 people were outfitted at The Dalles for the trip to the mines of eastern Oregon and Idaho (Oliver 1961, Potter 1976, Oliphant 1968).

The 1870s and 1880s marked the high point of the open range cattle business in north-central Oregon. In addition to the established cattle
operations in the region, thousands of head of beef were driven each year from the Willamette Valley to the summer grazing range beyond the Cascades. The markets for the range cattle of eastern and central Oregon, after the mines declined, included urban centers within the Pacific Northwest, California, and the ranges of the plains territories and states (Oliphant 1968).

By the late eighties, the coming of the transcontinental railroads and the influx of farmers and sheepmen hastened the end of the open range cattle enterprise. As Oliphant succinctly put it, "cattlemen in Transcascadia during the 1880s were confronted by the twofold problem of re-treating as gracefully as they could from the arable grasslands which the farmers were taking, and of holding, if they could, the nonarable ranges from which the 'pestilence' of sheep threatened to drive them" (Oliphant 1968).

Competition between sheepmen and cattlemen during the 1890s led to serious over-grazing on the remaining open range, and by 1906, after considerable violence on the Oregon range, the federal government began regulating grazing land within its forest reserves. By this time, farming had surpassed livestock raising in the region as the chief agricultural activity (Oliphant 1968, Shaver 1905, Anonymous 1902, Fussner 1975, Brogan 1964).

The peak years for the sheep industry were between 1890 and 1910. In the early nineties, 10,000,000 pounds of wool were transported from Pendleton and The Dalles; and during the first few years of the twentieth century, Shaniko became the premier wool shipping center of the region. After 1900, overgrazing and reduced range allotments through federal regulation led to a decline in the sheep industry. The census figures reflect this decline; between 1900 and 1920, the total number of sheep in the region declined from 1,064,153 to 441,485 (see Table 8; also Fussner 1975, Shaver 1905, Meinig 1968).

Because of better access to transportation and markets, the immediate hinterlands of The Dalles at first received the largest number of settlers in north-central Oregon. However, every part of the region gained at least a few inhabitants during the 1860s. The earliest settlers, stockmen, arrived in present Sherman County beginning in 1861; they located on the fertile soil between Spanish Hollow and Grass Valley. As late as 1878, only forty-two white people lived in that portion of Wasco that is now Sherman County. Present Gilliam County saw its first residents locate on Rock Creek in 1862 and engage in stock raising. Only five settlers had arrived by 1865. The first recorded inhabitant of present Wheeler County arrived in 1862, stopping near Twickenham. Other settlers, chiefly stockmen, spread out over future Wheeler County from Clarno on the west to Antone and Waterman on the east between 1866 and 1870. Those
<table>
<thead>
<tr>
<th>Product</th>
<th>Wasco</th>
<th>Grant</th>
<th>Crook</th>
<th>Gilliam</th>
<th>Sherman</th>
<th>Wheeler</th>
<th>Jefferson</th>
<th>Deschutes</th>
<th>Hood River</th>
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<td>Wheat</td>
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<tr>
<td>(Bushels)</td>
<td>85,894</td>
<td>45,892</td>
<td>8,612</td>
<td>84,461</td>
<td>148,891</td>
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<tr>
<td>1880</td>
<td>34,813</td>
<td>26,479</td>
<td>8,612</td>
<td>84,461</td>
<td>148,891</td>
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<td>1890</td>
<td>504,980</td>
<td>31,800</td>
<td>42,880</td>
<td>406,480</td>
<td>1,050,400</td>
<td>15,720</td>
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<td>1900</td>
<td>734,258</td>
<td>54,312</td>
<td>186,880</td>
<td>808,183</td>
<td>1,541,092</td>
<td>33,275</td>
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<td>21,146</td>
<td>42,225</td>
<td>1,017,136</td>
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<tr>
<td>(Head)</td>
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<td>9,087</td>
<td>165,446</td>
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<td>50,908</td>
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<td>93,156</td>
<td>22,121</td>
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</table>

Source: U.S. Census Data
portions of Wasco that later became Crook and Jefferson counties also received a few settlers, again stockmen, before 1870 (Shaver 1905, Fussner 1975, French 1958).

Shortly after mining commenced near the mouth of Canyon Creek, homesteaders took up land in the nearby John Day River Valley. By 1869, 3,608 acres were under cultivation in the valley. Settlement of the other lands in Grant County (Long Creek and Fox Valleys, Ritter, Monument, Silvies, and Izee areas) included in the study area occurred in the 1870s and 1880s. Most early settlers engaged in livestock and farming operations. Until about 1882, stockmen raised cattle and horses, gradually shifting to sheep thereafter. Isolation from outside markets because of poor transportation facilities delayed the development of farming by homesteaders in Grant County. The large stock operations only reluctantly surrendered the open range in the county to the small farmer or mixed farming and stock enterprise (Anonymous 1902, Oliver 1961).

The population figures in Table 9 indicate the rapid growth in central Oregon in the decade of the eighties. In 1890, the territory once comprised only of Wasco and Grant counties now contained one-half more inhabitants than it had in 1880. By 1890, three new counties had been carved out of Wasco. This population boom chiefly reflected the advent of farmers raising wheat on the rolling hills of the region. Although the first wheat crop successfully grown on the hills took place as early as 1864 above Fifteenmile Creek in Wasco County, it was the late 1870s before this activity became general. The shortage of farm implements and poor transportation inhibited real agricultural growth until the early 1880s. The completion of the railroad along the south bank of the Columbia River in 1881, and the arrival of thresher and other harvesting equipment speeded expansion almost over night. As early as 1885, Sherman County was reported to have produced 1,654,210 bushels of wheat (Shaver 1905, French 1958, Meinig 1968).

As Table 8 shows, both Gilliam and Wasco counties followed Sherman in the shift from stock raising to wheat production, registering similar growth in population and cereal production prior to 1900. Gilliam County's apparent population decline between 1890 and 1900 is chiefly the result of contributing about 800 to the formation of Wheeler County in 1899. While the economic hard times from 1893 to 1897 slowed agricultural development, the region had recovered by 1900. In fact, between 1894 and 1897, 188,207 acres of government land were entered for settlement in Wasco County alone (Shaver 1905, French 1958).

With the exception of Sherman County, stock raising, especially of sheep, remained important to the region until 1910. In general, the lands of Crook, Grant, Wheeler, and portions of southern Gilliam counties were suited better to livestock than crop production. Many homesteaders who
<table>
<thead>
<tr>
<th>County</th>
<th>Established</th>
<th>1870</th>
<th>1880</th>
<th>1890</th>
<th>1900</th>
<th>1910</th>
<th>1920</th>
<th>1870 to 1880</th>
<th>1880 to 1890</th>
<th>1890 to 1900</th>
<th>1900 to 1910</th>
<th>1910 to 1920</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasco</td>
<td>1854</td>
<td>2,509</td>
<td>11,120</td>
<td>9,123</td>
<td>13,199</td>
<td>16,336</td>
<td>13,648</td>
<td>343.2</td>
<td>-17.4</td>
<td>40.7</td>
<td>23.8</td>
<td>-16.5</td>
</tr>
<tr>
<td>Grant</td>
<td>1864</td>
<td>2,251</td>
<td>4,303</td>
<td>5,080</td>
<td>5,948</td>
<td>5,607</td>
<td>5,496</td>
<td>91.2</td>
<td>18.1</td>
<td>17.1</td>
<td>-5.7</td>
<td>-2.0</td>
</tr>
<tr>
<td>Crook</td>
<td>1882</td>
<td>(191)\textsuperscript{a}</td>
<td>(1,943)\textsuperscript{a}</td>
<td>3,244</td>
<td>3,964</td>
<td>9,315</td>
<td>3,424</td>
<td>917.3</td>
<td>67.0</td>
<td>5.1</td>
<td>135.0</td>
<td>-63.2</td>
</tr>
<tr>
<td>Gilliam</td>
<td>1885</td>
<td>(195)\textsuperscript{b}</td>
<td>(2,193+)\textsuperscript{b}</td>
<td>3,600</td>
<td>3,201</td>
<td>3,701</td>
<td>3,906</td>
<td>1025.0</td>
<td>64.2</td>
<td>-11.1</td>
<td>15.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Sherman</td>
<td>1889</td>
<td>(150)\textsuperscript{a}</td>
<td>1,792</td>
<td>3,477</td>
<td>4,242</td>
<td>3,826</td>
<td>1095.0</td>
<td>94.0</td>
<td>22.0</td>
<td>-9.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheeler</td>
<td>1899</td>
<td>(104+)\textsuperscript{c}</td>
<td>(1,097)\textsuperscript{c}</td>
<td>(2,031+)\textsuperscript{d}</td>
<td>2,243</td>
<td>2,484</td>
<td>2,791</td>
<td>954.8</td>
<td>85.1</td>
<td>10.4</td>
<td>1.7</td>
<td>12.4</td>
</tr>
<tr>
<td>Hood River</td>
<td>1908</td>
<td>(109)\textsuperscript{a}</td>
<td>(947)\textsuperscript{a}</td>
<td>(1,557)\textsuperscript{a}</td>
<td>(3,485)\textsuperscript{a}</td>
<td>8,016</td>
<td>8,315</td>
<td>769.0</td>
<td>64.4</td>
<td>124.0</td>
<td>130.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Jefferson</td>
<td>1915</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,211</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deschutes</td>
<td>1916</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9,622</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Census Data

\textsuperscript{a} Wasco Precincts
\textsuperscript{b} Wasco and Umatilla Precincts
\textsuperscript{c} Grant and Wasco Precincts
\textsuperscript{d} Grant, Gilliam, and Crook Precincts
Table 10.
Irrigation in Selected Counties of North-Central Oregon, 1899-1919.

<table>
<thead>
<tr>
<th>County</th>
<th>Crook</th>
<th>Deschutes</th>
<th>Jefferson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Farms</td>
<td>1900</td>
<td>576</td>
<td>1910</td>
</tr>
<tr>
<td>Number of Farms Irrigated</td>
<td>1899</td>
<td>212</td>
<td>1909</td>
</tr>
<tr>
<td>Approximate Land Area</td>
<td>1900</td>
<td>4,977,920</td>
<td>1920</td>
</tr>
<tr>
<td>Land in Farms</td>
<td>1899</td>
<td>783,485</td>
<td>1909</td>
</tr>
<tr>
<td>Improved Land</td>
<td>1899</td>
<td>55,734</td>
<td>1909</td>
</tr>
<tr>
<td>Acreage Irrigated</td>
<td>1899</td>
<td>13,921</td>
<td>1909</td>
</tr>
<tr>
<td>Percent of Increase of Acreage Irrigated</td>
<td>1899-1909</td>
<td>301.6%</td>
<td></td>
</tr>
</tbody>
</table>

Source: U.S. Census Data
<table>
<thead>
<tr>
<th>County</th>
<th>Wasco</th>
<th>Grant</th>
<th>Crook</th>
<th>Gillian</th>
<th>Sherman</th>
<th>Wheeler</th>
<th>Jefferson</th>
<th>Deschutes</th>
<th>Hood River</th>
<th>Total</th>
<th>Decennial Percent of Increase 1900-1920</th>
<th>Percentage of Total 1900-1920</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Farms</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>1,351</td>
<td>697</td>
<td>576</td>
<td>441</td>
<td>545</td>
<td>390</td>
<td>4,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1910</td>
<td>1,331</td>
<td>773</td>
<td>1,355</td>
<td>432</td>
<td>466</td>
<td>387</td>
<td>744</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,488</td>
<td>37.2</td>
</tr>
<tr>
<td>1920</td>
<td>1,339</td>
<td>728</td>
<td>561</td>
<td>454</td>
<td>460</td>
<td>359</td>
<td>572</td>
<td>751</td>
<td>878</td>
<td>6,102</td>
<td></td>
<td>11.2</td>
<td>52.6</td>
</tr>
<tr>
<td>Land in Farms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>431,600</td>
<td>316,346</td>
<td>783,485</td>
<td>340,460</td>
<td>302,482</td>
<td>280,754</td>
<td>2,455,127</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1910</td>
<td>542,754</td>
<td>445,170</td>
<td>571,600</td>
<td>434,277</td>
<td>372,526</td>
<td>415,576</td>
<td>38,049</td>
<td>2,820,952</td>
<td></td>
<td></td>
<td></td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>728,225</td>
<td>750,160</td>
<td>554,960</td>
<td>486,941</td>
<td>408,001</td>
<td>485,178</td>
<td>140,926</td>
<td>144,979</td>
<td>38,075</td>
<td>4,037,446</td>
<td></td>
<td>43.1</td>
<td>64.4</td>
</tr>
<tr>
<td>Improved Land in Farms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>115,059</td>
<td>41,222</td>
<td>55,734</td>
<td>136,258</td>
<td>198,285</td>
<td>22,056</td>
<td>568,614</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23.2</td>
<td></td>
</tr>
<tr>
<td>1910</td>
<td>171,051</td>
<td>53,045</td>
<td>138,354</td>
<td>235,666</td>
<td>273,918</td>
<td>53,396</td>
<td>14,284</td>
<td>939,714</td>
<td></td>
<td></td>
<td></td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>213,553</td>
<td>74,729</td>
<td>93,957</td>
<td>259,002</td>
<td>284,126</td>
<td>40,104</td>
<td>132,812</td>
<td>51,744</td>
<td>19,664</td>
<td>1,169,691</td>
<td></td>
<td>245.0</td>
<td>105.7</td>
</tr>
<tr>
<td>Average Acreage Per Farm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>319.5</td>
<td>453.9</td>
<td>1,360.2</td>
<td>772.0</td>
<td>555.0</td>
<td>719.9</td>
<td>613.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1910</td>
<td>408.5</td>
<td>575.9</td>
<td>421.8</td>
<td>1,005.3</td>
<td>799.4</td>
<td>1,073.8</td>
<td>51.1</td>
<td>514.0</td>
<td>-16.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>543.9</td>
<td>1,330.4</td>
<td>989.2</td>
<td>1,072.6</td>
<td>887.0</td>
<td>1,351.5</td>
<td>770.8</td>
<td>193.0</td>
<td>43.4</td>
<td>661.7</td>
<td></td>
<td>28.7</td>
<td>7.8</td>
</tr>
<tr>
<td>Average Improved Acreage per Farm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>85.7</td>
<td>59.1</td>
<td>96.8</td>
<td>309.0</td>
<td>363.8</td>
<td>57.0</td>
<td>142.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>1910</td>
<td>128.5</td>
<td>68.6</td>
<td>102.1</td>
<td>545.5</td>
<td>587.8</td>
<td>136.0</td>
<td>19.2</td>
<td>171.2</td>
<td>20.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>159.5</td>
<td>102.6</td>
<td>167.5</td>
<td>570.5</td>
<td>617.7</td>
<td>111.7</td>
<td>232.2</td>
<td>68.9</td>
<td>22.4</td>
<td>191.7</td>
<td></td>
<td>12.0</td>
<td>34.8</td>
</tr>
<tr>
<td>Farms Operated by Owners</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>1,154</td>
<td>619</td>
<td>493</td>
<td>396</td>
<td>454</td>
<td>358</td>
<td>3,474</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>86.9</td>
<td></td>
</tr>
<tr>
<td>1910</td>
<td>1,122</td>
<td>701</td>
<td>1,267</td>
<td>324</td>
<td>275</td>
<td>348</td>
<td>4,672</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>34.5</td>
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<tr>
<td>1920</td>
<td>1,008</td>
<td>647</td>
<td>510</td>
<td>300</td>
<td>255</td>
<td>333</td>
<td>4,653</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>33.9</td>
<td>76.3</td>
</tr>
</tbody>
</table>
tried farming the marginal lands of these counties in the first decades of the twentieth century failed. For example, in 1905, 29,490 acres in Wheeler County were reported as still open to settlement. Consequently, on a ridge south of Winlock in that county, twenty homesteaders filed claims between 1910 and 1914, but within a few years most had failed and left the area (Fussner 1975).

Only where large numbers of acres were put under irrigation, as in Crook County between 1900 and 1920, was growth still possible. Crook County's population grew by 135 percent from 1900 to 1910, and most of this expansion occurred in those sections which became Jefferson (1915) and Deschutes (1916) counties. Table 10 reveals how irrigation actualized the agricultural potential of the area. The percent of increase in the number of farms and acres irrigated in the original area of Crook County from 1899 to 1919 was as follows:

<table>
<thead>
<tr>
<th>Years</th>
<th>Farms</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1899-1909</td>
<td>157.5</td>
<td>301.6</td>
</tr>
<tr>
<td>1909-1919</td>
<td>65.5</td>
<td>84.8</td>
</tr>
</tbody>
</table>

The Carey Act accounted for 44 percent of the acreage under irrigation in 1909, the only year for which such figures are available (U.S. Census Bureau 1916).

The founding of the towns of Bend (1903) and Redmond (1905) in the heart of the irrigated lands reflected the rapid influx of settlers seeking land from developers operating under the Carey Act. The Pilot Butte Development Company, later called the Deschutes Irrigation and Power Company, was the chief developer of the Bend area irrigation segregations while the Central Oregon Irrigation Company promoted reclamation in the Redmond area (Brogan 1964).

For the period after 1900, Table 11 shows the general growth in the agricultural sector of the counties in north-central Oregon. The number of farms increased by 52.6 percent from 1900 to 1920 while the amount of land in farms grew by 64.4 percent during the same time frame. While there was little overall change in the average amount of acreage per farm (7.8 percent increase) over the twenty year period, the quantity of improved acreage per farm increased a more dramatic 34.8 percent. The greater usage of land per farm undoubtedly reflected the effects of irrigation and mechanization on portions of the agricultural land of the region. On the negative side, the census statistics reveal that tenancy was increasing over the twenty year span. The percentage of all farms operated by owners in the district decreased from 86.9 in 1900 to 76.3 in 1920.
The settlement and growth of north-central Oregon over a sixty year period (1860-1920) thus reflected the primary activities of grazing and farming. The former occupation dominated the region before 1880 and the latter assumed increasing importance thereafter as the open range shrank before the onslaught of plow and barbed wire. The demands of a sedentary agricultural population for business, professional, educational, and cultural services led to the founding and growth of towns throughout a region that seemed to have such a bright future before it. Settlers established post offices and towns at a feverish pace between 1880 and 1890 and again after 1900. During these periods, the expansion of railroads and the spread of homesteaders into the hinterlands altered the fortunes of various trading centers throughout the region. The appearance and disappearance of post offices and town sites between 1900 and 1920 graphically revealed the possibilities and limits of the agricultural nature of the region:

Table 12.
Growth and Decline in Number of Towns and Post Offices in North-Central Oregon, 1850-1920

<table>
<thead>
<tr>
<th>Years</th>
<th>Towns and Post Offices Created</th>
<th>Towns and Post Offices Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1850-69</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>1870-79</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>1880-89</td>
<td>54</td>
<td>18</td>
</tr>
<tr>
<td>1890-99</td>
<td>33</td>
<td>17</td>
</tr>
<tr>
<td>1900-20</td>
<td>54</td>
<td>50</td>
</tr>
</tbody>
</table>

MINING AND LUMBERING

Although few productive mines—except those at Canyon City and its vicinity—existed in north-central Oregon, mining activity did play a major role in the development of the region. As has been shown, the discovery of gold at Canyon Creek on June 8, 1962, attracted thousands to the area in the hope of instant riches. Even though most would not
Figure 30. Harvesting wheat near Madras, Oregon. Note that both horse-drawn and steam-powered machines are being used. Photograph courtesy of the Oregon Collection of the University of Oregon Library.

Figure 31. Steam tractor with thresher and crew harvesting wheat near Madras, Oregon in the early twentieth century. Photograph courtesy of the Oregon Collection of the University of Oregon Library.
Figure 32. Two wagons with five people enroute to mines at Granite, Oregon in 1869. Photograph courtesy of the Oregon Collection of the University of Oregon Library.

Figure 33. Discovery shaft of the Great Northern gold mine near Canyon City. Owner Isaac Gukerman, standing in entrance to shaft, extracted $40,000 in gold within a 40-day period from this mine in 1897. Photograph courtesy of the Oregon Collection of the University
strike it rich and would soon move on, many stayed, recognizing the potential for a living in agricultural and grazing pursuits. The heaviest mining activity in the Canyon City District occurred between 1862 and 1867, and approximately $26,000,000 in gold eventually was recovered in placer operations there. Mining continued as a significant occupation in Grant County throughout the late nineteenth and early twentieth centuries (Potter 1976, Oliver 1961, Brooks and Ramp 1968).

Gold was found over much of the John Day River Valley in the 1860s. Two particularly rich strikes in the valley included the Prairie Diggins, three miles east of John Day, and Marysville, on Little Pine Creek between John Day and Prairie City. Another valuable find was the Quartzburg District on Dixie Creek a short distance north of Prairie City. Other strikes occurred on the periphery of the study area in Grant County at Susanville, Granite, and the Greenhorn District (Potter 1976, Brooks and Ramp 1968).

Most of the early mining in Grant County was surface or placer mining. After white miners had skimmed the best surface deposits in the area, hundreds of Chinese came in and reworked them during the 1870s and 1880s. Only when the easy pickings were gone did the white miners turn their attention to underground or quartz mining, but lack of proper equipment, poor transportation, and inadequate financing hampered their efforts. The first quartz mill was set up in 1869 at Susanville on Elk Creek but was not very successful. Improved technology, the coming of the railroads, and outside investment made possible the successful exploitation of the rich underground veins in the 1890s. Harcrock mining in eastern Oregon boomed until 1907 when over-speculation and the financial panic of that year led to the failure of many mining companies and a costly slowdown of others. Gold production in Grant County was cut almost 50 percent from 1908 to 1916 (Potter 1976, Brooks and Ramp 1968, Anonymous 1902).

Mechanical dredging in the bed of the John Day River in 1916 proved highly successful, producing substantial amounts of gold until the government effectively abolished gold mining in 1942 as a wartime measure. Between 1916 and 1942, the output from dredging near John Day and Prairie City consisted of 146,411 ounces of gold and 13,066 ounces of silver, worth about $5,000,000. The increase in the price of gold in 1934 also stimulated renewed activity in quartz mining. However, gold production in eastern Oregon in general and Grant County in particular never recovered from the wartime closure of mines. The high startup costs involved in rehabilitating closed mines, inflation, and strict environmental laws have hampered the resumption of large-scale mining in the post-World War II era. But, the recent rise in the price of gold has led to renewed interest and some limited mining in the area in recent years (Brooks and Ramp 1968, Potter 1976).
Exact gold production figures are impossible to establish before 1880, when the federal government began keeping detailed records. The richest placers and heaviest production came in the 1860s, and one estimate for eastern Oregon from 1861 to 1900 credits the region with producing $13,378,376 worth of gold between 1880 and 1965, after the best placers had been exhausted. No one will ever know how much the Chinese miners gleaned from the area (Brooks and Ramp 1965).

A number of small mining districts exist in isolated areas of north-central Oregon. The most important of these include the Ashwood District in eastern Jefferson County and the Spanish Gulch District in southeastern Wheeler County. None of these has been a heavy producer.

The Ashwood District contains the town of Ashwood, twenty-six miles east of Madras, and lies in rugged, rolling hills. The chief mine of this district is the Oregon King silver mine, discovered in 1898 by some sheepherders. Production began in 1899 and has continued intermittently to the present. Between 1899 and 1950, $233,693 in silver was recovered (Brogan 1964, Brooks and Ramp 1968).

Gold was discovered in the Spanish Gulch District just east of Antone in Wheeler County in the early 1860s. The gold was recovered chiefly through placer mining and records of output are scarce. The Rosa D and the Red Jacket Mines were two of the claims in the district (Fussner 1975, Brooks and Ramp 1968).

Oregon is one of only ten states known to have produced quicksilver, and several of these mines are located within the study area. The Horse Heaven Mine in northeastern Jefferson County, discovered in 1933, was the second largest mercury producer in Oregon. This mine yielded 17,214 flasks before being exhausted in 1958. Several other quicksilver prospects in the Horse Heaven District produced another 150 flasks from the 1930s to 1963. Other quicksilver claims include the Marks Creek area south of Mitchell in Wheeler County and the Gray Butte Prospect in Jefferson County (Brooks 1963).

The potential for a lumbering industry in central and eastern Oregon was promising, for tracts of fine timber existed in the heavily forested mountainous terrain that covered portions of the region. The main difficulty in exploiting this resource lay in transporting the logs to mills and the finished lumber to markets. Early settlers had need of lumber for permanent housing and outbuildings, and so it was natural that small mills would spring up to supply this basic demand. Most of these sawmills were primitive operations, established close to a source of supply and operated by water or steam power.
Mining activities in the John Day Valley created an immediate need for lumber and a sawmill was erected on Big Pine Creek within a few months after the first miners descended on the area in 1862. The carpenters building the army fort at The Dalles set up one of the first sawmills in Wasco County in the 1850s. Central Oregon had its initial sawmill on Willow Creek by 1877. The first sawmill operated in Gilliam County was built on Lone Rock Creek in 1874 and powered by a water wheel. This mill was said to have furnished the lumber for all of the pioneer buildings in Gilliam County that were constructed of sawed timber. Early sawmills turned out finished lumber in Wheeler County near Antone, Winlock, and Wetmore (Shaver 1905, Anonymous 1902, Brogan 1964).

The impetus for developing the timber resources of the region came from the arrival of the railroad. While the mainline provided access to distant markets, branchlines—either subsidiaries of the transcontinentals or as small independents—provided the means for moving the raw logs to the mills. For instance, the Sumpter Valley Railroad, a narrow gauge, built east from Baker in 1893. It arrived in Sumpter by 1897 and eventually reached Prairie City in 1909. This line was owned by the Oregon Lumber Company and was designed primarily as a logging road; it tapped the timber resources on the periphery of the Northern Prineville District lands in Grant County. The Oregon Lumber Company also owned the Mt. Hood Railroad which reached into the timber lands at the base of Mount Hood. Also during the first decade of the twentieth century, the Great Southern line pushed south from The Dalles, partly to exploit the timber of the area around Mount Hood (Ferrell 1967, Culp 1972).

The Kinzua Corporation began lumber operations in Wheeler County in 1909 and in the 1920s built a company town and a rail line to connect their mill with the Union Pacific branch at Condon in Gilliam County. The Union Pacific extended its line to Burns in 1824 and the Edward Hines Lumber Company built a logging line from that town to Seneca (Fussner 1975, Oliver 1961, Culp 1972).

The sixteen billion board feet of prime pine in the vicinity of Bend lured the railroad builders, James J. Hill and Edward H. Harriman, to push their lines down the Deschutes River and deep into central Oregon in 1911. The Pilot Butte Development Company had built the first commercial sawmill in Bend in 1901. In time, after the railroads arrived, other small mills located on the fringes of the great pine forests near Madras, Sisters, and Redmond (Brogan 1964, Juris and Due 1968, Wilson and Scott 1974).

As interest increased in the valuable stands of timber in north-central Oregon after 1900, eastern lumbermen brought in trainloads of "entrymen" to file on 160-acre claims at $2.50 an acre under the Timber
and Stone Act of 1878. Applicants for the timberland had to swear that they would not transfer title to their claims, but this stipulation was widely ignored and the timber companies acquired huge tracts of virgin timber in this manner. The timber rush ended in 1905 when timber was withdrawn from entry and placed in forest reserves under the management of the United States Department of Agriculture (Brogan 1964, Puter 1908, Gates 1968).

Finally, in 1915 two major midwestern firms, Shevlin-Hixon and Brooks-Scanlon, built giant mills in Bend and began the major timber harvest of the region. In thirty-five years of logging in the Deschutes area, the two mills harvested almost ten billion board feet of timber. Many smaller, independent mills operated in central Oregon as well (Brogan 1964, Juris and Due 1968).

In the eastern reaches of the study area and on its edges, such major timber companies as the Kinzua Corporation (Wheeler County), Oregon Lumber Company (Grant and Baker counties), and the Edward Hines Lumber Company (Grant County) established mills, built railroads, and sometimes erected company towns. A number of smaller mills operated in this region, too. While the Blue Mountain area was slow to develop because of long hauls to market and a more mixed timber inventory than Deschutes County, it surpassed Deschutes in production following World War II. In 1970, Grant County became the third largest timber producer in eastern Oregon with a harvest of 251,000,000 board feet out of a total of 1,908,947 for the entire region. East of the Cascades, only Klamath and Lake counties surpassed Grant in timber production (Wall 1972, Oliver 1961).

RECREATION

In the past thirty years, many parts of north-central Oregon have become a mecca for tourists and those seeking recreation. Increased mobility for the masses, through relatively cheap transportation and an improved road system, coupled with increased leisure time, has encouraged thousands to enjoy the recreational opportunities of the region. Camping, rafting, fishing, hunting, and water-related sports in the many multi-purpose reservoirs all lured travelers to visit and relax in the area.

For those interested in amateur geology, the region offered special attractions. The Bureau of Land Management itself provides maps and recreation guides to such areas as the John Day Fossil Beds National Monument, the Painted Hills, Clarno, and Picture Gorge. The Oregon Museum of Science and Industry operates Camp Hancock, a summer camp for high school students interested in fossil hunting, field archaeology, and geology. The camp is located near the town of Fossil. The Oregon
Department of Geology and Mineral Industries also has published readily available pamphlets on the geology and minerals of the region.

The fascinating and unique lava caves of the Bend area are yet another geological tourist attraction. The state has created the Lava River Caves State Park to protect and exhibit this attraction. The writings of Phil Brogan have done much to publicize the scenic geology of the region (Brogan 1964).

For the more affluent, dude ranches and resorts have proliferated in the Bend area. Perhaps the major recreation attraction of this area is skiing, which started at Bachelor Butte in 1958. Each winter thousands flock to Bend and its vicinity, enjoying winter sports activities.

Finally, a part of the region's history can be traced by the casual tourist from visiting one of the many "ghost towns" of the inland country. Antelope, Shaniko, Ashwood, Richmond, and Lonerock are but a few of the many sites--each with its own interesting story about the range, mining, and homesteading years of the region.
CHAPTER V

CULTURAL RESOURCE SYNTHESIS

North-central Oregon consists primarily of private lands interspersed with a scattering of lands administered by the Bureau of Land Management. The Bureau lands addressed here are located for the most part close to the Deschutes and John Day water courses and sometimes border on National Forest Service lands which form the boundaries of much of the study area. The study area includes the northern portions of the Prineville and Burns districts which fall within the Columbia Plateau region.

Paleoecological studies indicate that there was a climatic change over much of western North America with the post-Pleistocene glacial recession. The climate began a trend from a moist, cool climate to warmer and dryer conditions after 8-10,000 years ago. The vegetation adjusted from the lush meadows of a moister environment to the less rich grasslands of a more arid and hotter climate. Many animal species, including large browsers and grazers such as bison, camels, and horses, were unable to survive and became extinct. Subsequent climatic fluctuations were not as major, but these later changes also affected the distribution of plant and animal species.

Archaeological evidence indicates that eastern Oregon has been occupied by humans for at least 12,000 years. During this time, people have had to adjust to climatic changes, shifts in vegetation and game, and geologic occurrences such as volcanic activity. It is obvious that environmental factors have had a definite influence on the patterns of human use in the area, both past and present.

The primary inhabitants of north-central Oregon during ethnographic times were the Tenino who occupied the central portion of the study area along the lower Deschutes and John Day rivers south of the Columbia. The Wasco claimed a small portion of territory in the northwestern corner of north-central Oregon, and the Umatilla extended along the eastern fringe of the Upper Prineville District and south into the Upper Burns District. The Northern Paiute, who occupied the southern reaches of the study area, frequently exchanged raids with the more northern groups. Other neighbors with whom the Tenino interacted were the Molala, Cayuse, Nez Perce, and Klamath-Mojave during the latter's excursions into north-central Oregon for trading purposes.

Generally speaking, little is known of these groups because they were rapidly decimated due to factors such as disease, wars, and famine which resulted from contact with the Euro-Americans. The available ethnographic information indicates that the Columbia River and Northern Paiute groups, who occupied the study area, shared many basic cultural traits in common. Both followed a semi-sedentary subsistence pattern. Settlements
tended to be seasonal, with groups generally returning repeatedly to the same village sites and camping spots. Food resources were utilized on a seasonal basis whenever and wherever they occurred. Both groups hunted game animals, fished, gathered roots, seeds and berries, and stored dried food for the winter. Due to environmental differences, the Northern Paiute emphasized hunting and seed gathering, while the Columbia River groups relied more on fishing and root gathering.

Neither group had a well-developed sociopolitical organization. The Paiute were much more flexible and loosely organized, however, than the Columbia River folk. Group territory boundaries were indistinct, and many subsistence areas within the study area were shared to some extent by Paiute, Tenino, Umatilla, Wasco, Cayuse and/or Nez Perce. Peaceable relations and extensive trading permeated the Columbia Plateau, but the Northern Paiute had little to trade and engaged in frequent raids against the Plateau people, who raided the Paiute in return.

The emphasis on raiding which was exhibited by both sides seems to have been a result of contact with Euro-Americans and the acquisition of the horse and gun. Other traits, such as the taking of slaves, the development of a more centralized political organization among the Columbia River groups, and increased trading activities, are also apparently outgrowths of the contact era and do not reflect the pre-contact lifeways.

The native populations of north-central Oregon, when seen without their veneer of post-contract traits, represent the local cultural traditions which have characterized the area for centuries and possibly millennia. The human use patterns documented in historic times therefore provide a basis for interpreting the prehistory of the study area.

Archaeological excavations in north-central Oregon have revealed a record of prehistoric occupation spanning the last 10,000 to 12,000 years. The early cultures of the Columbia Plateau, as yet only poorly known, appear to have followed a way of life similar to that in other regions of the intermontane west, as evidenced in the widespread and relatively uniform artifact assemblages of the Fluted Point Horizon and the San Dieguito-Windust-Milliken Horizon.

After about 8,000 years ago, however, the archaeological record in the intermontane west becomes more complex, as the prehistoric inhabitants began to follow lifeways more closely dependent on the exploitation of the natural resources available in each region. On the Columbia Plateau, the prehistoric peoples developed a way of life closely geared to exploiting the resources of the Columbia River and its tributary streams. The archaeological evidence suggests that cultural development on the Columbia
Plateau progressed from a generalized hunting-gathering-fishing tradition followed by small nomadic bands, to the semi-sedentary culture dependent on abundant anadromous fish resources which was followed in ethnographic times.

In the historic period, the lands of north-central Oregon have reflected a rich variety of human activity which includes many of the central themes of the history of the American West. Fur trappers, explorers, overland emigrants, soldiers, cattlemen, sheepmen, miners, homesteaders, townsmen, and lumbermen have all left their mark on the area.

Although north-central Oregon was well-traveled by explorers, trappers and emigrants beginning in the early 1800s, extensive settlement and development of the region was delayed by a number of factors until the 1870s. Prior to that time, the forbidding topography, harsh climate, hostile Indians, and remoteness from centers of population discouraged settlement. As long as fertile, well-watered lands were available in western Oregon, few pioneers would brave the hazards of Indian attacks, rough terrain, limited rainfall, and lonely isolation to permanently live in the region. By 1850 only one permanent settlement, a Methodist mission at The Dalles, existed in the region.

The initial thrust of white settlers into the study area resulted from the discovery of gold in the region in 1862, but the subsequent settlement and growth of north-central Oregon between 1860-1920 reflected the primary activities of grazing and farming. Cattle grazing dominated the region before 1880, but increasing competition with sheep raising and farming brought an end to this enterprise as the open range shrank before the onslaught of plow and barbed wire. The demands of a sedentary agricultural population for business, professional, educational and cultural services led to the founding and growth of towns throughout the region. Settlers established post offices and towns at a feverish pace between 1880 and 1890 and again after 1900. During these periods, the expansion of railroads and the spread of homesteaders into the hinterlands altered the fortunes of various trading centers throughout the region.

During the past thirty years, many parts of north-central Oregon have become a mecca for tourists and those seeking recreation. Camping, rafting, fishing, hunting, and water-related sports in the many multipurpose reservoirs have lured travelers to visit and relax in the area. In addition, numerous geologic formations, ghost towns, dude ranches and ski resorts are among the many attractions of the region which are enjoyed by thousands every year.
CHAPTER VI

RECOMMENDATIONS FOR THE DEVELOPMENT OF A CULTURAL RESOURCE MANAGEMENT PROGRAM FOR BLM LANDS IN NORTH-CENTRAL OREGON

All federal agencies are required by federal law to inventory, protect, and enhance resources of historical and archaeological significance on lands under their management. The rationale for these specific protective laws is that cultural resources are non-renewable in that once they are destroyed, the information pertaining to particular historic or prehistoric structures, sites, districts, or objects is lost forever. Due to the non-renewable nature of cultural resources, the federal government has passed legislation directed toward protecting and exploiting these resources to the maximum public interest. The Bureau of Land Management, like other federal agencies, is directed by federal law as follows:

(1) Executive Order 11593 of May 13, 1971, directs federal agencies to survey their lands and nominate to the National Register of Historic Places significant historic and archaeological sites on federal properties. The Federal Land Policy and Management Act of 1976 further requires that the Bureau of Land Management be responsible for preparing and maintaining "on a continuous basis an inventory of all public lands and their resource and other values" (including cultural resources). Both laws require that a systematic inventory of federal lands be made in order to locate, protect, and enhance significant cultural resources.

(2) Several recent laws, including the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969, require federal agencies to consider the impact of their proposed activities on cultural resources and to refrain from damaging or destroying significant historic or archaeological resources on their lands. This legislation also applies to the impact of federally-funded programs on cultural resources situated on non-federally owned lands.

To date, the BLM districts of north-central Oregon have made readily discernible progress toward compliance with federal policies regarding cultural resources. Although the Upper Prineville District has only recently hired a professional archaeologist to serve as a full-time Cultural Resources Specialist, two extensive reconnaissance surveys have been conducted for the purpose of inventorying cultural resources on portions of the BLM lands. The Upper Burns District, on the other hand, has employed such a specialist for some time in the past, but as yet has not initiated any major inventory projects within the John Day Planning Unit.
The importance of cultural resource management within this particular study area cannot be overemphasized. Less than 9% of the total area within the study area boundaries is under the protection and jurisdiction of the Bureau of Land Management. The lands which are protected and managed by the BLM are, however, those lands which were most heavily occupied during aboriginal and historic times (i.e., along the major water courses) and hence, contain the greatest potential for shedding light upon the lifeways of the previous inhabitants. In this respect, the Prineville and Burns districts face a considerable challenge in the immediate protection of the cultural resources to be found on their lands. Because the BLM is responsible for the most precious storehouse of cultural resource information in all of north-central Oregon, steps should be taken to preserve, enhance, and share these resources with the public.

The remainder of this report presents some recommendations for improving the cultural resource management program for north-central Oregon BLM lands. The recommendations discussed in detail in the following pages are summarized briefly as follows:

(1) A methodical multi-stage program of study must be followed to improve the cultural resource data base required for administrative planning purposes.

(2) Assessment of cultural resource significance should continue to follow the standardized policy established by the Bureau of Land Management for that purpose.

(3) Studies should be made of the various kinds of impacts affecting archaeological and historical sites in order to obtain information on the range and effects of such impacts and measures which may effectively mitigate them.

(4) A long-range program for the management of cultural resources must be instituted by each BLM district.

(5) Active attempts should be made to publicize both the results of BLM-sponsored cultural resource research and the management responsibilities of the Bureau concerning cultural resources so that such resources may be better appreciated and understood by the general public.

Recommendations for the management of specific archaeological and historic sites in the study area are presented in the companion inventory volume accompanying this Cultural Resource Overview.
Recommendation 1: A methodical multi-stage program of study must be initiated to improve the cultural resource data base required for administrative planning purposes.

As described in previous sections of this overview and in the accompanying inventory volume, archaeological and historic sites now known to exist in north-central Oregon occur in several characteristic geographical locations. Due to the highly unsystematic manner in which the existing site inventory has been amass, however, it is not known whether the types of locations so far identified as high probability areas are in fact the only ones in which sites occur. A more adequate resource inventory, based on a larger and much better-controlled sample of sites, is essential to establish a reliable means of predicting site locations.

1A. In order to accomplish this objective, it will be necessary to establish a program of cultural resource survey incorporating the following two levels:

(1) Clearance of specific ground-disturbing projects. These surveys will be of the most immediate concern to the Bureau of Land Management, but will make only limited contributions to developing the known cultural resource inventory.

(2) Large scale, systematic surveys on remaining Bureau of Land Management lands. Due to the relatively small amount of land held by the two districts in this study area (500 square miles in the Prineville District of which at least 10% has already been surveyed; 300 square miles in the Upper Burns District) and the high potential for damage to cultural resources on these lands due to their accessibility to the public, it is recommended that complete surveys of these lands be undertaken immediately in fulfillment of federal requirements and for the protection of the cultural resources.

1B. The Bureau of Land Management should continue to use a standardized system for inventorying the cultural resources encountered in north-central Oregon.

A standardized and detailed inventory system for recording cultural resources is essential for administrative planning purposes. The form provided by the Bureau of Land Management is adequate for recording information on historic and archaeological sites. Additional information on the recording of archaeological sites can be found in Hester et al (1975:22-30).
In addition to keeping adequate survey records, it is extremely important to maintain an accurate and current map record of all areas examined for cultural resources within north-central Oregon, whether or not any sites were actually found. Information as to where sites do not exist is as important as where they have been found, and both kinds of information can be useful in reconstructing aboriginal settlement patterns and in predicting the likely occurrence of sites. Notes on the intensity of the actual ground search, nature of the vegetation cover, soil types, nature of the terrain, and other conditions relating to the quality of coverage should be maintained with the map record. Such a cultural resources survey form is already in use by the Bureau of Land Management (Form OSO-6230-1), but it must be stressed that these forms must be filled out accurately and completely in order to serve their intended purpose.

In general, the collection of artifacts should not be a part of the inventorying process. The presence of cultural debris should be described in the site records, but artifacts should not be moved from their observed location within a site. The surface distribution of artifacts at a site contains important information on activity patterns carried on in the area; to the extent that the artifact distribution is disturbed, information is irretrievably lost. It is possible to gain information for planning purposes without making artifact collections (Lipe 1974:226). To the maximum extent possible, sites should be located, protected, and left undisturbed. The only rationale for artifact collecting is for scientific research purposes or for mitigation of unpreventable impacts. Any collection of artifacts, for whatever purpose, should be systematic, controlled, and carefully carried out by professional archaeologists.

Following established practice, copies of all site record and cultural resource survey forms should be filed both on the BLM district level and with the State Historic Preservation Office in Salem. In addition, archaeological site record forms should be sent to the Oregon State Museum of Anthropology, University of Oregon, Eugene.

1C. Reports of large-scale cultural resource survey projects, and also the results of any archaeological salvage fieldwork undertaken in north-central Oregon should be distributed in a technical publication.

North-central Oregon contains cultural resources—especially archaeological sites—which are of more than merely local importance. They have produced information on past lifeways which is relevant to the studies of archaeologists, ethnographers, and historians (among others) located all over North America. The results of fieldwork involving cultural resources in this area should be made available to any interested member of the academic community. Probably the most efficient means of accomplishing this objective is to establish a technical series for distributing these reports. The Nevada Bureau of Land Management has recently initiated a series called "Contributions to the Study of Cultural Resources" which
might serve as a model for the efficient, low-cost reproduction of cultural resource reports.

Because most such reports contain specific data on the location of cultural resources, popular circulation of this information would unnecessarily expose the resources to vandalism. Some other means should therefore be used to convey important new information on cultural resources to the general public.

**Recommendation 2:** Assessment of the significance of cultural resources on the BLM lands within north-central Oregon should continue to follow the standardized policy which has been established within the Bureau of Land Management for that purpose.

The significance of cultural resources must be assessed properly so that management decisions for the protection and enhancement of such resources, as required by federal law, may be made accordingly. The management procedures for various sites will of course vary with the significance of each site. Therefore, it is extremely important to establish and follow standardized criteria and procedures for determining the significance of cultural resources.

The significance of cultural resources may be evaluated from two perspectives—"scientific" importance and "community" importance. The scientific significance of cultural resources concerns the amount and kind of scientific information that they may contain. Community significance, on the other hand, relates to the status of a specific resource in terms of its meaning to the community in which it exists. A cultural resource may have both significant scientific and community values, or it may have little scientific importance while at the same time be of considerable community significance—for example, if it is related to an important person or local event (King and Hickman 1973:15).

Guidelines for assessing both community and scientific importance of cultural resources are presently in existence within the BLM administrative framework. The community importance of cultural resources is rated by the Bureau of Land Management partly in terms of sightseeing potential. The description and assignment of the significance of sites on this basis may be found in the recreation information section (RIS) of URA-3. Evaluation of sites according to this system is useful and should be continued, but additional perspectives on significance must also be assessed in evaluating cultural resources.

Procedures for evaluating cultural resources in terms of the actual or potential way in which individual cultural resource sites or properties
may be used have been recently set forth in the Cultural Resource Evaluation Guidelines proposed for incorporation into BLM Manual Section 8111 regarding cultural resource inventory and evaluation. The proposed guidelines view the evaluation of cultural resources in the following terms:

(1) sociocultural use, both in regard to present-day Native Americans and non-Indian community significance;

(2) current scientific or research use;

(3) the identification of various impacts on cultural resources and the effectiveness of specific protection measures in maintaining the integrity of cultural resources;

(4) the need for preserving specific resources as determined by future research and management needs (see Aikens 1976);

(5) the potential of each cultural resource for scientific or research use; and

(6) the extent to which specific cultural resources fulfill current data needs.

Although the proposed guidelines set management needs apart from "sociocultural and scientific values" (I111F), in our opinion the two can only be viewed as mutually reinforcing, as the pursuit of one necessarily contributes to a better understanding of the other.

It must be stressed here that cultural resource evaluations can be most accurately made only by a cultural resources professional who has had extensive training and experience in assessing historical and archaeological sites. Inaccurate or misguided evaluations will impede the implementation of proper management measures for cultural resources, and can only result in problems (e.g., project delays, potential lawsuits) for the BLM if cultural resources are improperly managed. Consequently, it is in the best interest of the Bureau to ensure that cultural resources will be assessed only by a qualified professional.
Recommendation 3: Studies of the various kinds of impacts affecting archaeological and historical sites should be made in order to obtain information to be considered in decisions regarding the short-term management of cultural resources.

In order to make proper management decisions regarding cultural resources, the Bureau of Land Management must be aware of the following:

(1) various activities or forces which may alter the integrity of a site;

(2) the effects of such impacts; and

(3) measures which may effectively mitigate the various impacts.

Until recently, little attention has been focused on the assessment of impacts affecting the cultural resource data base. To date, no such experimental research has been undertaken by the BLM in Oregon.

3A. The resource management studies by Chance (1968) and Aikens (1976), based on cursory field observations, indicate the kinds of impacts which may be expected within the study area, and the measures which may be taken to protect cultural resources from these impacts. Three major classes of potential impacts are discussed briefly below.

The first type of impact is the result of natural processes, such as wind and water erosion. Due to the open and exposed nature of cultural resource sites in eastern Oregon, many have been affected in this way.

The second kind of impact includes the effects of all projects which alter the surface of the land to any extent. Ground-disturbing projects which may destroy cultural resources are of several types: pipeline and powerline construction, recreational development, chaining, fence construction, road construction, plowing, spring development, and reservoir construction. Since much archaeological information can be gathered from the patterning of cultural debris on the surface as well as within the ground, disturbance of even only the surface of a site results in a loss of information. This is especially the case with the many surface sites found in eastern Oregon.

The third type of impact is created by the activity of private individuals on Bureau-managed lands. Vandalism of sites by individuals who surface collect and excavate for artifacts in violation of the Federal Antiquities Act of 1906 presents the greatest danger to cultural resource sites in eastern Oregon. Unfortunately, these individuals may include some BLM personnel as well as members of the general public. The Bureau is thus faced with a dual problem of convincing its own employees, as well as the public it is intended to serve, to cease their destructive activities.
3B. There is no question that the cultural resources of north-central Oregon are subject to the various kinds of impacts mentioned above. As part of its regular cultural resource management program, the BLM in many cases is already attempting to mitigate the impact of the natural, and especially the project-related, impacts. It is sufficient here simply to stress that a site must not be automatically written off as lost if a portion of it is disturbed in some way; such a decision must be left to the judgment of a qualified archaeologist. Also, since not all sites are visible from the surface, it is recommended that a professional archaeologist be on hand during project operations if sub-surface disturbance of the area is involved. Specific mitigation procedures for project disturbances are discussed by Chance (1968), Lipe (1974), and Aikens (1976).

Short-term solutions to the vandalism of cultural resources on Bureau lands may include posting signs warning people of the illegal nature of artifact collecting on Federal lands, surveillance by knowledgeable BLM employees, backfilling and seeding of sites excavated by amateurs, and prosecution of violators under the law. In the latter respect, note should be made of recent court decisions upholding the prosecution of relic collectors in both theHellis Canyon and Medford areas of Oregon for theft and destruction of government property.

Any negative feelings among the general public resulting from increased attempts to stop relic collecting on government land can be made up by positive public relations as proposed in Recommendation 5 below. Unless serious efforts are made to stop the activities of relic collectors, a situation may develop in which Federal agencies devote great effort and expense to protect cultural resources from the effects of their own potentially destructive activities, only to lose them to looters.

3C. Since cultural resources are known to be frequently altered, and sometimes totally destroyed, as a result of the impacts described above, it is strongly recommended that the BLM develop a standing capability to conduct emergency operations to salvage information from archaeological and historical sites threatened with destruction. In theory, the salvage of cultural resources should be viewed as a last resort to be implemented only when all other attempts to mitigate impacts upon them have been exhausted. Realistically, however, it is simply impossible to avoid damage to cultural resources in every situation. This is especially the case in regard to the looting of archaeological sites by members of the general public.

As a result of this situation, it is strongly recommended that the BLM districts create a reserve fund on a year-by-year basis which can be used in support of salvage operations. This fund would be used to contract with universities or professional research firms to conduct
fieldwork at threatened sites on an emergency short-term basis. The salvage of threatened sites cannot wait several months or even years for funds to be allocated for this purpose through normal government procedures. The need for such a fund is underscored by the fact that a number of cultural resource sites where salvage operations should be conducted are already known to exist, as indicated in the inventory volume accompanying this cultural resource overview.

Recommendation 4: A program for the long-range management of cultural resources must be instituted by each BLM district.

In addition to the short-term studies and mitigation measures mentioned in Recommendation 3, the BLM must consider preserving a part of its cultural resource data base for future use, in keeping with federal mandates to protect and enhance significant cultural resources for the purpose of public benefit. Since the public will reap more benefits from future research conducted on carefully preserved sites than from the destruction of these sites, a long-range program for selected site preservation is mandatory. (Some means for furthering the public benefit of cultural resource research studies are addressed in Recommendation 5).

4A. As noted in Recommendation 2, management and research needs are interdependent, as each enhances the other. Consequently, one of the best means for assessing site significance and the need to preserve specific cultural resources, particularly archaeological sites, is by evaluating the future scientific importance of each cultural resource.

There are two criteria which should be used in determining which cultural resources should be preserved for future study. First, an adequate representative sample of different site types must be preserved. The variety of site types as well as the number of each type recorded within north-central Oregon must be known in order to determine the abundance or uniqueness of various types of sites.

The second criterion for assessing which cultural resources should be preserved for future study is the analytic potential of each individual site. Some sites contain more information than others, due to their antiquity, depth of cultural deposit, degree of preservation, richness of content, and the like.

4B. A formal means for "banking" significant cultural resources has been provided to state and federal agencies in the form of the National Register of Historic Places. It is recommended that all sites deemed worthy of preservation according to the above two criteria of representativeness and analytic potential be nominated to the National Register.
Given the overall significance of the cultural resources—especially the archaeological sites—in north-central Oregon, the BLM should place a much greater emphasis on nominating sites to the National Register than has been displayed in the past. Within the next decade, it is expected that a large number of sites should be nominated to the Register within the study area.

Because of the legal provisions related to the protection of sites on the National Register, nomination of sites to the National Register of Historic Places is one of the best means of assuring worthy sites top management priority for protection and enhancement. Nomination to the Register is also a way of making available additional funds for future research purposes. Guidelines for identifying appropriate sites can be found in a memorandum distributed by the Keeper of the National Register [see Aikens 1976] and is further addressed in the companion inventory volume (Toepel and Willingham 1979, Appendix B).

**Recommendation 5:** In an effort to communicate the importance of cultural resources, active attempts should be made to publicize both the results of BLM-sponsored cultural resource research and the management responsibilities of the Bureau concerning cultural resources so that such resources may be better appreciated and understood by the general public.

Although the importance of cultural resources and their management has long been recognized by archaeologists, historians, legislators in Washington, D.C., and a few other interested parties, very little has been done to demonstrate the import and relevance of cultural resources to the citizenry. It is strongly recommended that the following steps be taken by the BLM to share with the public some of the more significant resources which are located within the study area. It is only by actively encouraging an appreciation and understanding of the use and long-term significance of cultural sites and materials that the Bureau will gain public cooperation in the management and protection of cultural resources.

5A. Special attention should be given to those members of the public residing within north-central Oregon. It is apparently commonly felt in the area that cultural resource specialists, particularly archaeologists, reap the research benefits of the region's resources, offering little in return. In order to rectify this situation and to help make people aware that cultural resources in their immediate vicinity are important and are worth protection or mitigation, the following courses of action should be considered:

(1) Archaeological and/or historical interpretative displays. Such displays would ideally concern cultural resources in the immediate
area of the communities in which they were placed and could be developed for placement in local community centers, town or city halls, schools, and museums.

(2) Publications on archaeological and/or historical resources in the region which would be of interest to the public. These publications could take the form of pamphlets or books and could cover a wide range of information stressing the significance of the resources and the BLM's responsibility in protecting and managing these resources. The publication of this overview in some form for widespread distribution is one such possibility. Contracting firms, whether university or private, could be required to produce a short report or essay suitable for the public. The BLM could then issue periodical collections of these essays to be made available for sale at local outlets, including museums and city halls, as well as at the BLM offices.

5B. Members of the public who do not reside within the study area but who may travel and spend time within the district should also be a concern of the BLM as they have an impact upon cultural resources in the region. The means are the same as those mentioned in 5A above. The only difference to be noted is that displays, pamphlets, and publications should be placed in areas frequented by travelers such as information centers, city halls, and museums.

In order to reach people state-wide, the Bureau should consider a BLM-sponsored pamphlet illustrating "Archaeology in Oregon" and "Historical Places (or Sites) in Oregon" for distribution throughout the state. An excellent example of such a pamphlet has been put out on the archaeology of Washington State by the Office of Archaeology and Historic Preservation in Olympia, Washington. It is also suggested that museums and other BLM offices outside the study area be utilized for the further distribution of suggested publications. Publications and displays might stress the illegal nature of collecting cultural resources and punitive measures which may follow, in conjunction with discussing cultural resource importance and BLM management responsibilities.

5C. BLM employees who are not directly concerned with cultural resource management should also be better informed with regard to the import of cultural resources, related legislation and BLM responsibilities in managing cultural resources. Well-informed BLM employees may then aid in the protection rather than the destruction of cultural resources by reporting and not collecting any historic or aboriginal cultural items, such as arrow points and old bottles, encountered in the performance of duties not related to cultural resources. No doubt the BLM wishes to avoid the embarrassing position of having some of its personnel violating legislative mandates which other BLM personnel are seeking to enforce.
Displays in BLM offices may serve to educate the public as well as BLM employees. Publication and distribution of pamphlets and larger volumes such as this overview are urged as another way of reaching BLM employees as well as the public.

While the means for implementing the above strategies may be beyond the immediate capabilities of the BLM districts of north-central Oregon at this time, it is further suggested that the Bureau implement an internship program through one or more state universities to be concerned in part with the public relations aspect of the BLM, including setting up and updating displays, speaking and giving demonstrations at local schools, and researching and writing pamphlets and other publications.

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In conclusion, the present cultural resource overview is but the first step toward more effective management of the cultural resources on BLM lands in north-central Oregon. Further steps, as outlined above, remain to be implemented if the Bureau of Land Management is to fulfill federal requirements regarding cultural resources. This cultural resource overview should provide a baseline from which the resource management program previously outlined may take shape. The close cooperation between BLM personnel at all administrative levels and the professional archaeological and historical community will ensure the success of an effective management program for the study area.
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