PREHISTORIC SETTLEMENT PATTERNS IN SOUTHWEST OREGON

by

KATHRYN R. WINTHROP

A DISSERTATION

Presented to the Department of Anthropology
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Doctor of Philosophy

December 1993

"Prehistoric Settlement Patterns in Southwest Oregon," a dissertation prepared by Kathryn R. Winthrop in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Anthropology. This dissertation has been approved and accepted by:

C. Melvin Aikens, Chair of the Examining Committee

11-29-93

Date

Committee in charge: D. Melvin Aikens, Chair
Don E. Dumond
Ann Simonds
Patricia F. McDowell

Accepted by:

Vice Provost and Dean of the Graduate School

An Abstract of the Dissertation of

Kathryn R. Winthrop for the degree of Doctor of Philosophy

in the Department of Anthropology to be taken December 1993

Title: PREHISTORIC SETTLEMENT PATTERNS IN SOUTHWEST OREGON

Approved: ______________________
C. Melvin Aikens

This study addresses the problem of prehistoric culture change in interior southwest Oregon as reflected in subsistence/settlement patterns. Eighty-three sites, excavated during cultural resource management projects, constitute the database. This study also demonstrates the applicability of cultural resource management data to questions of regional interest and of general importance to anthropology.

Two contrasting subsistence/settlement regimes are modeled based on regional ethnographic and archaeological studies. One pattern is that of a mobile subsistence regime; the other is that of a more sedentary regime associated with permanent villages and the collection and processing of foods for over-winter storage. The first is reflected in the archaeological record by a settlement system consisting of seasonal camps and short-term task sites; the second is represented by a settlement system consisting of villages, seasonal camps, and task sites.

To test these models against available data, sites were first placed in functional categories (village, seasonal camp, task site) based on qualitative and quantitative assessments of their archaeological assemblages. This analysis represents the first quantitative assessment of a large database of archaeological sites in this region, and also provide a means of testing previous archaeologists' intuitive judgments about site type. Quantitative measures distinguishing sites, based on the density and diversity of stone tools present in their assemblages include: (a) density measures for chipped stone artifacts; (b) a multidimensional scaling exercise which distinguishes sites based on assemblage diversity (richness and evenness); and (c) cobble and groundstone density measures compared with excavated feature data. The quantitative analysis also offers a methodological contribution for avoiding problems associated with comparison of archaeological samples of greatly varying sizes.

Next, sites were assigned to the Middle Archaic (6,000-2,000 BP) or Late Archaic (2,000-150 BP) period. Finally, a comparison of site types manifest in the two periods shows that the predominant settlement pattern during the Middle Archaic consisted of seasonal camps and task sites, indicating a more mobile subsistence/settlement regime. A more sedentary, village-centered regime, appeared along major waterways at the end of the Middle Archaic, and spread throughout the region during the Late Archaic.

CURRICULUM VITA

NAME OF AUTHOR: Kathryn Rice Winthrop

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon
University of Minnesota
University of California

DEGREES AWARDED:

Doctor of Philosophy in Anthropology, 1993, University of Oregon
Master of Arts in Ancient Studies, 1978, University of Minnesota
Bachelor of Arts in Historical Analysis, 1972, University of California

AREAS OF SPECIAL INTEREST:

Archaeology and History of the American West
Northeast Asia and Eastern Mediterranean
Human Ecology
Development of Complex Societies
Federal Land Management/Environmental Policies.

PROFESSIONAL EXPERIENCE:

District Archaeologist, Bureau of Land Management, Medford, Oregon, 1992-93

Principal of Winthrop Associates, Cultural Research, Ashland, Oregon, 1982-92

Instructor in Anthropology, Rogue Community College, Grants Pass, Oregon, 1983-85

Archaeologist, Modoc National Forest, Alturas, California; U.S. Bureau of Land Management, Medford District, Medford, Oregon; Lassen National Forest, Susanville, California, 1979-84

Teaching Assistant, Department of Anthropology, University of Minnesota, Minneapolis, 1981

Research and Laboratory Assistant, Department of Anthropology, University of Minnesota; School of American Research, Santa Fe, New Mexico, 1973-81

AWARDS AND HONORS:

Graduated with honors, University of California, Berkeley, 1972
Elected to Phi Beta Kappa (Alpha Chapter, Berkeley)
Graduate Assistantships, University of Minnesota, 1976-79
Tuition Fellowship, University of Minnesota, 1980
Biographee, Who's Who in the West, 1986 edition

PUBLICATIONS:

Winthrop, Kathryn R.

1982-92 Author or co-author of over 40 technical reports by Winthrop Associates in archaeology and ethnohistory.

1988 Depression Era Archaeology in Siskiyou County. Paper presented at the State of Jefferson annual meeting, Yreka, California.

1988 Poor But Not So Poor: The Depression Era in Siskiyou County. Co-authored with Anne Chambers. Siskiyou County Historical Society, Museum Series No. 6. Yreka, California.

1985 The Rainbow Family Gathering: An Archaeological Survey Report, co-authored with Gerald Gates. Paper presented at the 19th Annual Meeting of the Society for California Archaeology, San Diego.

1984 Archaeological Assessment of a 19th Century Oregon Farmstead, paper presented at the 49th annual meeting, Society for American Archaeology, Portland, Oregon, April.

1983 Klamath National Forest and the C.C.C. Revised and edited for the Klamath National Forest, Yreka, CA.

1975 Spindle Whorls and Textile Production in Early New Mexico, Awanyu: Jour. Arch. Soc. New Mexico 3[3]:28-46, co-author with Robert Winthrop.

ACKNOWLEDGEMENTS

This work was accomplished with the assistance and support of a number of people, and to them I owe my gratitude. I wish to thank the members of my graduate committee: C. Melvin Aikens, chairman, for getting me started on this project and providing high standards which I have tried to meet; Don E. Dumond, for his considerable assistance in helping me understand what I was trying to do; Ann Simonds, for taking on me and this project sight unseen, and providing valuable comments and a much-needed perspective; and Patricia F. McDowell for adding this task to an already busy schedule, and directing me to important sources on the palaeoenvironment. I especially wish to thank each of my committee members for his or her quick review of the drafts of this work, which allowed me to meet the deadlines I was facing.

I wish to thank my friends Dennis Gray and Nan Hannon, partners in southern Oregon prehistory, for many fruitful discussions over the years, and for helpful and supportive comments on this work. I also wish to thank my new friends at the Bureau of Land Management, Medford District, and especially my supervisor John Lloyd, for providing me the leeway to finish this work in a timely fashion.

I owe my largest debt of gratitude to my husband and daughters. To Rob--husband and colleague--I owe thanks for hours of assistance with the mysteries of ANTHROPAC and PC-Filer, as well as for his critical comments on early drafts of this work. But "thank you" is insufficient to express my appreciation for the love and support rendered over many years as I pursued this seemingly endless task. To my daughters Rebecca and Anna--now young women grown--I owe my heartfelt thanks for years of patience and understanding, especially during this past year of maternal distraction while I was writing this dissertation.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER I

INTRODUCTION

Goals

For the last two decades, archaeological research in southwest Oregon, as elsewhere in the United States, has proceeded largely through the operation of Cultural Resource Management (CRM) projects undertaken by federal agencies as mandated by federal law. These federal projects have produced quantities of archaeological information, meant to contribute to significant scientific questions. Much of this information is technical and site-specific in nature, and has been generated under conditions which pose certain limits to archaeological research. It is the intent of this dissertation to look critically at a body of these data, and to apply information from these CRM studies to a topic of regional interest and importance which also has relevance to the field of anthropology as a whole.

There are thus two main objectives of this study. The first is to study culture change in the prehistory of southwest Oregon, as seen in the subsistence/settlement systems of the prehistoric inhabitants; the second is to apply CRM data generated for the region to this research. This latter concern is methodological, and involves developing a means of integrating the diverse data of CRM studies to address a specific problem. The former seeks to contribute understandings relevant to the study of prehistory in southwest Oregon.

This study of culture change looks at differences in prehistoric hunter-gatherer subsistence and settlement patterns to define suspected changes in cultural adaptation between the Middle Archaic period (approximately 7,000 to 2,000 years ago) and the Late Archaic period (lasting from about 2,000 years ago through the period of historic contact). Subsistence regimes, which constitute the major element in hunter-gatherer economies, consist of those practices which prehistoric groups employed to provision themselves with daily necessities. Settlement pattern refers to the configuration of sites upon the landscape, and the relationships of sites to one another and to features of that landscape. Subsistence practices strongly condition hunter-gatherer settlement patterns; in this study, I assume that the settlement patterns observed are direct reflections of the subsistence regimes employed. Since subsistence and settlement regimes operate at the intersection of society and the natural environment, especially for hunter-gatherers, changes in settlement patterns imply changes in social organization, and may also allow inferences about environmental change. Hence the investigation of subsistence and settlement systems for prehistoric hunter-gatherers serves to direct future research to other aspects of hunter-gatherer life.

The results of this study confirm a change in the subsistence and settlement regimes of southern Oregon peoples between the Middle and Late Archaic periods. This change consisted of a shift from a pattern associated with low density populations and small nomadic groups to a pattern associated with more numerous and sedentary groups practicing storage of foods for over-winter use. This change, in turn, implies changes in adaptation to the natural environment, possibly corresponding to underlying environmental changes, or responding to other factors, such as population increase. It also implies changes in social organization, especially in those aspects of society through which economic practices are constituted.

The research problem was successfully addressed using primarily CRM data. However, these data posed specific methodological problems, and the approaches that were developed in response represent a second contribution of this dissertation. Specifically, the research undertaken necessitated grouping sites into functional categories. In order to do this, it was necessary to compare archaeological assemblages (the sample of artifacts excavated from a site) of widely varying sizes and character. Differing scales of excavation, as well as differences inherent in the sites themselves, have produced assemblages for sites in this study ranging from less than a hundred artifacts to thousands of artifacts. Assemblages produced by CRM studies are the result of many different types of projects; consequently, there is frequently little conformity in the amount of excavation undertaken at different sites in a region. Differences among sites in the kind and number of artifact types present in each site's assemblage can reflect differences in site function. However, such differences are also related to the size of the sample, which can confound the interpretation of function. Thus it was necessary, as part of this study, to develop methods which would allow comparison of site assemblages of widely varying sizes in the process of determining site function. The results provide approaches for future researchers faced with similar problems.

Cultural Resource Management

For almost 25 years, federal laws have generated much of the archaeological work in the United States. These archaeological projects usually occur as part of resource management programs in federal agencies, and are always undertaken in response to a federal action. Cultural resource work includes archaeological studies at every scale, from test excavations of the most minimal sites to large, multi-million dollar projects extending over years and involving specialists from a number of disciplines. The federal mandate has opened areas to archaeological investigation which might otherwise have remained unstudied, and has produced great quantities of data from the past wherever active CRM programs are in operation.

CRM studies take place under circumstances which affect the types of data collected. A major effect stems from the fact that studies are project-driven: They occur in response to specific federal development projects. Hence, a researcher does not choose a problem and then find the most reasonable way to address it, but must find a suitable problem for investigation in the specific area or at a specific site that will be affected by some other, non-archaeological, development. As a result, the distribution of tracts investigated reflects the types of federal projects undertaken in a region, and the specific sites excavated are those subject to impacts from development projects. A second consideration is that cultural resource laws are written to protect the archaeological materials through preservation, in publications and museums if necessary, but in situ if possible. Hence many sites which are test excavated and considered worthy of further investigation are frequently dropped from study by changing the development project to avoid impacts to them. The result is that material accumulated during preliminary excavations often leads no further than to an assessment of a site's research values.

The great value of CRM, however, lies in the abundant data which have accumulated over the last several decades. Because CRM does not discriminate among sites, the database created by these efforts includes sites of all types and characters. The results provide archaeologists with material for study which would otherwise be unavailable.

Interior southwest Oregon is an excellent place in which to assess the value of CRM-generated work. Virtually no archaeological work took place here prior to the inception of the federal laws, with the exception of Luther Cressman's work at Gold Hill in the 1930s (Cressman 1933a, 1933b). Furthermore, much of the land in southwest Oregon is under federal management and subject to federal environmental regulations. As a result, in the last 25 years professionals have excavated over 100 prehistoric sites in the middle and upper Rogue River drainage basin, and in the North and South Umpqua River drainage basins (the areas specifically targeted in the present study).

These excavations range from multi-million dollar investigations of pit-house villages in response to dam-building projects, to minor test excavations of small, featureless sites. Many of these sites have been damaged to some extent from vandalism, farming, or other such actions, and all but a few exist in areas where preservation of organic material is extremely rare. As a body, sites in this region have limited artifact inventories, and few have the potential for radiocarbon dates. Only a few sites are stratified. Yet the abundant data from these sites constitutes a substantial body of information available for analysis of regional issues.

CRM excavations in southwest Oregon, as elsewhere, are meant to contribute scientifically valuable information. The greatly varying scale of CRM work is such that many investigations result primarily in site-specific descriptive data. Occasional, more major research projects, such as the dam projects in southwest Oregon, are able to address broader issues. In southwest Oregon, the lack of archaeological work prior to the inception of the CRM projects has meant that these more synthetic projects have focused on the most basic of issues: determining artifact typologies relevant to the area and placing sites in chronological sequences. Such descriptive, cultural-historical studies are fundamental to analytic and theoretical research. A crucial problem here, however, is to show how the quantities of data generated by CRM research can address more analytic and theoretical issues, and hence make a larger contribution to problems and questions of interest to anthropology as a whole.

Culture Change

The study of culture change is one of those broad issues in anthropology with relevance to both cultural anthropologists and archaeologists, and one which is enhanced by the studies of both subdisciplines. Archaeology can extend the research domain to cover long periods of time and changing conditions, and the ethnographic record frequently provides a starting place for the interpretation of archaeological materials (Smith and Winterhalder 1981:8-9). Thus the demonstration of culture change, manifested as changes in subsistence/settlement systems, is not only an important fact for prehistory but also contributes to larger research areas important to anthropology as a whole. There are two research domains which encompass studies of subsistence/settlement systems. The first is the domain of cultural ecology; the second is the development of cultural complexity, which is part of the larger domain of cultural evolution.

Julian Steward's work in the 1930s (Steward 1938) fostered the development of cultural ecology as a major focus in anthropology, one with particular relevance to hunter-gatherer studies. The ecological orientation involves study of the adaptation of human societies to their environment, particularly as mediated through technology, economy, and social organization (R. Winthrop 1991:47). Cultural ecology has provided a powerful lens for the interpretation of diversity among hunter-gatherers, given their universally close and immediate ties to the natural environment.

Though providing valuable understandings, cultural ecological studies are subject to certain biases which can hamper the understanding of culture change. These weaknesses include a bias towards static, synchronic analyses and a tendency to produce circular arguments in place of explanations (cf. Rappaport 1979; Smith and Winterhalder 1981:3). In addition, earlier perceptions of hunter-gatherers viewed such cultures as static stages, generally impoverished and operating at the bottom rung of the evolutionary scale. Such views also operated, for a time, to constrain studies of change within hunter-gatherer societies.

In the 1960s, however, changing perceptions of hunter-gatherer societies stimulated research which today provides concepts for more dynamic interpretation of hunter-gatherer societies. Lee's (1968) work with the !Kung San of the Kalahari, for example, reversed the stereotype of hunter-gatherer societies as always on the brink of material privation. This understanding served to promote subsequent research which was unconstrained by the view of hunter-gatherers as representing a static evolutionary stage (Barnard 1983:197). Despite later criticisms of Lee's work (e.g., Wilmsen and Denbrow 1990), these new understandings have led to studies which emphasize the role of hunter-gatherers as active participants and strategists in their own survival. These perspectives have particular relevance to the study of change in subsistence/settlement systems.

In the 1970s and 1980s, anthropologists developed a number of theoretical constructs to link differences in hunter-gather subsistence/ settlement systems with differences in mobility strategies. These include the contrasts of foragers versus collectors (Binford 1980), immediate versus delayed-return strategists (Woodburn 1988), and travelers versus processors (Bettinger and Baumhoff 1982; Bettinger 1987). These distinctions share a common recognition of difference between those groups which move among resources, using them more or less immediately, and those which maintain a home-base for storage and pass a more sedentary life. These distinctions provide the basis for analyzing the data of this study.

The demise of the static-stage vision of hunter-gatherers has also promoted studies exploring the development of social complexity in hunter-gatherer groups (Ames 1985; Flanagan 1989; Gould 1985; King 1978). Recognizing the development of social complexity as a phenomenon which occurs in hunter-gatherer societies, furthermore, places studies of such development within the purview of cultural evolution, that is, the "reorganization of social systems involving an increase in scale, complexity, or heterogeneity" (R. Winthrop 1991:107). Understanding changes in hunter-gatherer societies as part of the process of cultural evolution also represents a departure from earlier views, in which hunter-gatherer societies merely provided a starting point for change into other types of societies, as in the transformation to agricultural or horticultural economies (e.g., Bender 1978; Flanagan 1989; Price and Brown 1985:4).

Studies which aim to explain social complexity among hunter-gatherer groups draw upon understandings developed in cultural ecology, which see differences among hunter-gatherers as arising from different subsistence/ settlement strategies. Certain characteristics of hunter-gatherer subsistence strategies promote the development of socially complex societies. These factors include decreasing mobility/increasing sedentism, and storage of resources (Brown 1985; Gould 1985; Kelly 1992; Price and Brown 1985). Sedentism refers to the length of time spent at permanent home bases, occupied for all or part of a year. Storage refers to the collection and processing of important resources for months of scarcity. Sedentary societies have a tendency to congregate in larger groups and to store foods on a seasonal basis. Such societies also have a tendency to harvest a wider range of foods than more mobile groups, and to harvest those foods which need considerable processing to make them palatable. Furthermore, population growth tends to be a corollary of sedentism. More mobile societies tend to be smaller in scale, have a lesser tendency to harvest or process a surplus for short or long-term storage, and hence tend to harvest resources which are readily consumable.

The development of social complexity requires as prerequisites population aggregation, population growth, and the production of surplus (e.g., Dumond 1972). The development of social complexity among hunter-gatherers, therefore, depends upon subsistence and mobility strategies, which are reflected in the subsistence and settlement systems of a given group. Analysis of these systems both draws upon and contributes to concepts developed in human ecology, and is part of the over-arching concern of cultural evolution.

Subsistence and Settlement Systems

Subsistence/settlement studies provide a particularly suitable focus for addressing the specific task of this dissertation, which is to examine the problem of culture change in prehistoric southwest Oregon. Subsistence/settlement studies have, from the beginning, provided a holistic and integrative way of working with information from numerous sites in a given region (Voght and Levanthal 1983:xx). Such studies are thus well-suited to integrating the site-specific data generated over the last 25 years of government-mandated archaeological work, especially in the large tracts of federal land in the American West.

Since Gordon Willey's influential study in the Viru Valley of Peru (Willey 1974), settlement studies have provided a perspective for numerous types of analyses, from those using region-wide locational theories to those focusing on the spatial diversity within a single site (e.g., Hietala 1984; Hodder and Orton 1976; Trigger 1968). Today, one productive strain of settlement archaeology directs its attention to landscapes and how people organized themselves within them, focusing on how societies or parts of societies used entire landscapes (Sullivan 1992:100). The specific orientation of the present study fits within this latter focus; the intent is to identify how prehistoric groups used the landscape and how such uses changed through time.

In this region sufficient archaeological data have accumulated to define settlement patterns, but this definition has not yet been accomplished.

This study constitutes an initial effort to use the archaeological data to identify settlement patterns, and changes within them.

Southwest Oregon in Regional Perspective

The people inhabiting the Pacific Northwest at the time of historic contact shared certain fundamental similarities in their subsistence/settlement patterns (Hunn 1990; Suttles 1990:4). The seasonality of the climate and the topographic distribution of resources engendered a semi-sedentary seasonal round which included over-winter settlement at established home bases complemented by annual movement from lowlands to uplands during the warmer times of the year. This rhythm varied from place to place and group to group depending on the specifics of the environment and the particulars of any group's adaptation. However, a semi-sedentary way of life in which provisions were collected and stored for over-winter use characterized virtually all of the people living in the region at this time. Indeed, these characteristics represent a pattern common to the North Pacific Rim as a whole (Watanabe 1992).

This way of life, however, almost surely did not characterize the whole of the 10,000 or more years that people have inhabited the region. The semi-sedentary regime, associated with pithouse settlements located along rivers, lakes, or other permanent sources of water, does not emerge in many areas until the last several thousand years. Along the Pacific Northwest coast, for example, the semi-sedentary system appears about 5,000 years ago, with a trend towards increasing logistical organization producing a mature stage after about 2500 years ago (Aikens 1986:5; e.g., Ames 1985, and Fladmark, Ames, and Sutherland 1990).

Similar trends are noted for the Cascades (Mierendorf 1986; Burtchard 1990, Burtchard and Keeler 1991) and Plateau (Lebow, Pettigrew, Silvermoon, Chance, Boyd, Hajda, and Zenk 1990). In the North Cascades, the existing archaeological record is interpreted as indicating a highly mobile subsistence pattern until about 5,000 years ago. The earlier pattern is characterized as "broad-spectrum foraging," in which small family groups travel throughout the year within a territory, using the natural resources in an area where they were found (Mierendorf 1986:47). Beginning about 5,000 years ago, there was a shift to a more sedentary way of life, accompanied by occupation of permanent villages and storage of foods for winter use. Such a pattern is also hypothesized for the central Cascades (Burtchard 1990, Burtchard et al. 1991). In the Plateau, a recent study synthesizing previous archaeological work in the region notes that the transition to a more sedentary way of life takes place during the Middle Archaic (7,000-2,000).

These syntheses for the Plateau and the north and central Cascades take the form of cultural resource management overview studies, and as such these studies define certain issues of current importance to regional archaeological research. The definition of past subsistence/settlement patterns, and the relationship of those patterns to the environment and to the development of social complexity, are among the issues of current importance in the region. The definition of past patterns relies in part on distinctions between idealized hunter-gatherer economies, such as those distinctions based on mobility/sedentism and food storage. These distinctions are further discussed in Chapter III of this study, as preliminary to interpreting the archaeological materials presented for southwest Oregon. Critical issues associated with defining change in subsistence/settlement patterns include the role of the environment (e.g., Aikens 1993:81), population (e.g., Burtchard 1990), and/or other factors (e.g., Ames 1985), and the correlative developments in social structure and organization (e.g., Mierendorf 1986).

The issue of change in the subsistence/settlement regime is as pertinent to southwest Oregon as it is elsewhere in the region. There is as yet no synthesis of the archaeological data available which can address this question, although previous archaeological studies, discussed further in Chapter III, are sufficient to hypothesize shifts similar to those recognized elsewhere. The definition of a change in subsistence/settlement patterns, the timing of such a change, and the its implications regarding cultural adaptations to the natural environment as well as the evolution of social complexity are issues of regional importance which deserve attention in southwest Oregon.

Subsistence and Settlement Patterns in Southwest Oregon

The primary aim of this study is to define the subsistence and settlement regimes of prehistoric southwest Oregon. Archaeological evidence is sufficient to address this problem for the Middle and Late Archaic periods, lasting from about 7,000 years ago until historic contact. Although archaeological evidence documents human habitation of this region for earlier periods, it is as yet too scanty to bear on the problems of this study.

This study proceeds by defining two basic, alternative subsistence/settlement patterns. The essential characteristics of these two patterns are reflected in the functional types of sites left upon the landscape. After the sites are placed into functional categories through statistical and qualitative analyses of assemblages, sites are grouped into two broad chronological periods. The types of sites apparent for these time periods reveal the subsistence/settlement systems dominant during those times. The changes observed in the subsistence/settlement patterns in turn allow inferences about the environment and about the social systems of the groups involved, and raise questions about the reasons for culture change during this prehistoric period.

This dissertation is organized as follows. The research area is introduced in Chapter II, which sets forth the environment as context to the cultural patterns which existed within it. The subsistence/settlement models are defined in Chapter III, through a discussion of relevant ethnographic and archaeological materials. Chapter IV presents the site database and the research methods and techniques used to group sites into functional categories. Chapters V and VI give results of the analysis for Rogue Basin and Umpqua Basin site samples. In Chapter VII, sites are sorted into the Middle and Late Archaic periods. This allows for the definition of settlement and subsistence regimes during those time periods. An examination of the classification methods used to determine site function, particularly in light of the sample size problem, follows the settlement analysis in Chapter VIII. Chapter IX, concluding the study, reviews the work accomplished and provides suggestions for further research.

CHAPTER II

ENVIRONMENTAL SETTING

Introduction

For hunter-gatherers, the natural environment both sets constraints on subsistence/settlement regimes, and offers possibilities in these realms. This dissertation addresses the question of cultural change as manifest through the subsistence/settlement systems of the people inhabiting southwest Oregon through two major prehistoric periods, the Middle and Late Archaic. The nature of the environment during those two prehistoric periods is the subject of this chapter.

The archaeological evidence for human occupation in southwest Oregon dates to about the last 11,000 years. From the earliest occupation, the people throughout the Pacific Northwest participated in hunting-gathering economies, provisioning themselves from the resources available in the natural environment. Broadly similar environmental characteristics throughout this region influenced certain aspects of all of the cultural regimes present, with regional variations in cultural patterns stemming in part from differences in local conditions.

Chief among those common environmental denominators is the temperate, seasonal climate, which everywhere provided foods at different places within the landscape at different times of the year. Hunter-gatherers reacted to this constraint through seasonal movements among the resources as they became available. At the time of contact, people in this region mitigated the effects of harsh winters by processing foods and storing them at established home bases for use during these months. The effects of the seasonal climate were enhanced throughout the Pacific Northwest by the mountainous topography; cooler seasons lingered longer in the uplands and abated sooner in the valleys. People occupied the valleys during the winter and used the uplands during the warmer times of the year. Valleys with streams and rivers intersect the mountains; in the Pacific Northwest these streams eventually drain into the Pacific Ocean. These rivers provide access to inland spawning grounds for a variety of anadromous fish; the fish in turn provided a predictable and frequently abundant resource to those people living near the rivers and streams which contained them. Though not all peoples had access to this valuable resource, those with access to abundant fish had subsistence economies which were focused around the annual fish runs.

Though analysis of present-day environments provides the general characteristics of the landscape, the types and distribution of plants and animals available to prehistoric peoples was different in the past. Those major climatic shifts which characterized the global climate during the Holocene (i.e., about the last 10,000-12,000 years) affected species in the Pacific Northwest. Understanding the past environments in which people lived requires consideration of these climatic effects.

The Research Area

The archaeological sites in this study occur within the drainage basins of three main rivers in southwest Oregon: the Rogue, the North Umpqua, and the South Umpqua (Figure 1). These rivers all flow west from the Cascade mountains, and are associated not only with these mountains but also with interior valleys in the region. The Rogue River runs through the Rogue Valley, north of the present city of Medford, past the city of Grants Pass, and on to the sea. The North and South Umpqua Rivers join the main stem of the Umpqua River in the Umpqua Valley, near the city of Roseburg. The sites in this study are divided into two groups: those which occur within the eastern part of the Rogue River drainage basin, and those which occur in the eastern part of the Umpqua drainage basin. These areas have a large number of excavated archaeological sites, providing the basic data for this study. Since the environmental characteristics of these two areas are broadly similar the research area is discussed in this section as a unit.

The research area lies mainly within the Cascades geologic province. The Cascades are rugged, volcanic mountains which run from California up into Canada. The younger High Cascades form the crest of the mountain chain to the east, with volcanic peaks rising to above 10,000 feet in elevation. The older Western Cascades, which comprise the mountains and foothills east of the interior valleys, are more moderate in topography and elevation but still rugged in character. The interior valleys provide relief to the mountainous landscape. In the south and west, these valleys are bounded by the Klamath Mountains.

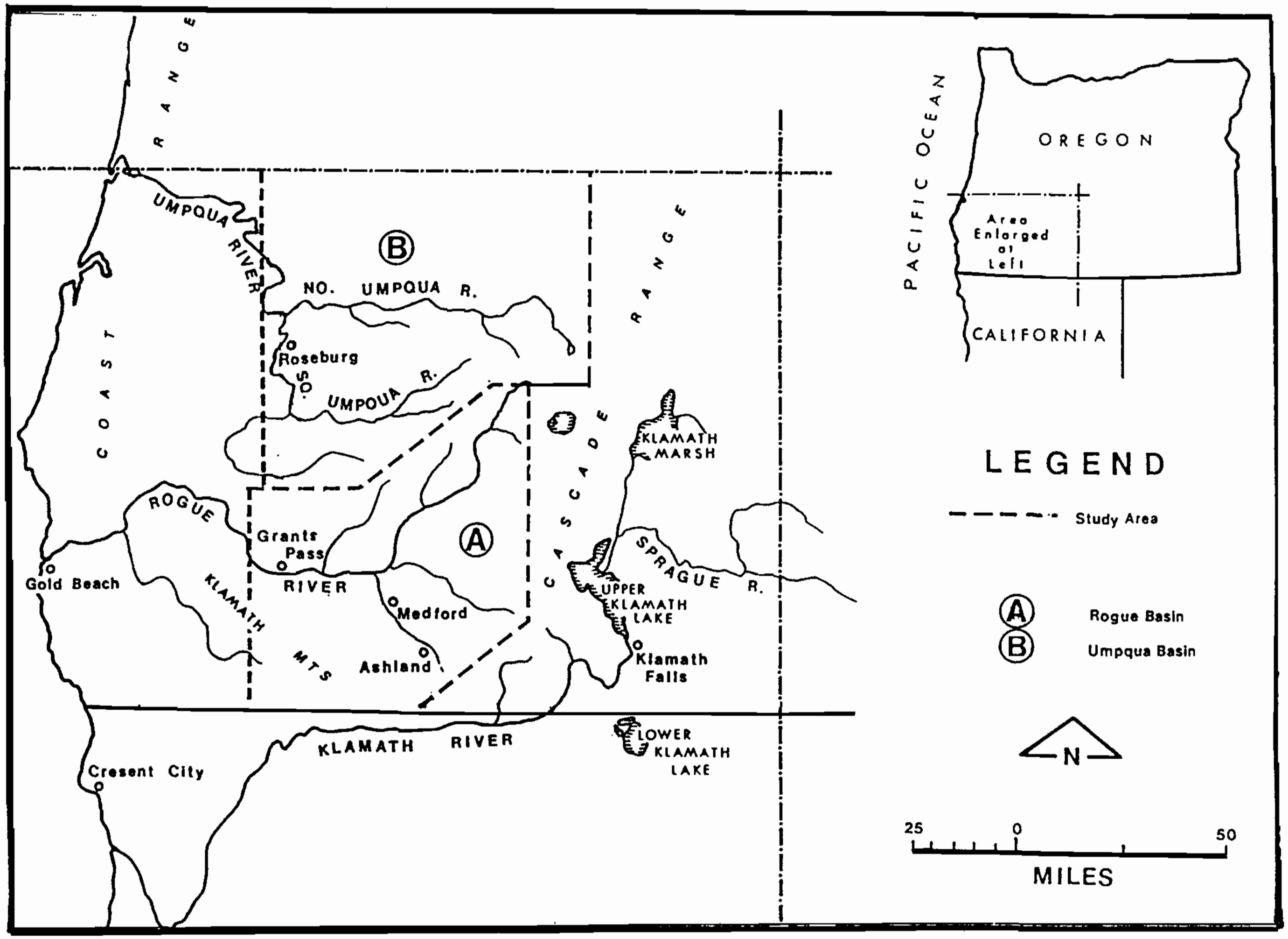


FIGURE 1. Map of study area.

The rivers themselves run from the High Cascades through the Western Cascades, then through the interior valleys and the coastal ranges to the sea. Major tributaries to the Rogue River include Bear Creek which drains the southern portion of the Rogue Valley, and the Applegate River which drains portions of the Klamath Mountains south of the Rogue Valley. Other tributaries further upstream include Elk Creek and Lost Creek; these two streams and the Applegate River are also locations of Army Corps of Engineer dams and therefore, due to CRM work associated with dam construction, the location of many of the Rogue Basin excavated sites. Cow Creek is a major tributary to the South Umpqua River, and numerous streams, such as Little River, Steamboat Creek, and Copeland Creek drain into the North Umpqua River.

Interior southwest Oregon today experiences a relatively mild, wet winter and a warm, dry summer. Temperature and precipitation statistics from the interior valleys proper give an indication of climatic regimes; upland conditions in the surrounding mountains are generally cooler, and there winter precipitation falls mainly as snow. Average July temperatures in the Umpqua Valley, at Roseburg, are 67.8 degrees (Fahrenheit) and 72.1 degrees in the Rogue Valley at Medford. Average January temperatures are 41.4 degrees in the Umpqua Valley, and 39 degrees in the Rogue Valley. Precipitation falls mainly during the winter, with heavy snowfalls limiting access to the uplands during cooler parts of the year. Average annual precipitation in at Roseburg the Umpqua Valley is 33 inches, and 20 inches at Medford in the Rogue Valley (Franklin and Dyrness 1988:111). These valleys experience the warmest temperatures and frequently the driest regimes in the southwest region, due to the rainshadow effect of the mountains (Todt 1990:76).

Several major vegetation communities characterize southwest Oregon. Generally the vegetation zones in the study area follow elevation (Franklin and Dyrness 1988:110-149). The Interior Valley Zone covers the low lying valleys and portions of the associated foothills, to an elevation of about 800 meters (2,600 feet). Above this is the Mixed Conifer Zone, to an elevation of about 1300 meters (4,200 feet). The Abies concolor zone occurs next, to an elevation of about 1600 meters (5,200 feet); above it is the Abies magnifica shastensis zone, to an elevation of 2,000 meters (6,500 feet). The Tsuga mertensiana Zone rises to the higher elevations, to about 2,500 meters (8,200 feet), and the Alpine Zone occurs at the highest points (see Figure 2).

The Interior Valley Zone includes the extensive lowlying valleys of interior southwest Oregon (the Rogue and Umpqua valleys) as well as portions of the surrounding foothills. Several vegetation communities make up this zone, including grasslands and oak woodlands, chaparral, and mixed hardwood and coniferous forests. The species composition of the native grassland is "strictly conjectural," since this vegetation community has been nearly eliminated by modern land use practices such as grazing and agriculture, and by the introduction of new species (Franklin and Dyrness 1988:119). These grasslands contained some mix of perennial and annual grasses, as well as forbs. Species such as Danthonia californica (California pitcher-plant) and Stipa spp. (needlegrass) were probably typical dominant

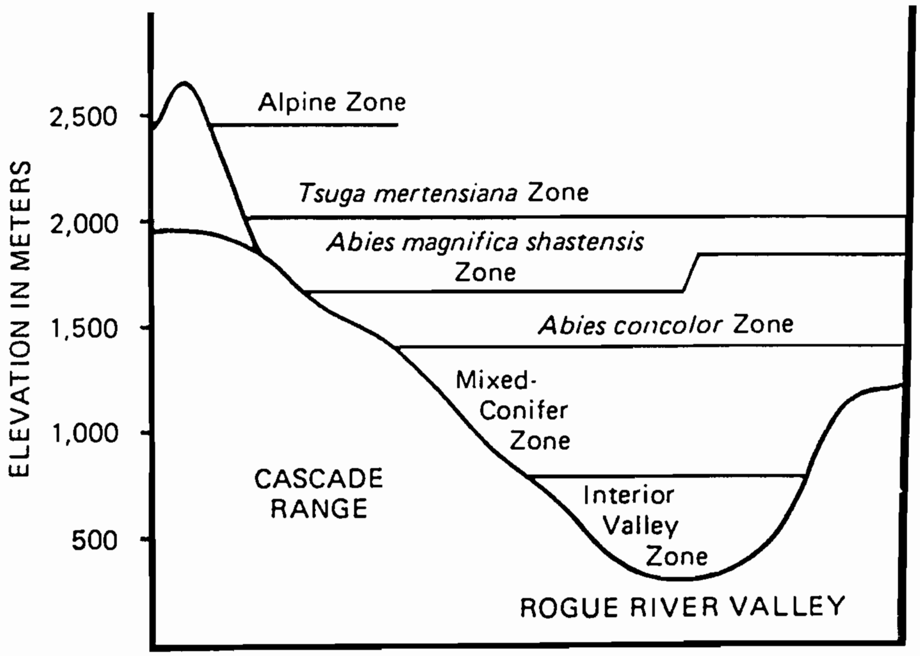


FIGURE 2. Arrangement of Vegetation Zones in Southwestern Oregon (from Franklin and Dyrness 1988:131).

species (Franklin and Dyrness 1988:119). Oak woodlands vary from open savannahs of scattered oaks with grass understories to dense oak forests and mixed forests of oaks and coniferous species. The two main species of oak are Quercus kelloggii (California black oak) and Quercus garryana (Oregon white oak); associated conifers are most commonly Pseudotsuga menziessii (Douglas-fir) and Pinus ponderosa (ponderosa pine) (Franklin and Dyrness 1988:114-115).

Chaparral, consisting of drought tolerant shrubs such as Ceanothus (buckbrush) and Arctostaphulos spp. (manzanita) occurs as a sub-climax species in the Interior Valley Zone. Today, these communities represent the northernmost extension of chaparral vegetation. The chaparral shrubs are frequently associated with oak, Douglas-fir, and ponderosa pine. Chaparral communities are indicative of warm, dry conditions, and may be dependent upon fire for their existence (Detling 1961:356).

The Interior Valley Zone also includes forests of hardwoods and conifers on the foothills surrounding the valleys. In addition to the oaks, Acer macrophyllum (bigleaf maple), and Arbutus mensiesii (Pacific madrone) are associated with Pseudotsuga mensiesii (Douglas-fir), Pinus ponderosa (ponderosa pine), and Abies grandis (grand fir) in these foothill communities (Franklin and Dyrness 1988:116).

The Interior Valley Zone plant communities were especially important to native peoples, furnishing major dietary staples such as acorns and camas, a variety of other seeds and roots, and abundant forage for game. The grasslands and meadows, together with the open oak savannah and pine/oak woodland, were in part a product of human interaction with the environment; cycles of regular burning carefully regulated by the native peoples kept the landscape open and promoted the growth of these plant communities (Boag 1992; Franklin and Dyrness 1988:122; Martinez 1993). Frequent fires also contributed to the growth of chaparral communities, which provided browse for game animals. Fire also increased the amount of area transitional between different vegetational zones, such as the savannah and forests; these transitional zones are places of increased biological diversity and especially productive of foods and materials used by native peoples (Boag 1992:21).

Elevations above the Interior Valley Zone are characterized by forest communities which change with increasing altitude. The Mixed Conifer Zone occurs immediately above the Interior Valley Zone, with Pseutotsuga menziesii (Douglas-fir), Pinus lambertiana (sugar pine), Pinus ponderosa (ponderosa pine), (Libocedrus decurrens (incense cedar), and Abies concolor (white fir) as dominant species. Above these forests, a narrow belt of forest dominated by Abies concolor (white fir) occurs below the Abies magnifica shastensis (Shasta red fir) forests. At the highest elevations, Tsuga martensiana (mountain hemlock) and alpine vegetation succeed the fir forests.

Wet and dry meadows and brushfields, important to native peoples for foods and game forage (e.g., Snyder 1987), provide openings in the forests at all elevations and occur in the valleys as well. These communities occur as a result of a number of factors, such as shallow soils, damp soils, and normal successional patterns following fire or other disturbances. A number of varieties of berries and root crops, such as huckleberries and camas, are associated with these meadows and were of particular importance to native peoples. Major game species, such as deer and elk, are also attracted to these forest openings, which provide forage with nearby cover from predators.

The fauna of the area includes large ungulates which browse on the forage found at the forest edge, as well as a variety of predators and small mammals. Black-tailed deer (Odocoileus columbianus columbianus) are the most common ungulate species, with limited numbers of white-tailed deer (Odocoileus virginianus leucrus) occurring along the Umpqua River (Mace and Smith 1970). Roosevelt elk (Cervus canadensis) also inhabit the area. Other large mammals, such as black bears, cougars, bob-cats and coyotes still roam the area; formerly the grizzly bear, bighorn sheep, antelope, and wolves also lived in the southwest mountains. Numerous smaller mammals, such as beaver, otters, rabbits, and squirrels, furnished prey species for food and materials. Game birds such as quail and grouse also occupy the valleys and foothills. Many of these birds and mammals were seasonally available to native peoples at different locations within the landscape. Deer and elk especially follow a migratory pattern, congregating in low elevation ranges during the winters, and dispersing into the uplands during the spring and summer as forage becomes available.

The rivers and streams provided a major staple to most of the people living in the research area (see Figure 3). Anadromous fish, consisting primarily of coho and chinook salmon, and steelhead, formed a significant part of the diet. These fish migrate annually up the rivers and their tributaries to spawn. These annual migrations, or "runs," provide excellent fishing opportunities, and occur every season of the year (Johnson 1993, personal communication; Loomis 1993, personal communication). On the Rogue River, spring chinook run from March to June; summer chinook from June to August, fall chinook from September to October or November; coho salmon from September to December; summer steelhead from March to October; and winter steelhead from October to March. On the North Umpqua River, Coho salmon run from September to January; spring chinook from March until August; fall chinook from August to December (today, this is a light run); winter steelhead from December to May, and summer steelhead from May to October. On the South Umpqua, coho run from September to January; spring chinook from March to August (this is a light run); fall chinook from August to December; and winter steelhead from December to May. There is no summer steelhead run today on the South Umpqua. Other fishes, such as trout, sculpin, lamprey, and dace, also occur in these rivers and their tributaries.

It is difficult to assess the abundance of aboriginal fisheries. Current researchers agree that anadromous fish today have been severely affected by a number of historic factors, and that current fish runs are well below early historic levels. These factors include: over-fishing; habitat destruction

RUNS	J	F	M	A	M	J	J	A	S	O	N	D
ROGUE RIVER												
Coho									-----	-----	-----	-----
Sp. Ch.			-----	-----	-----	-----						
S. Ch						-----	-----	-----				
F.Ch.									-----	-----		
S. Sthd.			-----	-----	-----	-----	-----	-----	-----	-----		
W.Sthd.	-----	-----								-----	-----	
NORTH UMPQUA RIVER												
Coho	---								-----	-----	-----	-----
Sp. Ch.			-----	-----	-----	-----	-----					
F. Ch.								-----	-----	-----	-----	-----
S. Sthd					-----	-----	-----	-----	-----	-----		
W. Sthd.	-----	-----	-----	-----	-----							--
SOUTH UMPQUA RIVER												
Coho	---								-----	-----	-----	-----
Sp. Ch.			-----	-----	-----	-----	-----	-----				
F.Ch.								-----	-----	-----	-----	-----
W.Sthd	-----	-----	-----	-----								--

Coho = Coho salmon
S.Ch. = Summer chinook
Sp. Ch. = Spring chinook
F. Ch. = Fall chinook
S. Sthd. = Summer steelhead
W. Sthd. = Winter steelhead

FIGURE 3. Anadromous Fish Migration Periods (Johnson 1993; Loomis 1993).

through mining, logging, and road-building; pollution of water; blockage of migratory patterns with dams; and a number of other effects attendant upon our modern way of life (FEMAT 1993:II-36-37; Kaczynski and Palmisano 1993; Netboy 1973). Anecdotal evidence from settlers and early fishery reports attest to the earlier richness of these streams, although these late nineteenth century reports may reflect a temporary surge in fish populations after the elimination or restriction of Indian harvests (Hewes 1947; 1973). Whatever the historic effects have been, however, fish runs in the Umpqua and Rogue Rivers and their tributaries at the time of historic contact were both abundant and predictable, and were a major source of food for the people who lived along them.

The climate, topography, and vegetation created a seasonally varying resource base for the prehistoric inhabitants, with staple foods available throughout most of the year at different places and elevations. The rugged mountains hosted large game which migrated during the winter to lower elevations, returning to the uplands as the weather warmed. Berries and root crops--especially camas--provided spring, summer, and fall resources in both upland and lowland meadows. At lower elevations, oaks and grasses such as tarweed provided foods available in the warmer months. Major fish runs occurred in every season, at least in the North Umpqua and the Rogue Rivers, and, until recently, fish were available year-round in the rivers and streams (Spencer 1991:vii). The topography of the area and the seasonality of the resources placed constraints upon the hunters and gatherers who lived here: adequate year-round provisioning required people to move among the various resources as they became available.

Palaeoenvironments

During the time that people have inhabited southwest Oregon the global climate has experienced major shifts which have been expressed differently in different regions. At present, there is little direct information regarding either the climate or the effects of climatic change on vegetation, fauna, and hydrology for interior southwest Oregon. There is more information in adjacent regions, which suggests models for this area.

Work in the Pacific Northwest has identified a climatic sequence with relevance to this project's study area (Thompson, Whitlock, Bartlein, Harrison, and Spaulding 1993). Following deglaciation between about 14,000 BP and 10,000 BP[1], the northern hemisphere experienced an amplified seasonal cycle of solar radiation lasting until about 6,000 years ago. During this time solar radiation was greater and winter radiation was less than today, resulting in increased temperatures and decreased effective moisture (Whitlock 1992:16). This was a warm, dry interval, indicated by the expansion of open forests or savannahs into the Puget Trough in Washington. This vegetation, with _Pseudotsuga_ (Douglas-fir), _Alnus_ (alder), and _Pteridium_, as well as _Quercus_ (oak), _Chrysolepis_ (chinkapin), and herbs, was similar to vegetation now characteristic of the Willamette Valley in Oregon. After about 5,000 or 6,000 years ago, this xeric period began to

[1]BP = Before Present.

moderate. Throughout the region, modern vegetation patterns began to appear. This climatic scheme is summarized as follows:

<u>14,000 - 10,000 BP</u>: Appearance of temperate taxa during Deglaciation.

<u>10,000 - 5,000 BP</u>: Introduction of xerothermic communities in the early Holocene.

<u>5,000 BP - Present</u>: Establishment of modern vegetation patterns in the late Holocene.

A small amount of research in the central part of western Oregon has been conducted to date, consisting of a pollen core from Gold Lake Bog (east of Cottage Grove) and a core from Indian Prairie Fen (east of Eugene), both in the Western Cascades and north of the study area (Sea n.d.). Another core comes from Little Lake, in the central Coast Range (Worona 1993). These three studies support the general pattern outlined above, indicating a warmer and possibly drier interval during the early Holocene, followed by a wetter and cooler climate in the later Holocene. At Indian Prairie Fen, development of the present-day forest occurs after 6900 BP; at Little Lake on the coast this appears after 5,000 BP.

The critical elements of this Holocene climatic scenario are the contrasts between a xeric early Holocene period with more limited moisture and higher summer temperatures than today with the more mesic--wetter and cooler--conditions which follow. These mesic conditions characterize the modern environment. The earlier xeric conditions produced distributions of plant and animal species different from those typical of this region today. Both the nature of the xeric and mesic Holocene periods as well as the timing of the transition between them provide important background to the present study.

The timing of the transition from the xeric to the mesic period fluctuated throughout the American West. There is as yet little direct evidence for southwestern Oregon; it is assumed that this region would fit the broad patterns characterizing more studied areas in western Washington or California. These patterns, however, do not define a consistent theme readily applicable to southwest Oregon. For example, one interpretation of fossil pollen data for a location on the northern Washington coast (Hoh-Kalaloch) notes that the warmest was prior interval to 8,000 BP, followed by colder and wetter conditions which peaked between 5,000 to 2,000 BP (Heusser 1985:160). On Mt. Rainier in Washington, however, warmer conditions prevailed into the fourth millennium BP, and modern vegetation was established only after 3,500 BP (Whitlock 1992:18). Similar fluctuations are apparent to the south. Analysis of fossil pollen from Clear Lake, for example, in coastal, central California, together with fossil pollen from an off-shore ocean core, suggest a period of disequilibrium between 15,000 and 5,000 years ago, with essentially modern characteristics established by about 7,000 BP (Baker 1983:118; Gardner, Heusser, Quinterno, Stone, Barron, and Poore 1988:181). Pollen from Osgood Swamp in the western Sierras, however, indicates a warmer mid-Holocene climate lasting until about 2800 BP (Baker 1983:118).

A recent discussion of climate change in the American West during the last 18,000 years models climate at three-thousand year intervals. This effort synthesizes information from numerous diverse sources, including general circulation model simulations based on various boundary conditions (e.g., the presence and size of the ice sheet during the earlier periods), and direct evidence of past climates derived primarily from pollen studies, plant macro-fossils from pack-rat middens, and lake-level records. At 9,000 BP the climate in the Pacific Northwest was at its driest, based on data from Washington and the Columbia Basin. In California, similarly arid conditions prevailed in the Sierras as well as along the coast. By 6,000 BP, drought conditions were less severe than earlier but still more arid than at present, both in the Pacific Northwest (Washington and the Columbia Plateau) and California. Additional data from Clear Lake (i.e., growth-increment widths from fossil tule perch scales) in California suggest that warmer conditions also prevailed here. Although this climate study does not present data for 3,000 BP in any detail, a map showing periods of maximum effective moisture shows the region west of the Cascades and Sierras as reaching this peak 3,000 years ago (Thompson et al. 1993:Fig.18.14).

Although there is as yet little direct evidence for conditions in southwest Oregon, comparison with gross climatic conditions in northwest Washington and California imply the following scenario. The warmest and driest period was at about 9,000 years ago. This period lasted at least until 6,000 years ago, at which time the climate was still drier than at present. Some time after 6,000 years ago, the climate began to turn cooler and moister. By about 3,000 years ago, the climate had reached maximum effective moisture.

The possible effects of these climatic shifts on those aspects of the environment which were important to the native peoples have not been analyzed for southwest Oregon, due to the absence of direct evidence for past climate and vegetation patterns. It is possible, however, to make some inferences regarding these effects, and there are several studies which model past conditions based on knowledge of current environments. These studies and inferences allow discussion of possible changes in the environment in southwest Oregon during the Holocene.

For areas such as interior southwest Oregon, where today many species are at their physiologic limits (such as the California black oak), the past environment is particularly difficult to predict. The vegetation patterns in the Pacific Northwest consist of "loose associations composed of species independently adjusting their ranges to environmental changes on various time scales" (Whitlock 1992:22). Simple zonal shifts of intact communities of plants and animals, either altitudinally or latitudinally, were unlikely. That is, the specific constellations of plants and animals present today probably did not migrate to higher elevations or more northerly regions as the climate warmed. Rather, certain species migrated, and others disappeared, producing configurations of plants and animals which are somewhat different than today. Furthermore, during the early warm and dry interval, wildfire was probably more common; fires would have positively affected those species which are fire tolerant or dependent, such as oak and chaparral communities, and placed further stress on those which are not, such as conifers (Detling 1961).

In southwestern Oregon, already warm and dry in comparison with the rest of the Northwest, the warm interval of the early Holocene would probably have seen the coniferous forests diminish and much of the cold zone hemlock forests eliminated (Franklin, Swanson, Harmon, Perry, Spies, Dale, McKee, Ferrell, Means, Gregory, Lattin, Schowalter, and Larsen 1991:243). Elimination of the cold zone also implies changes in hydrology, with diminished snow-packs. Non-forest type ecosystems, today represented by grasslands, chaparral, and oak savannah, probably covered a greater part of the study area than today.

The specific effects of these palaeoclimatic changes on the human environment are difficult to gauge. Several models exist, however, which predict conditions for the early to mid-Holocene xeric period. These models examine the effects of environmental constraints on resource productivity, and then predict the potential effects of environmental changes on those resources. The potential effects of a warmer, drier climatic regime on anadromous fish, other game resources, and staple plants such as oak and camas, as expressed in these studies, are summarized below.

Recent attempts to predict changes to anadromous fish runs in the event of global warming draw upon the warm period of the Holocene as a model (Chatters, Neitzel, Scott, and Shankle 1991; Neitzel, Scott, Shankle, and Chatters 1991). These studies are particular to the Columbia Basin fisheries; another study concerning salmon in the Rogue River drainage also presents a model for changes in fish populations during this warmer interval

(Spencer 1991). These works suggest that significant effects on the fish populations were possible.

One study for the Columbia River Basin provides an assessment of the effects of a warmer and drier climate on fish populations (Neitzel et al. 1991). Based on palaeoenvironmental studies, the authors estimate a 1-2 degree centigrade increase in temperature, with a decrease in effective moisture of between 33-38 percent during the xeric period. They assess the effects of increased temperature and decreased precipitation on four hydrologic variables which affect salmon production: duration of peak flow, amount of sedimentation, stream temperature, and annual flow (decrease or increase in annual surface runoff).

For the Columbia basin as a whole, they conclude that the climate changes estimated would not adversely affect the rivers and streams west of the Cascades, in terms of their ability to support anadromous fish, but would have a generally detrimental effect on streams east of the Cascades. They note that proximity to the ocean as well as differences in vegetation patterns and hydrologic regimes account in part for the differences postulated between the east and west Cascade streams. They also conclude, however, that changes in climate would affect various species of fish differently. Spring and summer chinook would be affected negatively in most streams, for example, due to changes in timing and volume of the spring freshet (peak flow). Steelhead, however, have a tolerance for warmer water and intermittent streams, and would have been unaffected or possibly helped in certain areas.

In another study these researchers examine the effects of conditions resembling the warm, dry Holocene interval on spring Chinook in the Yakima River. They conclude that a climate change to such xeric conditions could significantly reduce current fish runs. They base their conclusions on a computer model which calculates the effects of climate change (using the same figures for temperature and effective moisture noted above) on hydrologic variables, and the effects of changes in these variables on fish survival. Specifically, they model the effects of changes in stream temperature, sedimentation, flow volume, and timing of the peak annual flow on three critical life stages of anadromous fish and a stream's capacity to produce juveniles (smolt capacity). The important life stages are: egg-to-smolt survival rate; smolt-to-smolt survival rate; pre-spawning (adult fish) survival rate. (A smolt is a young fish ready to migrate to the ocean from the home stream.) The computer model also calculates cumulative survival over several generations.

Changes in the hydrologic variables would have the following effects on fish. Increased changes in water temperatures decrease pre-spawning survival by increasing the incidence of disease in adult fish. Higher sedimentation causes low egg-smolt survival; however, climate induced changes in sedimentation would vary with stream gradient and watershed type. Changes in the timing of the annual peak flow would adversely affect smolt-smolt survival, and would be most likely to affect upstream areas. Finally, smolt capacity depends upon stream volume; a 33 percent reduction in volume correspondingly reduces smolt capacity, except in those streams which become intermittent and loose their smolt capacity entirely. The authors conclude that a climate change such as that modeled for the early Holocene (i.e., a 2 degree centigrade increase in temperature and a 33 percent decrease in precipitation) could reduce spring chinook salmon production by 60 percent (Chatters et al. 1991).

Both of the Columbia Basin studies stress the complexity of the factors which interact to provide good habitat for anadromous fish. It would be inappropriate to apply the findings of these studies for the Columbia Basin directly to southwest Oregon, where the present-day climate, vegetation, and stream environments are different. These studies do, however, highlight the possibility of significant differences in anadromous fish populations during the xeric interval of the Holocene.

In a less elegant but equally intriguing paper, Spencer (1991) analyzes the possible effects of the warm, dry interval on the Rogue River and its tributaries, and hypothesizes effects on the salmon inhabiting these streams. According to Spencer, a lesser snowpack during this period would have produced a peak-flow period in the winter, rather than the spring. Lower stream flows in the spring and summer, in turn, made steeper gradients and low falls effective barriers to migrating fish. Furthermore, some streams which are perennial today would have been intermittent, further limiting salmon populations. Warmer stream temperatures would also have inhibited salmon populations. The upper reaches of the Rogue and its tributaries already are at the further end of the anadromous fish migration routes, where runs are less abundant and fish more exhausted than in those areas closer to the coast. The postulated climatic effects--warmer waters, reduced seasonal flows, effective migration barriers, intermittent flows--could have had a greater effect on fish in the upper Rogue River drainage than for areas closer to the coast. Overall, under this scenario, a possible effect on fish of a more xeric climate would have been to limit major runs to the winter months, and to limit the geographic extent of those runs, particularly at upper reaches of the major rivers and tributary streams.

Another recent study, by Nan Hannon (1992), constructs a model for prehistoric availability of critical resources based on the study of plants today and inferences regarding past conditions. Hannon argues that during the early Holocene xeric period oaks expanded, but their productivity was low. Camas may have disappeared from valley floors, and the major plant species available to people were seeds from various grasses. Chaparral expanded and, together with oak, provided increased forage for deer, elk, and other mammals such as rabbits and squirrels. She argues that this xeric period would have fostered a highly mobile subsistence regime focused more on hunting and less on the acquisition of valuable plant foods such as acorns and camas, which were not as available as during later times. Grass seeds may have supplemented the diet, but may not have been used as staple foods.

Based on her ten year study of acorn production, Hannon argues that acorns were not likely to have ever been an abundant and predictable crop in interior southwest Oregon. In southwestern Oregon, two main species of oak have nutritionally valuable acorns: the Oregon white oak and California black oak. Black oak was the preferred species, producing an acorn that has a higher fat content than that of the white oak. However, the black oak is at the northern limit of its range in southwest Oregon, and is neither an abundant nor reliable producer. Yields may fluctuate widely from year to year or place to place. Though both oaks are moderately drought and fire resistant, the black oak appears to need more water than the white oak to be a good producer; in the drought years of the 1980s and early 1990s, the black oaks in Hannon's study were poor producers. The white oaks observed in the study were more consistent producers, but production was nonetheless highly variable. During the recent drought years, monitored acorn production from white oaks in natural settings was abundant only one year out of five (Hannon 1993, personal communication). Both white oaks and black oaks were better producers in swales or near irrigated areas, where they received additional moisture, indicating that drought may affect acorn production in both species. Furthermore, though the white oak is drought and fire resistant, it nonetheless needs moisture to establish seedlings and may therefore have been restricted to riparian zones and north-facing slopes during the xeric interval. Hannon concludes that black oaks were unlikely to do well during the xeric phase. White oak may have expanded its range, especially as conifers retreated, but these trees may have been restricted to specific locations and were not necessarily reliable or abundant producers of acorns.

Camas, formerly abundant in the meadows of the interior valleys (i.e., prior to modern agricultural practices), provided a significant carbohydrate to the diets of prehistoric peoples. Camas today grows in moist meadows, and is most productively harvested in those areas where the ground is damp most of the year. Hannon's experiments harvesting this crop showed that in moist areas the camas bulb grows closer to the surface, and is easier to dig. She argues that the hot summer regime of the xeric period would have effectively eliminated camas as a food crop from the dry, low-lying valleys, which even today experience high summer temperatures. Camas may have been available at higher elevations, however, where damp meadows existed.

Although these significant plant foods may have been restricted, the xeric climate of the early Holocene may have enhanced the availability of certain game species. Open environments, such as grasslands, wet and dry meadows, oak savannah, and chaparral communities were probably more characteristic of this period. These environments provide browse, seeds, nuts, and cover for numerous game species, including deer and elk; rabbits, squirrels, and other small mammals; and birds such as grouse. Although high value, easily processed vegetable foods may have been limited during this period compared to later times, high value game species--which feed on vegetation less appealing to humans--may in fact have flourished.

If the above inferences are valid, the xeric climate of the early Holocene would have produced a different distribution of staple resources than the mesic climate of the later Holocene. The Interior Valley Zone's biota would have expanded, with larger areas of grassland and chaparral. Oaks may have replaced conifers at the valley edges. Fisheries may have been more restricted than they were later, with abundant runs only during the winter season. Acorn production may have been important, but under conditions of moisture stress minor fluctuations in local moisture regimes may have contributed to unpredictable and annually fluctuating harvests. Camas may have been restricted to moist meadows at higher elevations. Game animals may have flourished. Winters were not as long or harsh, and use of the uplands was possible from earlier in the spring until later in the fall than during later more mesic times, both for game animals and their human predators.

The transition to a more mesic interval brought about changes significant to the prehistoric inhabitants. Additional rainfall led to an expansion of oak trees and acorn production; anthropogenic burning maintained the oak woodlands, and was necessary to keep conifers from encroaching upon the oaks. Cooler and damper conditions fostered growth of camas at lower elevations. More rainfall and a winter snowpack contributed to better conditions for anadromous fish. Harsher winters and heavier snows also kept people at lower elevations for longer periods during the year. Coniferous forests expanded, possibly limiting the lower elevation habitat beneficial to those game species important to people.

Summary

The environment of interior southwest Oregon at the time of historic contact promoted a seasonal round of subsistence activities, in which native people provisioned themselves from the resources available at different times and places throughout the year. The abundance and predictability of anadromous fish runs throughout the year provided a stable resource. Availability of fish was complemented by acorn harvests from low-elevation oak groves probably maintained against colonization and replacement by conifers through anthropogenic burning. Cold and wet winters restricted human movement into the uplands, but also drove important game animals to low elevations. As elsewhere in the Pacific Northwest, these factors operated to promote a semi-sedentary way of life, with stable winter settlements along fish-bearing streams and summer camps at locations of seasonally abundant foods in both the lowlands and the uplands.

Gross differences in the climate of the early Holocene engendered a different constellation of resources available to the prehistoric inhabitants, and may have influenced different ways of life. A xeric interval in the early to mid-Holocene may have limited the availability of staple foods such as anadromous fish, acorns, and camas, but may have permitted movement throughout the countryside for longer periods during the year, due to milder or shorter winters. It may also have enhanced the availability of game throughout the year. The timing of the transition from an earlier xeric period to a later more mesic one is as yet unclear, but it probably occurred sometime between 6,000 and 3,000 years ago.

In addressing the question of culture change as seen in the subsistence and settlement patterns of prehistoric inhabitants, the environmental context assumes great importance. Hunter-gatherer economies are inextricably tied to the resources available in their local territories. The potential resources of those localities, as well as environmental changes within them, provide the most basic explanations of subsistence/settlement patterns and changes within those patterns. Other factors which condition these cultural configurations may have great importance, but environmental possibilities and constraints are fundamental.

CHAPTER III

DEFINITION OF SUBSISTENCE AND SETTLEMENT PATTERN MODELS

Introduction

In addressing the question of culture change in prehistoric southwest Oregon, it is useful to examine contrasting modes of subsistence and settlement established for hunter-gatherer societies in general. Local ethnographic and archaeological work can then assist in determining how such contrasts apply to this area. The task of this chapter is to review these contrasting subsistence/settlement modes, and to use the ethnographic and archaeological evidence to formulate models expressing these contrasts which are appropriate to this region and discernible in the archaeological record.

Hence, the intent of this chapter is to present two alternative models for prehistoric subsistence/settlement systems in southwest Oregon, based on distinctions generally recognized in hunter-gatherer societies. The first pattern, termed here the "Collector Model," represents a more sedentary way of life in which people established themselves at permanent villages for at least the winter months, and at which they stored foods collected and processed throughout the year for use during that time. The people living in this area at the time of historic contact followed this way of life, and descriptions of their way of life help define and identify the archaeological elements of this regime. The contrasting model, here termed the "Mobile Model" represents a hypothetical pattern in which people led a mobile existence, moving among resources as they became available, and relatively independent of collection and processing of foods for provisions over winter. Previous archaeological work in this region permits the hypothesis that this pattern existed early in this area's prehistory.

Differences in hunter-gatherer subsistence/settlement modes are reviewed below, as are the ethnographic and archaeological data, in order to define the expression of these two models in this area and the types of sites of which they are constituted. The chapters following this discussion focus on the methods used to discern these subsistence/settlement patterns in the archaeological record.

Subsistence/Settlement Contrasts in Hunter-Gatherer Societies

The archaeological analyses presented in subsequent chapters reveal a difference between the subsistence/settlement systems of the earlier and later prehistoric periods. In order to interpret these distinctions, it is useful to review contrasts noted for hunter-gatherer subsistence/settlement systems more generally. The contrasts reviewed here provide a specific framework for interpreting the archaeological record, and for developing the two models used in this study.

Distinctions in hunter-gatherer subsistence/settlement systems are sometimes expressed as differences in mobility/sedentism and in the degree of reliance on processed and stored foods. Three examples of such distinctions provide a basis for analyzing the local materials: Bettinger and Baumhoff's (1982) traveler/processor distinctions; Woodburn's (1988) immediate versus delayed-return conceptions; and the forager/collector contrasts used by Binford (1980). Each of these three examples arise from different purposes and have different research orientations, but they share a common perspective in recognizing mobility, intensive use of resources, and storage, as key elements in contrasting hunter-gatherer systems.

Bettinger and Baumhoff (1982) describe two hunter-gatherer systems which are distinguished from one another on the basis of the intensity of resource use, resulting in differences in subsistence mobility and in processing and storage of foods. Travelers, they argue, focus on "high quality" foods--such as game--which do not take much time and effort to process, but which do take time and effort to procure. Such groups move their camps frequently, and send hunting groups out from camps for long distances to procure these high-return items. Processors, however, focus on foods--such as seeds--which take considerable time and energy to obtain and make palatable, but which do not require as much time and energy to locate. Processors also use high return items, resulting in a broader subsistence base and more intensive subsistence strategy than travelers. Since they focus on labor intensive items, processor groups are not as mobile in the subsistence quest.

In attempting to explain culture change in the Great Basin, Bettinger and Baumhoff (1982) argue that the processor strategy will out-compete the traveler one, when the two regimes come in contact. Processors have larger populations and eat not only what travelers do, but other foods as well, giving them a competitive advantage over travelers. Bettinger and Baumhoff also argue that cultural differences would make it difficult for a traveler society to shift rapidly into a processor mode, even when faced with competition from such groups.

Woodburn approaches the differences between hunter-gatherer societies from a different orientation. Working primarily with modern hunter-gatherers, Woodburn expresses major differences among hunter-gatherers as differences in understanding and intention. Immediate-return societies are those in which activities are focused on the present; delayed-return societies are those in which activities are oriented to the past and future as well as to the present. More fully expressed, immediate-return systems are those in which "people deploy their labor to obtain food and other resources which will be used on the day they are obtained or casually over the days that follow"; have "simple, portable, utilitarian, easily acquired, replaceable tools and weapons," and are not dependent upon assets which have delayed yields based on labor invested (Woodburn 1988:32). In delayed-return systems, however, people do hold assets which provide a return on their labor (Woodburn includes some hunter-gatherers and all other societies in this system). There are four main types of such assets for hunter-gatherers, often found together in mutually reinforcing arrangements (Woodburn 1988:32):

> (1) Valuable technical facilities used in production: boats, nets, artificial weirs, stockades, pit-traps, beehives and other such artefacts which are a product of considerable labour and from which a food yield is obtained gradually over a period of months or years.

(2) Processed and stored food or materials usually in fixed dwellings.
(3) Wild products which have themselves been improved or increased by human labour: wild herds which are culled selectively, wild food-producing plants which have been tended, and so on.
(4) Assets in the form of rights held by men over their female kin who are then bestowed in marriage on other men.

Immediate versus delayed return systems are reinforced and further differentiated by a number of correlated aspects of the social organization of each. Immediate return systems, for example, have flexible social groupings which change constantly in composition; social relationships stress sharing and mutuality, resulting in leveling mechanisms in terms of accumulation of wealth; social relations do not include long-term, binding commitments; and distinctions in wealth, power, and status are consequently eliminated. Delayed return systems depend upon "binding commitments and dependencies between people" in order for people to "build up, secure, protect, manage and transmit the delayed yields on labour" or other assets which are part of a delayed-yield system (Woodburn 1988:33).

Binford (1980) offers a third example of hunter-gatherer subsistence contrasts. He uses the concepts of foragers and collectors to explain variation in the ethnographic and archaeological record in hunting-gathering societies. Forager societies are those which "map on" to resources, moving people among different resources to obtain their subsistence needs. These groups do not engage heavily in storage of seasonally available foods, but rather circulate, often through large territories, on an annual foraging round. Collectors, in contrast, do have a stable home base where foods are collected and stored, provisioning a more sedentary way of life. Such groups are logistically organized; they send specially organized task groups to resource patches where foods are processed and brought back to the home base. Binford presents these concepts not as stark contrasts, but as concepts which can help explain the variation evident in hunter-gatherer societies, many of which employ both strategies at various times, depending on local circumstances.

Binford presents these differing subsistence strategies as strongly correlated to environmental constraints. He argues that conditions which constrain mobility foster a collector strategy. A seasonal climate, for example, constrains mobility due to weather factors, and gives rise to temporal (seasonal) and spatial differences in the availability of resources. Storage becomes necessary to meet subsistence needs for at least part of the year; stored foods in turn decrease a group's options for mobility by tethering them to the place of storage. Furthermore, a seasonal climate produces a variety of desired resources available more or less simultaneously at different places, but only during part of the year. In order to harvest all desired resources, it thus becomes necessary for a group to carefully plan and organize its subsistence strategies, with members of the larger group frequently engaging in different tasks. Foragers, however, are typically found in the tropics, where seasonal limits are not as pronounced and where resources are more spatially and temporally homogeneous. Under these conditions foragers simply move from place to place, meeting subsistence needs until the surrounding territory is depleted and a new camp is made.

The three sets of contrasts just presented are not entirely equivalent, yet for the purposes of this study it is possible to derive two alternative patterns which assist in the definition of subsistence/settlement models for prehistoric southwest Oregon. Processors, delayed-return systems, and collectors all share an emphasis on processed and stored foods and a more sedentary settlement regime. These types share a number of other characteristics which stem from these factors, such as higher densities of population, non-portable facilities which represent an investment in time and labor, and carefully organized strategies for food procurement accompanied by labor intensive food processing and "binding" social ties. Woodburn's enumeration of assets (listed above) is especially interesting from an archaeological view, since all but the last are potentially visible in the archaeological record. Where such things are found, therefore, a delayed-return system is indicated. Translated into an archaeological idiom, such groups would have stable villages, with substantial architecture, storage facilities, tools for processing, and possibly distinctions in wealth and status evident among the people.

In contrast to the above, travelers, people engaged in immediate-return systems, and foragers follow a more mobile existence, generally unencumbered by the accoutrements of a group that is dependent upon processed and stored foods. Such mobile groups have smaller populations, move frequently about the countryside, and are unlikely to display great distinctions in wealth or to invest in substantial facilities for housing or storage. Archaeologically, such groups would lack the stable settlements postulated for the alternative regime, as well as the tools and facilities associated with a heavy dependence on processed and stored foods. Settlements would be small, relatively temporary, and frequently moved. Tools would be useful and expedient, and wealth items would not be particularly important.

In the review that follows, the ethnographic record demonstrates the existence in southwest Oregon of the processor/delayed-return/collector mode (here termed "collector mode" for simplicity). Ethnographic peoples followed a way of life with the distinguishing hallmarks of the collector mode: stable communities with a significant investment in labor; processed and stored foods; limited mobility with movements tied to a central base; and a labor intensive subsistence regime which required centralized planning and logistical organization. In southwest Oregon, the particular variant of this pattern was expressed in a semi-sedentary subsistence/settlement pattern in which the stable home base was occupied for part of the year, with the remainder of the year devoted to forays aimed at obtaining, processing, and storing foods for the winter.

If there was a difference between the way of life expressed in the ethnographic record and that of an earlier time, as argued here, then the contrast to the collector regime poses the likely alternative for the earlier period. Here termed the "mobile" pattern, this alternative hypothetically consists of a subsistence/settlement regime with the following characteristics: small, mobile groups which do not depend heavily upon processed and stored foods, with no major investments in architecture or facilities, with fluid social organizations and little distinction in wealth and status.

The above contrasts are illustrated in the ethnographic record and expressed in previous archaeological work for the study area. The following sections review the ethnography and previous archaeology for this area, as sources for the collector/mobile models used to interpret the archaeological materials in the subsequent analyses.

The Collector Model: Ethnographic Example

Ethnographic research complements archaeological studies in many ways. It provides a deeper understanding of the cultural reality of which the archaeological materials were a part, and in this study gives specificity to the concept of a collector subsistence/settlement pattern. The ethnographic evidence available for the people living in the study area supports the inference that these groups participated in a collector regime. This information also assists in the definition of archaeological site types which characterized that regime, and helps describe the archaeological assemblages and features which identify these types. The following review introduces the diverse groups who lived in the study area, and presents information from the ethnographic record which is directly relevant to the description of subsistence/settlement patterns.

The ethnographic record for interior southwest Oregon is limited, and scattered among ethnographic summaries and notes, historic accounts, oral histories, and recent analyses and summaries (e.g., Beckham 1971, 1983a, 1983b, 1986; Beckham and Minor 1992; Gray 1987; Kendall 1990; Lalande 1989; Miller and Seaborg 1990; O'Neill 1989b; R. Winthrop 1993). While it is possible to use this material to illustrate different parts of the collector regime, such as descriptions of winter villages and resources used, it is more difficult to obtain an integrated picture of the seasonal round.

In order to provide a fuller picture of a collector way of life, therefore, I provide a brief description of the seasonal round employed by the Yakima, at the end of this section. The Yakima are a Plateau group living along the central reaches of the Columbia River, in an environment which shares certain essential characteristics with southwestern Oregon, including a seasonal climate, mountain and valley topography, and fish-bearing rivers. These people remained in their homelands and maintained their subsistence traditions beyond the period of historic contact. This brief description adds unity to the disparate pieces of information available from the local material, and emphasizes the utilization of strategy and planning which accompanied the annual round. Though some of the staple foods were different than for the southern Oregon groups, the annual rhythm was similar, and this example illustrates the timing of various subsistence tasks undertaken, and underscores the hard work which was part of a collector way of life.

The tribes who inhabited interior southwest Oregon were distinguished from one another mainly on linguistic grounds but were connected through all the usual ties of social concourse, including intermarriage, trade, and warfare. They shared furthermore a common approach to the land in terms of economy and settlement, and the material remains from their sites bear no easily recognized ethnic signatures.

The people who inhabited the study region consisted of the Takelma, the Cow Creek Band of Umpqua, the Applegate Athapascans, the Molala, and the Shasta (see Figure 4). The Takelma spoke a Penutian language and inhabited the Rogue Valley. Their linguistic kin, the Cow Creek Band of Umpqua Indians, lived immediately north of them along the South Umpqua River and its tributaries. The southwestern part of the Rogue Valley was inhabited by Athapascan-speaking peoples, who lived along the Applegate River. Other Athapascan groups lived along the lower reaches of the Rogue, including Galice Creek, and along the Umpqua and lower portions of the North Umpqua Rivers. The Molala, speaking a language in the Penutian family (Rigsby 1969:79), inhabited the uppermost reaches of the North Umpqua and Rogue Rivers, in the Cascades. The Shasta, speaking a Hokan language, maintained a hold in the southern Rogue Valley from their main homeland in the Shasta Valley of northern California.

The Takelma

The Takelma Indians inhabited the Rogue Valley, with a territory extending from about the confluence of Grave Creek and the Rogue River on the west to the crest of the Cascades on the east, and along the Rogue Umpqua divide on the north to about the present town of Ashland on the

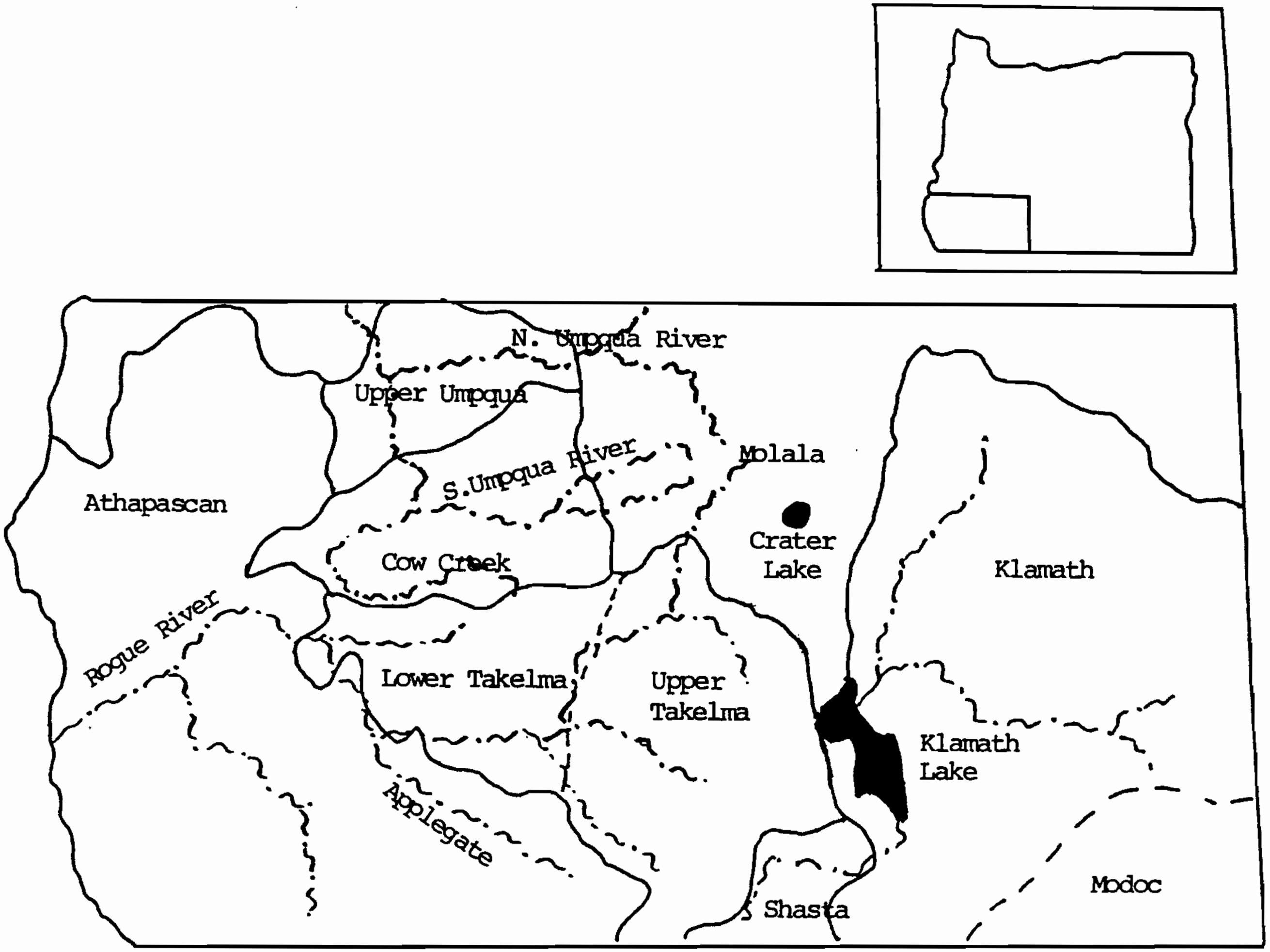


FIGURE 4. Ethnographic map of study area.

south.[1] The Takelma, along with the other Indians in this area, fought a series of battles with the historic (mainly Euro-American) invaders, who flocked to this region after the discovery of gold in the early 1850s. This period, known as the time of the "Rogue Indian Wars," was disastrous for the Indians, many of whom were killed or removed from the region to distant reservations by 1856. As a result of this traumatic history, the ethnographic information which exists is very limited. It is based largely on interviews with a few informants near the turn of the century (Dorsey 1890; Sapir 1907, 1909) or a few decades later (Drucker 1937; Gray 1987:10). Gray (1987) has extensively reviewed the extant data on the Takelma, including the unpublished fieldnotes of J. P. Harrington which pertain to these peoples. Unless otherwise noted, the following brief discussion draws largely upon Gray's synthesis.

Gray distinguishes two and possibly three divisions of the Takelma, recognized by the informants of the early decades of this century (cf. Sapir 1907:252). These divisions consist of the Lowland Takelma, occupying the western part of Takelma territory; Upland Takelma in the eastern part of the territory; and another band whom Gray refers to as the "Northern Takelma" in the northeastern area. These groups shared a common way of life, though local differences in the availability of certain resources may have engendered variations in the seasonal subsistence regime. The Lowland Takelma were situated along better fisheries on the Rogue, for example, and

---

[1]In this and in other territorial distinctions I am following Gray (1987), who has extensively reviewed the literature, much of it conflicting, regarding local ethnographic territories in this region.

the Upland Takelma were probably more dependent upon deer and elk for animal foods (Drucker 1937:294; Gray 1987:32).

The staple foods of the Takelma consisted of acorns, camas, anadromous fish (particularly salmon), deer and elk. Manzanita berries, tarweed seeds, pine nuts and cambium, wild plums, small mammals such as rabbit and squirrel, other fish, eels, and mussels, and certain insects are also listed in the ethnographic record as foods (Gray 1987:30-34; Sapir 1907:257-260). These foods became available at different times of the year: Acorns were gathered in the late summer or fall, as were camas and the pine-bark cambium; other seeds and fruits became available in the summer and fall. Fishing occurred during seasonal spawning runs, which are noted for summer, winter, and spring, although not all fish-bearing streams had runs of fish every season (Gray 1987:32). Favorite fishing locations were at falls and rapids along the Rogue and its tributaries; fishing along the Applegate was remembered as particularly productive (Gray 1987:32-33). Hunting deer and elk was primarily an upland pursuit, generally associated with the warmer months of the year (Gray 1987:33; Sapir 1907:260).

Many of the foods listed above required preparation for eating and storage. Acorns needed to be pounded into meal which was leached of its natural tannic acid to make it palatable; camas was roasted in earth ovens, mashed, and formed into cakes for winter use (Sapir 1907:258). Manzanita berries were pounded into flour, mixed with sugar-pine nuts, and stored for future use (Sapir 1907:259). Salmon were split and dried, and the meat sometimes pulverized for storage (Drucker 1937:294); baskets of roasted salmon were kept for winter use (Sapir 1907:260). Deer products were also processed for winter storage; Sapir notes that cakes of deer fat were put away for winter use (1907:260).

The Takelma occupied permanent villages, situated along the major waterways and at lower elevations[2]. These habitation sites were occupied over the winter, and as needed during the warmer months (Gray 1987:38-39). These villages were home-places, and provided the locus of an individual's social identity (Sapir 1907:267). Villages consisted of substantial houses, built of poles and planks with the floor excavated up to two feet into the ground; structures were approximately 12 feet wide and 15 to 20 feet long (Gray 1987:37). A village would contain one sweat-house, a semi-subterranean structure which was covered with earth and sufficiently large enough for six men (Sapir 1907:263). In terms of the annual cycle, villages were probably the locations at which inhabitants spent the most time. Goods were stored there, and the dead were brought back to the village for burial if the death took place elsewhere (Gray 1987:42). Villages may have varied considerably in size, depending upon location. Sapir notes that they were "generally insignificant" (1907:267), though Peter Skene Ogden (a trapper in the area in 1827) noted a village of "six large houses" sufficient to contain upwards of "100 Indians" (LaLande 1989:22).

During the warmer months, the need to gather foods available at other locations frequently took villagers to the uplands (Spier 1927:359), to be near such resources as oak groves and game. Seasonal camps could occur at

---

[2] These villages are listed and mapped in Gray, 1987.

any location, however, such as along the rivers at fishing stations and near meadowland resources such as camas. A more mobile existence in the summer is noted by one informant, who stated that ". . . in summer Indians travelled all around" (Gray 1987:38). Summer shelters were temporary and minimal; Sapir notes that "in summer the Indians dwelt in a brush shelter built about a central fire" (1907:262).

The ethnographic record for the Takelma does not directly indicate several features of the subsistence/settlement system which are important to this study, though such features may be inferred. Warm-season camps are assumed to represent generally more specialized activities than those occurring at the main village, since these locations are specific to the acquisition of certain foods or other resources. It is also inferred that small groups or individuals took part in specialized tasks outside the winter or summer habitation areas, such as hunting.

Support for these inferences comes from ethnographies of the Shasta Indians, who inhabited the land directly south of the Takelma and who were, according to Sapir, closely allied in terms of cultural patterns (Sapir 1910:673). The many similarities in the environment, staple subsistence foods (acorns, salmon, deer), as well as the close proximity of these two peoples supports this assertion. The Shasta survived the period of contact better than did the Takelma, and the ethnographic data are correspondingly richer. A brief review of the Shasta data helps augment the scanty Takelma record.

Like the Takelma, the Shasta inhabited villages along waterways[3] during the winter and dispersed into the mountains during the warmer months to gather supplies. Winter villages could be small, consisting of only two to three families. Winter houses were substantial semi-subterranean pole and plank affairs, inhabited for about five months of the year and sometimes large enough to accommodate several related families. Houses contained baskets for storing acorns and dried meat and fish, and for cooking. A communal house was built only in villages containing several families, and was used for gatherings, games, and other social purposes; a men's sweat-house might also be built in the larger villages (Holt 1946:344; Silver 1978:215). Menstrual huts and small family sweat-houses used mainly by women were also part of the village pattern. As the weather warmed, the Shasta would move into brush shelters, not far from the village (Dixon 1907:413-422).

According to Holt (1946:308), they lived in these shelters through the summer salmon season. When acorns were ready, they moved higher up in the hills to seasonal camps in the oaks, where they lived in bark shelters. Later in the fall, when further into the mountains for the fall hunt, they camped in the open. Smaller parties would depart from these sites to accomplish discrete tasks. Dixon, for example, notes fall or winter hunting parties composed of men and women, or only men (1907:431). In early summer a group of men and women might go to the mountains to prepare

[3]These villages are listed and mapped in Heizer and Hester (1970).

lumber and other materials for house construction back at the village (Holt 1946:306).

The Shasta seasonal round is summarized by Holt (1946:312) as follows:

> The type of activity changed with the season. In the summer the people lived in brush houses by the river and almost their entire attention was turned to fishing and its attendant activities. In early fall when acorns were ripe, they moved up on the hills among the oaks, leaving a few old people in the village, put up their bark houses, and set about gathering the year's supply of acorns. While the women gathered acorns the men hunted deer, singly at this time, with bow and arrow. Then they came down and late in the fall went high up in the Siskiyous for the last big fall deer hunt. It was at this time they had the big drive, encircling the deer with fire. This was a busy time, occupied entirely with hunting and cutting up and drying the meat. . . . After this hunt, the acorns, left stored where they had been gathered among the oaks, were brought in by the people, who hurried to get them in [to the village] before the storm. . . . The people gathered wood, shelled acorns, and generally prepared for winter. At the onset of the first snowstorm all prepared their snowshoes . . . after the storm settled, there came the hunt in the snow . . . and in early spring came the hunting at the deer lick.

The Applegate Athapascans

The people living along the Applegate River, in the southern part of the Rogue Valley, spoke an Athapascan language and were differentiated from the Takelma mainly on that basis. The literature on this group is very scant. In 1904 Pliny Goddard collected information on these Athapascans, as did Melville Jacobs in the 1930s. These studies are reviewed in Gray (1987).

The Applegate Athapascans followed a cultural pattern similar to the Takelma (Drucker 1937:284). There were perhaps no more than three villages in the Applegate drainage (Gray 1987:56). Villages were reported to consist of two to ten houses; archaeological evidence suggests that these winter "villages" could be as small as one house inhabited by an extended family (Gray 1987:56). The houses themselves were substantial wooden constructions built over excavated, semi-subterranean floors. Houses contained beds and mats, hearths and stools. Winter drying structures were associated with family dwellings, and sweat-houses were part of the village architecture. Sweat-houses varied in size, depending on the size of the community, and were used by the men. Like the Takelma, the Applegate Athapascans would bring the cremated remains of people who died elsewhere back to the village for burial, where the dead were interred in graveyards.

Like the other peoples in this region, the Applegate Athapascans followed a seasonal round, gathering and processing foods for over-winter storage at the home village. Summer dwellings were temporary affairs consisting of "brush or grass walled shelters with a flat roof of fir boughs surrounding a centrally located campfire" (Gray 1987:56). Subsistence tasks followed a seasonal pattern. In the autumn deer and elk were hunted specifically to dry meat for the winter, and quantities of salmon were dried and pulverized for winter use (Gray 1987:49). People had a camp in the early fall "at the foot of the mountain to snare deer" and earlier in the year lived at a summer camp at the mouth of the Applegate River where they fished. In fall they hunted on "the big round mountain," and packed their kill back down to temporary camps in the upper Applegate Valley (Gray 1987:50).

The Umpqua

The North and South Umpqua Rivers were home to several different tribes. The lower reaches of the North and South Umpqua Rivers were inhabited by a group known as the Umpqua, speaking an Athapascan language. The upper reaches of the South Umpqua were inhabited by a group known today as the Cow Creek Band of Umpqua, who were a people speaking a Takelman language. The Molala lived along the upper reaches of the North Umpqua River as well as the upper reaches of the Rogue. This section considers the two Umpqua peoples; the following section discusses the Molala.

There are no published ethnographies directly pertinent to either the Athapascan Umpqua or the Cow Creek Band. The information available for their histories comes from the records of early settlers and explorers, Bureau of Indian Affairs agents, linguistic studies and archival sources pertinent to the larger Athapascan-speaking group in Oregon, and later oral histories conducted as part of a federal recognition treaty (Beckham 1983a and 1983b) or cultural resource projects (e.g., R. Winthrop 1993). The early information is largely anecdotal, and has been analyzed and summarized in several recent works (Beckham 1983a, 1983b; Beckham and Minor 1992; O'Neill 1989c; R. Winthrop 1992). More inclusive studies of Athapascan-speaking peoples in southwest Oregon provide firmer ethnographic documentation on a broader scale for the Athapascan-speaking Umpqua (e.g., Drucker 1937; Miller and Seaburg 1990).

The Athapascan Umpqua depended on a constellation of staple foods similar to those of their neighbors to the south: anadromous fish, acorns, deer, and camas, though camas may have been more emphasized and acorns somewhat less so, due to possible differences in availability of these resources in the Umpqua and Rogue River drainages. The annual subsistence/settlement cycle was apparently similar to that of the other peoples in the area and other Athapascan-speaking groups in southwest Oregon. Semi-permanent villages provided a place for winter habitation and storage of winter foods. Habitation at these sites alternated with movements to seasonal camps in the countryside as annual resources became available. Shelters at these camps were made of grass or thatch and temporary in nature (Drucker 1937:279)

An early explorer noted a village of two houses containing about 25 people; another observer noted that the lodges were about 15 or 20 feet long and made of cedar planks. These houses contained baskets, mortars, and pestles (Beckham and Minor 1992:107). Sweat-houses resembled those along the lower Rogue River (Drucker 1937:279). The seasonal round, described generally for the Athapascans of southwest Oregon, was probably applicable to the Umpqua. In June, women gathered roots such as camas, and berries, which were processed for storage. In July men fished; in August the old people stayed in the village while the younger people departed for summer camps to hunt and to dry the meat. Early fall was spent at fishing camps; men fished, women processed the fish, and gathered acorns, nuts and seeds. In winter, people settled into the villages (Miller and Seaburg 1990).

The Cow Creek Band of Umpqua consisted of several bands living along the South Umpqua and its main tributaries. Though enemies of the Takelma, they spoke a closely related language (Beckham and Minor 1992:111) and followed a similar way of life. Beckham, who conducted the historical studies in support of the Cow Creek Tribe's federal recognition application, has examined the historical literature and oral histories associated with these peoples. In a recent summary of their ethnology, he presents a view of the subsistence/settlement regime which is broadly in keeping with that of the other peoples reviewed here.

Beckham defines three zones related to subsistence/settlement activities. The Lowland zone exists between 400 - 800 feet in elevation, and has river terraces and extensive meadows of camas and tarweed, and oak groves. Cow Creeks had permanent winter villages in this area. The Uplands, from 800 - 1,800 feet, was also used for winter villages, especially along the South Umpqua and its tributaries Elk Creek and Cow Creek. This area encompassed forested hillsides with hunting and gathering areas, and the river and creeks provided fish and other aquatic foods. The High Mountains, from 1,800 to 5,500 feet provided extensive huckleberry patches and excellent hunting.

Beckham notes that the Cow Creeks, like other Indians in the region, utilized all three environmental settings throughout the course of the seasonal round. A good description of a summer camp, for example, comes from the reports of summers at the huckleberry fields. Families would rendezvous at these camps in August and September; the men would hunt, the women and children would gather berries, and everyone would enjoy themselves with socializing and games (Beckham 1983a:44-55). As elsewhere, the annual round also included sorties from the village and seasonal camps by specialized groups and individuals for specific and focused purposes. Beckham (1983a) lists a number of such specialized activities, including hunting, herb and medicine gathering, and spirit quests.

The Molala

Data on the Molala of the southern Oregon Cascades are even more meager than for the Umpqua. Sources of information on this group have been most recently reviewed in R. Winthrop (1992) and Beckham and Minor (1992). These authors draw upon ethnographic studies by Leo Frachtenberg in 1910-11 (unpublished), as well as on studies by Harold Mackey (1972) and Bruce Rigsby (n.d.; 1966; 1969).

The Molala, divided into several groups, inhabited the Western Cascades from the Rogue Valley in the south to Mt. Hood in the north. Based on Frachtenberg, Rigsby (n.d.:2) states that

> The Molalas wintered in sites located along streams in the lower elevations, usually west of the Cascades, and they exploited the higher country for roots, berries, and larger game (deer, elk, and bear) at other times of the year.

Also based on Frachtenberg, R. Winthrop (1992:3-35) notes that winter houses were built of cedar and were six to eight feet wide and 20 to 30 feet long; summer shelters consisted of a roof of fir boughs with no walls. A winter house might contain several families, and villages were small, consisting of a few families (R. Winthrop 1992:3-36).

The complex of important resources consisted of the familiar deer, fish, camas, acorns and berries. However, the interior location of this group suggests a greater reliance on hunting, since anadromous fish runs would not be as abundant as for those living further west along the main fish-bearing streams. The Molala are noted for trading smoke-dried meat for other goods in the Willamette Valley, and one informant stated that "all the Molala people did was hunt!" (quoted in R. Winthrop 1992:3-35). In reviewing a Molala myth, Winthrop argues that the theme of the myth is to provide a cultural charter for the Molala's identity as a hunting people. Based on this evidence, he suggests that these people may have been somewhat more mobile in the food quest than were their neighbors, with hunting a greater focus than other more stationary pursuits (R. Winthrop 1992:3-35).

The Yakima of the Plateau

Eugene Hunn's contemporary work with the Yakima Indians of the mid-Columbia River presents a useful portrait of a collector regime in an area with environmental parameters similar to those of interior southwest Oregon (Hunn 1982; 1990). The brief description of that regime rendered here provides a more coherent picture of the collector way of life than can be attained from the fragmentary data available for the groups just discussed. Hunn's work has the further advantage of an ecological focus, which is lacking in ethnographic work compiled for the southern Oregon groups, and provides a fuller picture of the planning and hard work that are part of the logistically organized collector regime.

The Yakima inhabit the middle section of the great Columbia River, occupying a territory which incorporates the fish-bearing river and its tributaries, the valleys of these streams, and the forested mountains which rise above them. This landscape provides abundant foods at different seasons of the year, requiring careful timing for harvest and a strategy for seasonal movement. None of the staple foods are available during the winter; people had to process and store goods throughout the year to avoid winter famine. The need for seasonal movement coupled with the tie to a home base where goods were stored resulted in a subsistence regime which required careful planning and coordination of procurement tasks, as well as a lot of labor to process and transport a surplus of goods during the warmer months for use during the cold season. This planning and coordination resulted in a predictable annual routine, which resembled that of the people in southwest Oregon.

Winter was a season free from the rigors of direct subsistence tasks, and devoted to other pursuits. It was a time for making and mending tools, making rope and netting, visiting, myth-telling, and exchanging goods and information. Families congregated in villages along the Columbia, beginning in about October and remaining until early spring, when the first plant harvests become available.

Root crops formed a significant part of the Yakima diet. Gathering parties would leave the village for short periods of time as these became available at low elevations, as early as February. During late April and early May, root digging was suspended for the peak run of spring Chinook salmon, when all available labor was needed to catch, clean, and dry the fish. As the season warmed and root species became available at higher elevations, parties would dismantle the winter lodges and move to a series of camps at increasingly higher elevations, spending perhaps a week's time in each camp. Women would gather roots and other foods, which they would process back at the camp. The dried provender was then hauled back to storage facilities in the main village.

In early summer, families would move in loose association with one another to the camas meadows in the mountain uplands, harvesting staple crops as they became ripe at higher altitudes. Where crops were plentiful but dispersed, camps were small, but where summer crops such as camas or huckleberries were dense and plentiful, congregations could be large. These larger camps provided opportunities for socializing, gambling, politicking, and match-making. Stays at these camps might last from one to several weeks, sufficient to provision a family with camas or berries for a year. The summer runs of salmon pulled families back to the river to harvest and process the fish. During slack periods between fishing peaks women would gather berries and fruits, with all departing for the berry camps in late summer.

Fall was a busy season. Huckleberries were prime in the uplands, and the most important fish run of the year, of fall chinook, occurred in September. Where distances were not too great, men departed the berry camps to fish; in later times, with the horse, fish were hauled back to the berry camps for women to process. Huckleberry season also coincided with the prime time to hunt deer and elk in the uplands. By October, the winter village was replenished and re-occupied, with final preparations for the winter taking place.

The Collector Model

The ethnographic evidence for the people living in the study area illustrates the collector regime, and provides evidence for the types of sites which characterized that regime. All these people lived in stable, permanent, winter villages where goods were stored, and participated in an economy dependent on processing surplus foods during the warmer parts of the year. The village provided a firm geographic locus; tethered as they were to the winter village, the seasonal movements of its inhabitants were likely to be relatively predictable and systematic. Warmer seasons of the year saw people moving to temporary shelters at seasonal camps; these places were often re-occupied year to year. Small groups of people departed both village and seasonal camps for short forays into the countryside for specific tasks, such as to hunt, gather specific plants, or participate in a ritual activity.

Archaeology: Hypotheses for a Mobile Subsistence/Settlement Regime

There are three recent works which present interpretations of the archaeological record in southwest Oregon (Connolly 1986; Hannon 1992; Pettigrew and Lebow 1987). The works by Connolly and Hannon provide analyses which permit the hypothesis of a mobile subsistence/settlement regime prior to the inception of the collector pattern; Pettigrew and Lebow suggest a variant of the collector regime which may be long-lived in this region.

A dissertation by Connolly (1986) sets forth an argument for a series of significantly different patterns of land-use throughout the long prehistory of southwest Oregon. He statistically groups artifact assemblages from a number of sites, and identifies three distinct patterns based on the artifact types present. He argues that the earliest pattern, called the Glade Tradition, represents an extremely long-lived and stable cultural tradition which persisted from the beginning of the Holocene, but was gradually replaced after about 1500 years ago. He hypothesizes that the Glade Tradition was characterized by a "generalized hunting and collecting strategy oriented toward terrestrial resources." Small, mobile bands of foragers are inferred as part of this pattern, and "occupation sites appear to be predominantly temporary camps," frequently located at valley edges (Connolly 1986:214).

The two later patterns, called Siskiyou and Gunther Patterns, are similar to the ethnographically known way of life. These later patterns are characterized by settlement in river-side villages with fishing and intensive use of other foods as an important part of the subsistence regime. The transition from the Glade Tradition to these later patterns thus represents a significant shift in subsistence and settlement practices, from highly nomadic foraging groups to those living a more settled existence in semi-permanent villages located along major rivers and streams. A part of this change is a shift to a way of life in which resources are collected and stored in central villages, coincident with somewhat greater groupings of people.

Connolly bases his argument on archaeological data for a broad region, encompassing northern California and southwestern Oregon. His sample consists of 32 cultural components from 25 sites; sites were compared based on culturally diagnostic elements (e.g., projectile point types, pottery, oil lamps, bell-shaped mauls, and other distinctive artifacts). Once cultural groups were segregated, characteristics of the sites, such as site location, were noted to provide clues regarding the way of life followed by their inhabitants. Connolly's conclusions thus remain as hypotheses to be investigated by further work, as in the present study.

In another model, Pettigrew and Lebow (1987) argue that local variations in resource availability account for differences in prehistoric settlement regimes. In their work along Elk Creek, these authors note the existence of small, residential hamlets within the foothills of the Cascades. Drawing upon data from the Rogue Valley as a whole, they argue that the regional settlement system involved two kinds of habitation sites: large riverside villages (with multiple houses and extended families) on large streams where salmon could be relied upon as a staple, and small homesteads or hamlets (with one extended family group and one to three houses on average) fairly evenly scattered across the landscape on smaller streams. Though similar food staples would be used by these groups (i.e., salmon, deer, acorns), emphasis would vary depending on availability within any group's territory. Salmon, for instance, were of "paramount importance to the large riverside villages while acorns and deer were more important for the homesteads . . . the resource distribution largely determined the settlement distribution." They further suggest that a lifeway involving small housepit settlements as central bases and wintertime habitation sites is of considerable antiquity (Pettigrew and Lebow 1987:12.11).

A third study, already mentioned in Chapter II, relates subsistence and settlement patterns to presumed changes in the environments of the Rogue Valley during the course of the Holocene (Hannon 1992). As previously noted, Hannon argues that the xeric interval in the early to mid-Holocene would have affected the resources available to the hunters and gatherers of the study area. Fisheries were probably less abundant and annual runs confined to the winter season, especially along the upper reaches of the major rivers and their tributaries. Oak was more prevalent, but drought stress may have meant that crops were not always predictable, resulting in a patchy distribution of annual crops. Small game and deer were more abundant, but more dispersed for much of the year, given a shorter winter season. Hannon argues that this constellation of resources provided dispersed foods which fluctuated annually, with acorns abundant in one place one year but not the next, or deer abundant in one place one year but another place the next.

If this scenario is correct, she argues, the dispersed and unstable nature of the resources during the early Holocene would foster a highly mobile way of life on the part of the people who depended upon them. Campsites, rather than sedentary or semi-sedentary settlements, would have characterized this period. People probably did not re-inhabit the same sites every year, since the critical resources fluctuated annually, or were depleted in one area and allowed to regenerate. This consideration would have operated for both winter and summer residential bases. That is, if an area was hunted, fished, or gathered one year, it may have been several years before the group returned. This would contribute to considerable mobility, with large "catchment" areas necessary for each group. Population densities were probably lower than later on, and maximum group sizes smaller. Under this scenario, the basic social unit would be a small group that wintered and summered together, with some splitting off at certain times for special tasks.

Following the xeric period of the early Holocene, according to Hannon's model, the valley resources improved; a more mesic climate meant that staple crops such as camas and acorns were more abundant, as were anadromous fish. The winter habitation became the primary settlement focus, with groups returning to the same location annually. These places were located on anadromous fish-bearing streams, frequently where annual runs were plentiful and predictable. With harsher winters and shorter spring and fall seasons, the wintering spot was inhabited longer, and resources were stored to accommodate this period. Social units were flexible; where winter habitations were along major streams, comparatively large groups inhabited them. These groups would split into smaller units for the warmer seasons in the uplands and special task groups would make forays from either winter or summer habitations. At other places, smaller groups would constitute a winter village, perhaps consisting of a single family (i.e., the "homesteads" defined by Pettigrew and Lebow 1987).

The Mobile Model

The work accomplished by Connolly and Hannon helps develop the mobile model postulated as preceding the collector way of life. In this mobile regime, people lived in small groups, occupying home territories but not tethered to specific, stable, winter villages. Seasonal camps provided the main habitation sites; these were occupied by the entire group and moved when necessary. They might be reoccupied annually, or occasionally, but would be located near specific resources as such resources came available. Necessary short-term tasks, such as hunting, butchering, or quarrying, might be accomplished by a part of the group away from the camp.

Subsistence/Settlement Systems and Site Types

The two subsistence/settlement models used in this study, therefore, are contrasted with one another on the basis of sedentism/mobility, intensive use of resources, and the presence/absence of significant food storage as a critical element of the subsistence regime. The ethnographic record portrays a semi-sedentary regime, in which foods are processed and stored for over-winter consumption. Archaeologists working in this area postulate a different, earlier pattern, in which people followed a more mobile way of life, and did not rely on significant amounts of food processing and storage to cope with the winter months. In order to identify these patterns archaeologically, it is necessary to define the types of sites which constituted them.

Archaeologists in this region have long worked with three site types: the village, the seasonal camp, and the task site (e.g., Beckham, Minor, and Toepel 1981). These types were initially derived from ethnographic information, and have been used by many archaeologists as descriptive terms for the sites they have investigated. These three types are sufficient to describe the mobile and collector regimes hypothesized and demonstrated for this region, and to note the differences between them. Since these site types are in wide use, and since most of the sites used in this study have been initially described in these terms, these types are used in this study. The collector pattern produced all three types of sites; the more mobile pattern did not include the village.

Although these three site types have been in wide use, there is no definition of these types specific to the archaeological record for this region, nor is there a description of the archaeological correlates associated with these types of sites. Hence, these three site types are defined below, in terms of the types of activities accomplished at these sites and the relationships of these site types to one another. The following chapter gives specific archaeological content to these types, which is arrived at through the multi-step analyses which form the core of this dissertation.

Villages

The village was the geographic locus of the social group, the place which focused the annual round and the place where people spent the most extended period of time. As described in the ethnographic works, people spent up to five or six months a year at these places, returning to them at other times for various purposes. In some cases, the villages may have been inhabited for all of the year by some members of the group, such as the elderly. The larger winter villages were located along those rivers and streams which produced abundant fish; smaller settlements were located along less productive streams but all were at comparatively low elevations to avoid the harsh winters of the uplands.

Villages are the most functionally complex of all the site types. Numerous activities were accomplished at villages, by people of every age and status, and of both sexes. Permanent habitation, even on a semi-annual basis, made investment in substantial architecture--such as pithouses--worth the effort. The village's function as the focal point for storage made artifacts and facilities for storage necessary, such as baskets and pits. The variety of tasks at these sites as well as their stable locations also called for a variety of tools and implements, including many which were heavy and relatively non-portable, as well as those--such as pottery--which were fragile. Middens and cemeteries are associated with such sites, as places for long-term accumulation of refuse and burial of the dead.

Archaeological evidence defines variants of the village type. Small hamlets or homesteads, consisting of as few as one house for an extended family, provide a variant to the nucleated village settlements described more commonly in the ethnographies. The social implications of these differences in settlement size are surely significant; however, both types served a similar purpose in the settlement system. Large or small, the winter habitation was the locus of a group's territory and subsistence, providing the focus for the annual subsistence regime and the place for long-term storage. Hence, in this analysis, these two variants are included within the "village" category.

Seasonal Camps

Throughout the warmer months of the year, most people from the winter village moved to seasonal camps in the countryside, shifting these camps as different resources became available. Family groups moved together, though sometimes old people remained in the village, as noted above for the Shasta. The seasonal camps usually had a particular focus, such as berrying, root gathering, or hunting, and represented more specialized locations than the winter village. Yet these were also places where families camped and engaged in normal everyday maintenance tasks; tools and materials left from these camps would also reflect this more generalized focus.

These seasonal camps lasted from a week to perhaps a month or more, and provided temporary bases from which work parties could direct subsistence tasks. Temporary shelters often were erected at these seasonal camps. For collectors, these camps were also places where crops were processed, to reduce the bulk for transport to the home base. Those spots which were reliable producers of annual foods were visited on an annual basis, and heavier tools, if needed, were stored there. Other places for summer encampment may have changed from time to time within a given territory as resources fluctuated in response to various conditions. As noted in the ethnographic review above, some sites were occupied by only a small group, while others--such as the huckleberry fields--attracted large congregations of people. Regardless of the size of the group, however, the temporary and semi-specialized nature of the seasonal camp, complemented by a short-term, generalized activity focus, characterized these locations.

For the more mobile subsistence pattern, hypothesized for the earlier period, the seasonal camp was the main habitation site. These camps would have been similar to the seasonal camps of the collector regime. These camps were occupied by family groups, and were moved with the availability of seasonal foods. They thus reflected both the specialized focus on a particular resource, or constellation of resources, and the everyday activities of a diverse group of people. These camps were not stable home places, however, and their locations might shift annually. This pattern did not support substantial architecture, nor accommodate long-term storage. Winter camps would have characteristics similar to summer seasonal camps, except that they would be expected to occur at low elevations, probably along waterways productive of winter fish, and in areas of winter forage for deer and elk.

Task Specific Sites

Such sites result from focused and specialized activities accomplished by limited groups of people. Hunting/butchering sites, hunting blinds, fishing stations, quarries, spiritual quest sites, and short-term encampments when traveling are examples of such sites. These sites differed from the seasonal camps in two important respects: they were occupied for shorter periods of time, sufficient to accomplish the purpose generating the stay, and they were more specialized. Such sites reflect a single purpose, accomplished by a specialized group of people, such as a few male hunters, or a few adults quarrying stone material, or a few women and children gathering certain plants.

Task sites were tied to seasonal camps and village sites, and were generated throughout the year and at all elevations. It is predictable that task sites were more frequently associated with village sites and the logistically organized collector regime, for a number of reasons: the larger villages, at least, were better able to produce specialized work parties than small family groups; the longer residence at a single location required more forays to supply the resident group; and the emphasis on collected and stored foods would promote specialization during the warmer months, to optimize gathering of concurrently available foods.

In summary, the site types used in this study, and the subsistence/settlement regimes of which they are part, are as follows:

Site Types

1. Task-specific sites: located in a variety of environments, but related to either of the following two types.

2. Seasonal camps: (a) warm-season camps tied to a collector regime, (b) summer and winter camps postulated for a mobile subsistence pattern.

3. Semi-sedentary winter villages: includes both larger villages and small "homesteads" of one or a few houses.

Subsistence/Settlement Systems

1. The Collector Model: composed of all three site types.

2. The Mobile Model: composed of seasonal camps and task sites without the winter village/homestead component.

Although the three site types discussed here have been widely referred to by archaeologists in the region, there is no standard definition of the archaeological correlates of these sites. In order to place sites into these functional categories, it is thus necessary to define such correlates, and identify them in the sample of sites used in this analysis. This is the task of the next three chapters of this dissertation.

CHAPTER IV

RESEARCH METHODS: FUNCTIONAL ASSESSMENT OF SITES

The site types introduced in the previous chapter provide the framework for organizing the archaeological materials into functional categories. In order to analyze the archaeological materials, it is necessary to identify those characteristics of each site type which are likely to leave an archaeological imprint. This chapter reviews those characteristics, and introduces the methods used to assign archaeological sites to functional types.

Functional Types and Archaeological Correlates

Mobility, or the degree of sedentism, is one of the main characteristics distinguishing villages from seasonal camps, and both of these from task sites. The length of time a site was inhabited is linked to the number of people present during the period of occupation, and the degree to which activities at the site were specialized or generalized. These differences in turn are reflected in certain characteristics of the archaeological assemblages.

The density of artifacts at a site is assumed loosely to reflect the length of time spent at a site, the size of the group present, and the extent of periodic reoccupation. Very simply, this proposition assumes that the more people present and the longer the length of stay at a site, and the more frequently a site was revisited, the more artifacts were used and discarded at that place. Village sites should therefore have greater densities than seasonal camps, which in turn should have higher densities than task sites. This presumes fairly homogeneous depositional environments among the sites being compared, since density is measured in terms of site matrix excavated. That is, given a similar number of artifacts, slow or rapid rates of sedimentation will render different densities. In fact, most of the sites in this sample come from similar environments; they are open-air sites in the foothills and mountains of the Cascades and soil deposition is assumed to be relatively uniform among the sites. Where such environments differ, and this difference appears to be reflected in the density measures, this condition is noted in the discussion of site density.

The diversity of a site's assemblage should reflect the degree to which activities, and probably also the social group, were specialized or generalized at a site. A generalized assemblage has a high diversity of tools; it contains lots of different tools representing a multiplicity of tasks. A specialized assemblage has a low diversity of tools; it contains few tool types, reflecting only a few--or even just a single--task(s). Those sites which are low mobility (i.e., more sedentary) sites, occupied by a diverse group of people, produce the most generalized assemblages. In this analysis, the low mobility sites are village sites. Task sites represent the opposite extreme, having the most specialized and least diverse assemblages. Seasonal camps are intermediate in terms of mobility, and are assumed to have assemblages less generalized than village sites, but not as specialized as task sites.

The diversity of an artifact assemblage is measured both by the number of categories of artifacts present (richness) and the uniformity of their specimen distribution among those categories (evenness). Measurement of artifact diversity has engendered considerable debate in archaeology, since the diversity of an assemblage is confounded statistically by the size of the sample analyzed. This is a distinct problem, and is treated separately in Chapter VIII. The methods used in this analysis, however, are designed to mitigate the effects of sample size differences.

Differences in mobility are manifest in other ways, besides artifact density and diversity, in the archaeological record. Sedentary hunting-gathering communities are generally associated with substantial architecture, cemeteries, storage features and other permanent facilities, as described in the ethnographic summary above (see also Kelly 1992:56; Price and Brown 1985:13, 438). In this study, the presence of these features helps define village sites, and provides comparative data as a check on the density and diversity measures.

The three types of sites, and their distinguishing archaeological manifestations, are defined as follows:

- Village sites were the most sedentary communities, and had the most people of all ages, statuses, and both sexes; were re-occupied; had permanent architecture; and were the locations of a diversity of different activities. Such sites produced generalized, unspecialized assemblages which were both comparatively rich and comparatively even, a high density of artifacts, and habitation features. Hence assemblages are both dense and diverse, and associated with significant archaeological features.

- Seasonal camps were occupied by smaller, heterogeneous groups for shorter periods of time than the villages. Like village sites, these sites produce assemblages reflecting the generalized range of activities coincident with a mixed group of people spending a significant amount of time at a place. These sites may not have been re-occupied annually, however, and were more focused on certain resources (e.g., meadow plants, game, acorns, or fish) than were village sites. They were frequently locations for collecting and processing resources for over-winter storage. Hence, the assemblages still reflect a range of daily activities, but are more specialized than those for village sites; the assemblages are less diverse--less rich and less even--than village sites, but more diverse than task sites. Site assemblages are not likely to be as dense as the annually re-occupied, more densely populated, and longer-term habitation sites, but are likely to be more dense than assemblages from shorter-term task sites.

- Task sites are the most specialized sites, occupied for the shortest amounts of time. Specialized groups, such as a few hunters, would depart from the village or seasonal camp for forays into the countryside for a particular purpose. Sites were not occupied for long; a diversity of tasks is not represented. Task sites might or might not be annually re-occupied. Although the basic tool-kit might be represented at a site, the dominant task would generate an assemblage which was more specialized than that found at the other two types. Site assemblages would be the least rich and even, and probably the least dense[1], of the three types of sites.

In the analysis, it is assumed that the dominant use of a site is that represented by the diversity and density of its assemblage as just defined. It is probable that predominantly seasonal camps were occasionally used as task sites, or that villages were once seasonal camps. In cases where the assemblages cannot be separated into stratigraphic or spatial components (which most often is the case) it is assumed that the function represented by the assemblage diversity (richness and evenness) and density measures is the main function of that site. Since the most intensive uses--such as village

---

[1]It is possible that certain short-term, specialized tasks, such as quarrying, would produce a high density of materials. Such sites would appear as high density, low diversity sites in the archaeological record.

habitation--are more likely to drown evidence for less intensive use, it is possible that the more intensively used site types will be somewhat over-represented in the sample as a whole.

Functional Analyses: Methods

The intent of this analysis is to determine groupings of archaeological sites based on function. Several different analyses have been performed in the hope of finding concurrence among the results, which would strengthen the findings of any one analysis. A secondary purpose to this endeavor is to experiment with different quantitative measures, to see which might prove useful for analyzing artifactual data from hunter-gatherer sites. Four different procedures constitute this effort. The first consists of a qualitative assessment of a site's function; the next three are based on quantitative data.

Qualitative Assessment

The first analysis draws upon the data presented in the site reports, including the excavator's opinion, to define the site type. These data are not generally subject to quantification; site function is assessed on the basis of an archaeologist's previous experience in the area, the types and abundance of various artifacts, site location, site size, site features, reports concerning the site from local residents, ethnographic or historic references, and other sources of information. Though not subject to quantification, this qualitative assessment is made on the fullest information available and is an important contributor to site function analysis. However, the method is subject to personal bias; different investigators with different experiences will interpret the record from varying perspectives. Though these subjective assessments provide valuable insights, they must be checked by more rigorous and objective quantitative methods.

Quantitative Assessment

The three quantitative methods employed here are built upon analysis of the archaeological record from each site. The first defines groups based upon the density of the stone artifacts from each site (per cubic meter); the second defines groups based upon the proportions of various stone artifact classes at each site (i.e., the "richness" and "evenness" of the assemblage). The third uses cobble and groundstone density data compared with feature data to sort sites into functional groups.

These methods rely on specimens which are common to the sites in this study and characteristic of sites in this region. Almost all of the sites in this study have artifact assemblages primarily of stone, and only non-perishable items are considered in comparing artifact assemblages.

At many sites the refined specimens are so few in the assemblages at hand that measures of statistical significance cannot be meaningfully applied to their presence/ absence. In order to circumvent this small-sample problem, specific tool types were combined into broader categories which are common to sites in this region. For example, various projectile point types are all subsumed under "projectile points," and various specimens exhibiting bifacial workmanship are grouped together as "bifaces." This lumping made it possible to compare the assemblage diversity among all sites in the sample.

Grouping tools in this fashion also makes it possible to compare sites where tools for specific tasks may have changed, though overall site function remained the same. That is, even though hafted scrapers may have replaced hand-held flakes for hide-working, the overall characteristics of the assemblage should remain the same if the overall site function remained stable.

Artifacts from site assemblages were therefore divided into seven tool categories, plus debitage. The tool classes used are: projectile points, bifaces, edge-modified flakes, cores, groundstone, battered cobbles, and other cobble tools. These categories are broadly recognized classes of stone tools in this area. Although finer distinctions are frequently noted in the site reports, it was necessary (as just noted) to assign artifacts to these general categories in order to make assemblages comparable and deal with analytical units of adequate sample size. These tool classes are defined as follows:

- Projectile Point: Artifacts used to tip spears, atlatls, and arrows.
- Bifaces: Drills, knives, blanks, preforms, and other chipped stone implements which are usually formed by working both sides of a flake.
- Edge-Modified Flakes: Edge-modified flakes form the largest class of artifacts. They include scrapers, utilized flakes, unifaces, burins, and other tools which have one or more edges modified for or by use.

- Cores: Chunks of rock from which material has been removed in the process of tool manufacture.

- Groundstone: Shaped/utilized implements generally associated with plant food processing: manos, pestles, metates, mortars, bowls and grinding stones.

- Battered Cobbles: Hammerstones, anvil stones and other cobbles damaged from heavy use but otherwise unshaped or modified. In the last quantitative analysis, relating the density of cobble tools to habitation features, this group of artifacts is combined with the cobble tool category.

- Cobble tools: Flaked cobbles, choppers, cobble flakes, and other such implements of heavy work as well as smaller cobble/pebble tools such as netsinkers and abraders.

Density Measures

In order to group sites according to assemblage density, it was necessary to devise a means for comparing sites. An earlier experiment with data from the Elk Creek sites provided a model (Nilsson and Kelly 1991:375). In the Elk Creek analysis, the density of projectile points (per cubic meter of excavated site matrix) was plotted against the density of other chipped stone tools, for each site. The resulting scatterplot showed a strong correlation between the two measures (projectile point density and chipped stone tool density); that is, sites with many projectile points were also likely to have many other chipped stone tools. The plot not only illustrated this correlation, but also visually distinguished the high density from the low density sites. Nilsson and Kelly found that those in the high density range corresponded to the sites considered possible winter villages, with those at the low density end corresponding to sites considered task sites. In assessing the site density data for the sample of sites in this analysis, I decided to use Nilsson and Kelly's technique, and to expand it to include another, similar measure for illustrating site density. These techniques are frankly experimental and are used here based on the success of the Nilsson and Kelly procedure.

Since I did not know at the outset which density measures would be most useful in distinguishing sites, I chose to look at four measures of density: density of projectile points, density of other chipped stone tools, density of all stone tools, and density of debitage. While it is possible to arrange sites in order from the most to least dense based on any one of these measures, or based on the total artifact density, such an arrangement either loses possibly significant distinctions by combining all types of density on one measure (e.g., total artifact density), or produces a series of density measures with no demonstrable relationship to one another. The use of the scatterplots helps mitigate these problems.

The scatterplots permit two types of artifact density per site to be expressed relative to other sites in the sample. For example, the density of projectile points for each site is plotted along one axis and the density of other types of stone tools is plotted along the other axis in the first density measure. Each point on the scatterplot represents a specific site, and the density of projectile points and stone tools at that site compared to other sites is immediately evident. In using the scatterplots, I was attempting to combine different measures of density, such as projectile point density and total tool density, in order to use data efficiently. At the same time, use of various different measures of artifact density, such as total tool density and debitage density, permits the expression of possible differences among sites in terms of these measures.

Density Measure 1 plots the density of projectile points per cubic meter against the density of other chipped stone artifacts per cubic meter (Nilsson and Kelly 1991). Density Measure 2 plots the density of chipped stone debitage against the density of all chipped stone, cobble, and groundstone tools and other tools (occasionally sites would have stone artifacts--such as pipes--which did not fall easily into the chipped stone or cobble category; these were added into the overall tool density measure). Density Measure 1 measures the density of all chipped stone tools at a site, and compares the sites on that basis. Density Measure 2 uses all the data available for a site's stone tool assemblage, since it includes all stone tools as well as debitage density. The two measures were employed in order to permit possible differences in density measures to be expressed, but also to take advantage of the data available. A number of sites did not have debitage density data, and use of only the second measure would have left a these sites out of the density analysis. Use of only the first measure, however, would have precluded using all the information available for many sites which did have debitage density data.

Once the sites were plotted, the resulting scattergram was divided into three groups of low, medium, and high density sites. The breaks were determined based on visual inspection of the scatterplot, with lines drawn where I distinguished breaks in the plot. These groups are taken to represent functional types, with low-density task sites at the low end of the plot, seasonal camps in the middle, and village sites at the high end.

Not all site reports recorded volume of material excavated, nor was the volume of material excavated given for distinct components at certain sites. Since density is measured in terms of the volume of material excavated per site or per site component, it was therefore not possible to derive density statistics for some sites or site components.

Multidimensional Scaling (MDS)

The MDS analysis was used to place sites into functional types based on the diversity of a site's assemblage. Diversity consists of the number of different categories of tools present in a site (assemblage "richness") and the distribution of artifacts among those types (uniformity or "evenness" of the assemblage). The components of a site's tool assemblages (projectile points, bifaces, edge-modified flakes, cores, cobble tools, groundstone) were given proportional (percentage) definitions for each site, in order to make assemblages of unequal size comparable. Use of the MDS method has the advantage of being applicable to all sites which provide data on the number and types of tools collected. Hence, it was also applicable to most of the sites and site components which did not have density data.

The MDS analysis proceeded as follows. First, all pairs of sites were assigned a measure of dissimilarity using Euclidean distance. Euclidean distance is a measure in which the difference between two units is expressed numerically as a measure of distance, yielding a measure of dissimilarity.

That is, two sites with assemblages whose proportions of tool types are the same would have a distance measure of 0; those whose proportions were increasingly different would have increasingly greater measures (Aldenderfer and Blashfield 1984:25). This exercise was performed on a computer using a program from ANTHROPAC (Borgatti 1990), which generated a large matrix.

Next, the dissimilarity matrix was entered into a non-metric MDS program, again using ANTHROPAC. The MDS procedure then takes the matrix and creates from it a rank-ordering of sites, in which each site is ordered depending on its distance from each other site (Doran and Hodson 1975:214). Thus sites which are similar to one another but different from other sites would have low rank orders relative to one another, and high rank orders compared to the different sites.

Finally, the similarities among sites, derived from the rank orders, are expressed graphically. The computer program arranges the sites in conceptual space so that the relationships among all sites (expressed as rank-orders) is preserved. In plotting these arrangements on a piece of paper, the relationships are necessarily compressed into two-dimensional space (Kachigan 1986:413-420). The program calculates a statistic, known as Kruskal's formula 1 stress coefficient, which is a measure of how good a fit the two-dimensional plot is of the original multi-dimensional arrangement. Although there are no objective standards for a "good-fit," a stress value of .15 or less is generally considered satisfactory (Kachigan 1986:418). In the following analysis, the stress values were less than .15 for both the Rogue River Basin and Umpqua Basin data.

Interpretation of the resulting scatterplots is based on the following considerations. Sites with the least specialized tool kits would produce assemblages which had tools in every category, and the tools would be distributed relatively evenly among the various categories. These site assemblages would be both rich and uniform; as noted above, village sites should characteristically produce rich and uniform assemblages. These assemblages would therefore be very similar to one another and the village sites should clump together in the scatterplot.

Seasonal camps would be less similar to the village sites than village sites are to each other, but would nonetheless share some of the characteristics of the village sites. Seasonal camps, like village sites, were occupied by non-specialized groups and would have moderately rich assemblages. These sites would not necessarily be very similar to one another, however, since they would probably represent different specializations reflected in less uniform (even) assemblages. In terms of rank orders, such sites would be relatively close to the village sites, but dispersed about them depending on the degree of specialization manifested in the assemblage. Thus, in the scatterplot, the seasonal camps should form a ring around the central clump of habitation sites.

Finally, the most specialized sites--the task sites--would have assemblages which are neither rich nor uniform, but rather consist of high proportions of specific artifact classes reflecting the special purposes of these sites. These sites would not be very similar to either of the two other classes, and would not necessarily be similar to one another. On the scatterplot, they would be distant from the other sites and generally dispersed about the central clump of habitation and seasonal camp sites. Those highly specialized sites with similar specializations and tool kits would group together.

The interpretation of the scatterplot drew upon these considerations and proceeded as follows. First, those sites which seemed firmly identified from other analyses were distinguished on the scatterplot. This exercise corroborated the assumptions outlined above, since the readily identified village sites clumped in the middle, with seasonal camps in a ring about them and tasks sites dispersed beyond both types. Those sites which had not been subjected to other analyses, or which had equivocal designations, were then given a functional designation based on their location within the matrix, i.e., whether clumped with other village sites in the center, or in the secondary ring of seasonal camps, or dispersed beyond the central clump with the task sites.

The MDS analysis offers another way of grouping sites, based on data--assemblage richness and uniformity--which are sometimes difficult to compare. This analysis also provides a check on the other tests, and gives a way to incorporate data from sites which lack information for some of the other measures. It proved a useful exercise from these perspectives.

Cobble tool - Groundstone/Feature Analyses

Both of the above analyses depend heavily on data from chipped stone tool assemblages. Though groundstone and cobble tools are included in the analyses, they generally comprise such small proportions of an assemblage that their effect on the overall density or diversity measures is slight. This last analysis looks at data from these categories of artifacts. The cobble and groundstone densities are computed for each site, and the sites arranged in order of increasing density for these artifacts. Again, three groups based on increasing density are distinguished.

This last analysis incorporates feature data as a test. Feature data are compared to the groups derived from the cobble and groundstone density analyses. Feature data provide an outside check on the quantitative analyses based on artifacts. Sites with habitation architecture and features can by definition be considered villages. In this analysis, housepits, middens, and burials are considered as indicators of village sites. Other features present in the sample of sites include hearths and miscellaneous (buried) rock features. These features imply at least some degree of sedentism, and may be more frequently associated with seasonal camps (or village sites) than task sites.

Final Assignment to Functional Type

In each of the methods described above, I use the data to place each site into one of the three functional groups:

Group 1 = Task sites
Group 2 = Seasonal camps
Group 3 = Villages

In many cases, all measures used produce mutually consistent results, and the assignment of a site to a particular functional category is unambiguous. Where the different tests yield different results for the same site, however, it was necessary to decide which category best represented the data. Generally, in making the final assessment in these cases, I followed the original excavator's judgement or relied upon information concerning the site which was not represented in the quantitative analyses. In these cases, where results of the various tests are ambiguous, I have stated the reasons for the final assignment.

The Site Database

The sites in this study are divided into two groups, those from the upper and middle Rogue River drainage basin (Rogue Basin sites) and those from the North and South Umpqua River drainage basins (Umpqua Basin sites). Figures 5 and 6 show the locations of these sites. The keys to these figures list the sites and their identifying numbers, and provide the report references for the sites. In order to keep the text less cumbersome, these reports are only referenced here, rather than every time a site is discussed in this study.

The site data used in this study are presented in Tables 1-4. These data provide the raw material from which the analyses in the next two chapters are derived.

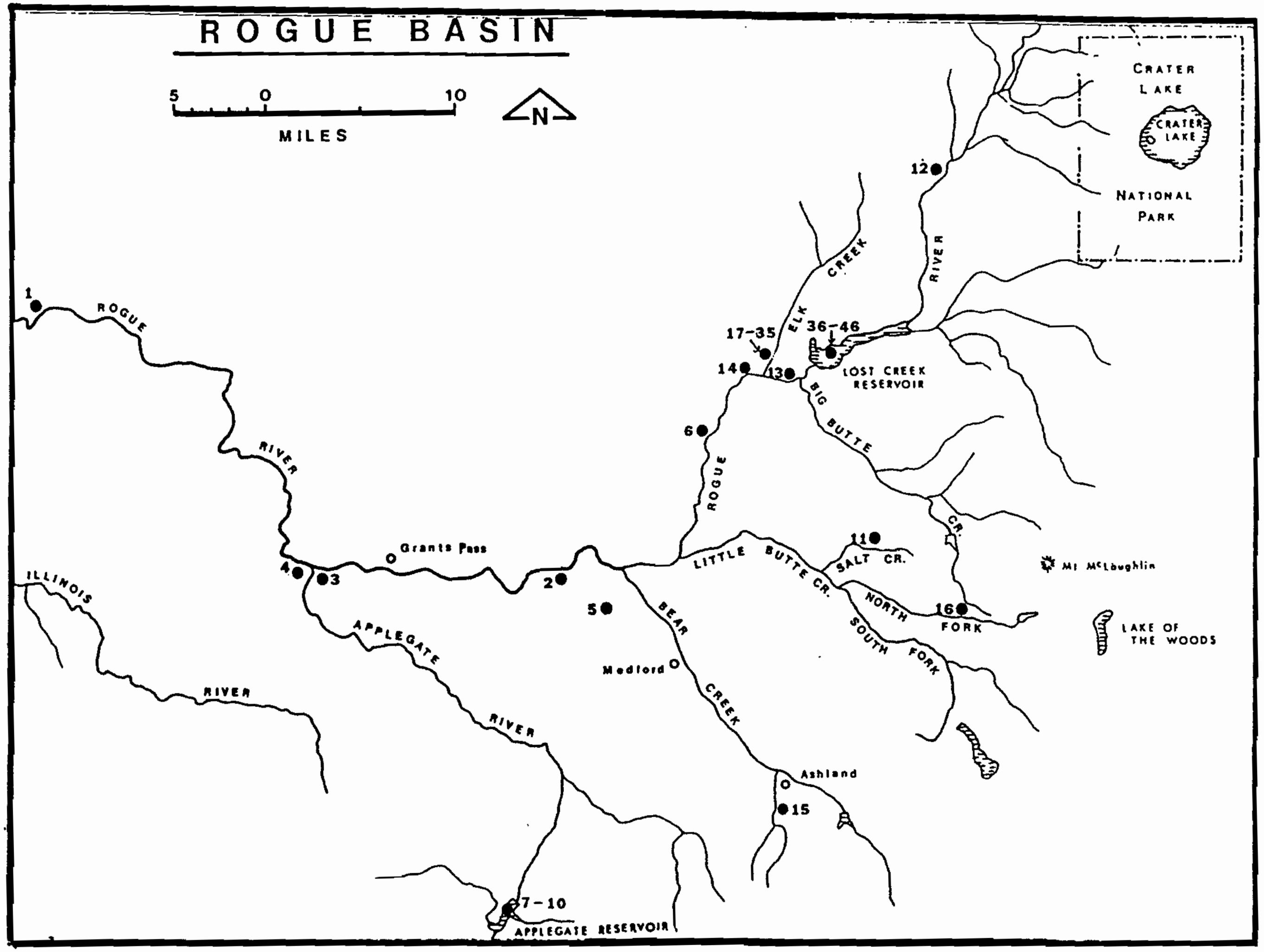


FIGURE 5. Rogue Basin Sites (map and reference key).

Ref. No.	Site No.	Site Name	Reference
1	35CU84	Marial	Clark 1988; Griffen 1983; Schreindorfer 1985
2	35JA1	Gold Hill	Cressman 1933a,b; Hughes 1990
3	35JO4	Ritsch	Wilson 1979
4	35JO16	Marthaller	Steele 1984; Deich 1982
5	35JA21	Saltsgaver	Prouty 1988
6	35JA25	Far Hills	Davis 1983
7	35JA42	Applegate	Brauner 1983
8-10	35JA47	Applegate	Brauner and McDonald 1981
11	35JA77	Salt Creek	Satler n.d.
12	35JA133	RRNF	LaLande 1983
13	35JA189	Trail	Connolly 1988
14	35JA190	Trail	Connolly 1988
15	35JA191	Reeder	LaLande 1987
16	35JA197	Little Butte	Winthrop and Gray 1991
17	35JA10	Elk Creek	Davis 1983; Nilsson and Kelly 1991
18	35JA11	Elk Creek	Nilsson and Kelly 1991
19-21	35JA27A	Elk Creek	Pettigrew and Lebow 1987
22	35JA27B	Elk Creek	Pettigrew and Lebow 1987
23	35JA59	Elk Creek	Pettigrew and Lebow 1987
24	35JA100	Elk Creek	Pettigrew and Lebow 1987
25	35JA101	Elk Creek	Nilsson and Kelly 1991
26	35JA102	Elk Creek	Budy et al. 1986
27	35JA103	Elk Creek	Nilsson and Kelly 1991
28	35JA105	Elk Creek	Nilsson and Kelly 1991
29	35JA107	Elk Creek	Budy et al. 1986

FIGURE 5. Continued

Ref. No.	Site No.	Site Name	Reference
30	35JA110	Elk Creek	Nilsson and Kelly 1991
31	35JA112	Elk Creek	Nilsson and Kelly 1991
32	EC-2	Elk Creek	Nilsson and Kelly 1991
33	Island	Elk Creek	Nilsson and Kelly 1991
34	Winningham	Elk Creek	Nilsson and Kelly 1991
35	Zimmerly	Elk Creek	Nilsson and Kelly 1991
36	35JA5	Lost Creek	Davis 1983
37	35JA6	Lost Creek	Davis 1974, 1983
38	35JA7	Lost Creek	Davis 1974, 1983
39	35JA8	Lost Creek	Davis 1983
40	35JA12	Lost Creek	Davis 1983
41	35JA14	Lost Creek	Davis 1970, 1983
42	35JA16	Lost Creek	Davis 1974, 1983
43	35JA18	Lost Creek	Davis 1974, 1983
44	35JA19	Lost Creek	Davis 1974, 1983
45	35JA20	Lost Creek	Davis 1983
46	35JA23	Fawn Butte	Nilsson and Kelly 1991

FIGURE 5. Continued

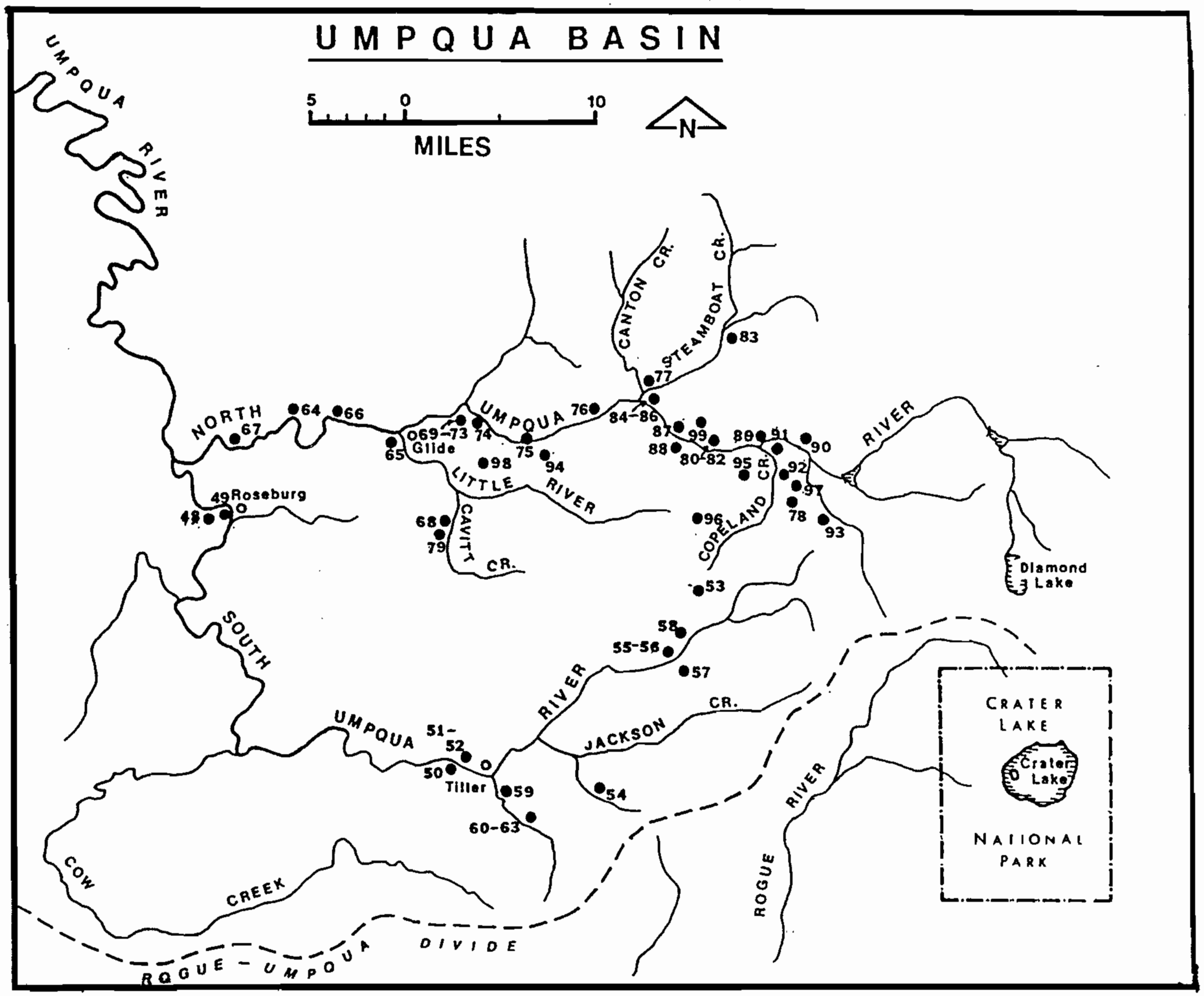


FIGURE 6. Umpqua Basin Sites (map and reference key).

Ref. No.	Site No.	Site Name	Reference
48	35DO275	Sylmon	Lyman 1985
49	35DO274	Orchard	Simmons and Gallaghar 1985
50	35DO36	Crispen	Baxter and Minor 1987
51	35DO412	Coffee Creek	Musil and Minor 1989; Baxter 1988
52	35DO413	Coffee Creek	Baxter 1988; Musil and Minor 1989
53	Tiller 1	Tiller	Snyder 1979
54	Tiller 6	Tiller	Snyder 1978
55	35DO205	S.Ump.RS-U	Minor 1987
56	35DO205	S.Ump.RS-L	Minor 1987
57	35DO209	Hughes I	Keyser and Carlson 1987
58	35DO212	Time Sq. RS	Minor and Connolly 1987
59	35DO396	Sprint	Baxter and Minor 1987
60-63	35DO219	Section Crk	O'Neill 1991b
64	35DO395	Grubbe Ranch	O'Neill 1989b
65	35DO58	Glide	Churchill and Jenkins 1985
66	35DO61	Whistler's	Connolly 1982
67	35DO67	Winchester	O'Neill 1989a
68	35DO252	Gatchel	Ottis and West 1984
69-73	35DO153	Narrows	O'Neill 1989b
74	35DO359	Swiftwater	O'Neill 1990
75	35DO383	Susan Crk	Musil 1992
76	35DO278	Bogus	Winthrop 1989
77	35DO126	Steamboat	Brauner and Honey 1977
78	35DO11	Lower Rhody	Minor 1976
79	35DO40	Cavitt Crk	Snyder and Honey 1979
80-82	35DO401	Dry Creek	O'Neill 1991a, 1992

FIGURE 6. Continued

Ref. No.	Site No.	Site Name	Reference
83	35DO372	Reynolds	Churchill 1986
84-86	35DO422	Island	O'Neill 1991a
87	35DO418	Apple Ck. Bnch	O'Neill 1991a
88	35DO265	Apple Creek	O'Neill 1991a
89	35DO421	Copeland Crk	O'Neill 1991a
90	35DO161	Medicine Crk	Snyder 1981b
91	35DO187	Powerful 1	Winthrop and Gray 1987
92	35DO227	Powerful 2	Winthrop and Gray 1987
93	35DO379	Snuffout	Jenkins 1988
94	35DO397	Shivigny East	O'Neill 1988a
95	35DO289	Little Oak	Berryman 1987b
96	35DO399	Snowbird	Jenkins and King 1988
97	35DO160	Muddy	Snyder 1981a
98	35DO398	Powerline	O'Neill 1988c
99	35DO389	Limpy RS	Baxter 1987

FIGURE 6. Continued

TABLE 1. Rogue Basin Site Data

Record No.	Site No.	Site Name	No. of Projectile Points	No. of Bifaces	No. of Edge-Modified Flakes	No. of Cores	No. of Battered Cobble Tools	No. of Other Cobble Tools	No. of Ground-Stone Tools	Total No. of Artifacts (non-perishable)	Total Debitage	Total No. of Bone	Total No. of Bone Artifacts	Other Artifacts	Housepit	Midden	Burial	Hearth	Other Features
1	35CU84	Marial	251	86	2357	33	204	49	23	3003	14276	2327		13					
2	JA01	Gold Hill																	
3	JO4	Ritsch	52	35	288	12	38	18	7	450			7	2	Y				
4	JO16	Marthaller	222	228	154		106		128	838	16375	322			Y	Y	Y	Y	
5	JA21	Saltsgaver	18	9	97	4	32	3	17	180	942	40		2		Y			Y
6	JA25	Far Hills	91	43	233	30	64	10	41	512			1	20	Y		Y		Y
7	JA42	Applegate	204	243	494	35	88	39	79	1182		2000	17	25	Y				
8	JA47	Applegate	348	587	990	94	39	5	40	2103	29365			4	Y				
9	JA47-1	Applegate	44	113	160	14	12		13	356									
10	JA47-2	Applegate	304	474	830	80	26	6	27	1747				4	Y				
11	Salt Creek	Salt Creek	17	59	101	18	10	2	6	213	3901	491							
12	JA133	RRNF		1	3	11	3		1	19	152	1							
13	JA189	Trail	12	22	49	9	5		9	106	1821		1						
14	JA190	Trail	7	4	27	4	4	2	7	55	875								
15	JA191	Reeder	17	3	10	4	4		1	39	168	162				Y		Y	
16	JA197	Little Butte	23	59	37	13	9	3	2	146	3185	199							
17	JA10	Elk Creek	17	13	28	24	11		3	96				1					
18	JA11	Elk Creek	1	14	13	11	2		1	42	855	30							
19	JA27A	Joham 1	190	289	731	147	108	6	87	1558	24267	1870	5	18			Y		Y
20	JA27A-1	Joham 1	172	191	459	101	81	3	51	1058			5	8		Y	Y		Y
21	JA27A-2	Joham 1	18	98	272	46	36	3	36	509				10					
22	JA27B	Elk Creek	38	76	245	33	22	1	22	437	7500			3					Y
23	JA59	Elk Creek	447	570	982	147	61	1	43	2251	22301		3	72		Y		Y	Y
24	JA100	Elk Creek	936	1072	1896	535	147	9	128	4723	53800		17	100	Y	Y	Y		Y
25	JA101	Elk Creek	56	79	115	26	27	5	37	345	7622	1193	2	31		Y			Y
26	JA102	Elk Creek	29	18	22	7	2		3	81	1784	15							
27	JA103	Elk Creek	5	13	20	5				43	1177	104	1						
28	JA105	Elk Creek		2	3	1			1	7	383	18							
29	JA107	Elk Creek	93	105	138	55	54		26	471	10287	16							Y
30	JA110	Elk Creek		2	4	3				9	209								
31	JA112	Elk Creek	4	11	6	1			1	23	2132								
32	EC-2	Elk Creek	43	78	92	21	9		3	246	6243	478							Y
33	Island	Elk Creek	3	6	6	1				16	561	13							
34	Winningham	Elk Creek	12	18	7	2	2		2	43	1086	24	1						
35	Zimmerly	Elk Creek	4	19	37		2		1	63	2150	20							
36	JA5	Lost Creek	27	12	17	34	6		8	104									
37	JA6	Lost Creek	64	28	131	24	24		5	276								Y	
38	JA7	Lost Creek	4	2	15			1		22									
39	JA8	Lost Creek	10	10	23	10	6		7	66				2					
40	JA12	Lost Creek	16	14	24	13	6		8	81					Y				
41	JA14	Lost Creek	7	9	43	17	7		4	87	786								
42	JA16	Lost Creek	47	33	111	13	10		6	220				2	Y				
43	JA18	Lost Creek	32	28	74	10	21		8	173				1		Y			
44	JA19	Lost Creek	60	15	83	4	6	1	1	170				1				Y	
45	JA20	Lost Creek	1	7	47	19	3	1	3	81									
46	JA23	Fawn Butte	74	149	141	23	7	1	3	398	17992	1081	3	2					Y
47	JA29	Lost Creek		1	8				2	11				1					

TABLE 2. Rogue Basin Site Data, Computations

Record No.	Site No.	Site Name	Amount Excavated*	Percent Projectile Points	Percent Bifaces	Percent Edge-Modified Flakes	Percent Cores	Percent Battered Cobble Tools	Percent Other Cobblestones	Percent Groundstone	Total Chipped Stone Tools	Debitage Density	Total Non-Projectile Point Chipped Stone Tool Density	Projectile Point Density	Total Tool Density	Groundstone Density	Total Cobble Tools	Cobble Tool Density
1	35CU84	Marial		.083	.028	.784	.011	.067	.016	.007	2443						253	
2	JA01	Gold Hill	738.00															
3	JO4	Ritsch	144.00	.115	.077	.640	.026	.084	.040	.015	323		2.24	.36	3.13	.0486	56	.3889
4	JO16	Marthaller	98.00	.264	.272	.183		.126		.152	382	167.09	3.90	2.27	8.55	1.3061	106	1.0816
5	JA21	Saltsgaver	10.00	.100	.050	.538	.022	.177	.016	.094	106	94.20	10.60	1.80	18.00	1.7000	35	3.5000
6	JA25	Far Hills	34.00	.177	.084	.455	.058	.125	.019	.080	276		8.12	2.68	15.06	1.2059	74	2.1765
7	JA42	Applegate	42.00	.172	.205	.417	.029	.074	.033	.066	737		17.55	4.86	28.14	1.8810	127	3.0238
8	JA47	Applegate	107.00	.165	.279	.470	.044	.018		.019	1577	274.44	14.74	3.25	19.65	.3738	44	0.4112
9	JA47-1	Applegate		.123	.317	.449	.039	.033		.036	273						12	
10	JA47-2	Applegate		.174	.271	.475	.045	.014		.015	1304						32	
11	Salt Creek	Salt Creek	15.00	.079	.277	.474	.084	.046		.028	160	260.07	10.67	1.13	14.20	.4000	12	.8000
12	JA133	RRNF	0.60		.052	.157	.578	.157		.052	4	253.33	6.67		31.67	1.6667	3	5.000
13	JA189	Trail	5.50	.113	.207	.462	.084	.047		.084	71	331.09	12.91	2.18	19.27	1.6364	5	.9091
14	JA190	Trail	6.50	.127	.072	.490	.072	.072	.036	.127	31	134.62	4.77	1.08	8.46	1.0769	6	.9231
15	JA191	Reeder	1.50	.435	.076	.256	.102	.102		.025	13	112.00	8.67	11.33	26.00	.6667	4	2.6667
16	JA197	Little Butte	6.00	.157	.404	.253	.089	.061	.020	.013	96	530.83	16.00	3.83	24.33	.3333	12	2.0000
17	JA10	Elk Creek	3.00	.177	.135	.291	.250	.114		.031	41		13.67	5.67	32.00	1.0000	11	3.6667
18	JA11	Elk Creek	3.10	.023	.333	.309	.261	.047		.023	27	275.81	8.71	0.32	13.55	.3226	2	.6452
19	JA27A	Joham 1	24.00	.122	.185	.469	.094	.069		.055	1020	1011.13	42.50	7.92	64.92	3.625	114	4.7500
20	JA27A-1	Joham 1		.162	.180	.433	.095	.076		.048	650						84	
21	JA27A-2	Joham 1		.035	.192	.534	.090	.070		.070	370						39	
22	JA27B	Elk Creek	26.00	.087	.173	.560	.075	.050		.050	321	288.46	12.35	1.46	16.81	.8462	23	.8846
23	JA59	Elk Creek	70.00	.198	.253	.436	.065	.027		.019	1552	318.59	22.17	6.39	32.16	.6143	62	.8857
24	JA100	Elk Creek	159.00	.198	.227	.401	.113	.031		.027	2968	338.36	18.67	5.89	29.70	.8050	156	.9811
25	JA101	Elk Creek	21.10	.162	.229	.333	.075	.078	.014	.107	194	361.23	9.19	2.65	16.35	1.7536	32	1.5166
26	JA102	Elk Creek	40.40	.358	.222	.271	.086	.024		.037	40	44.16	.99	.72	2.00	.0743	2	.0495
27	JA103	Elk Creek	4.40	.116	.302	.465	.116				33	267.50	7.50	1.14	9.77			
28	JA105	Elk Creek	12.20		.285	.428	.142			.142	5	31.39	.41		0.57	.0820		
29	JA107	Elk Creek	107.70	.197	.222	.293	.116	.114		.055	243	95.52	2.26	.86	4.37	.2414	54	.5014
30	JA110	Elk Creek	2.00		.222	.444	.333				6	104.50	3.00		4.50			
31	JA112	Elk Creek	12.19	.173	.478	.260	.043			.043	17	174.90	1.39	.33	1.89	.0820		
32	EC-2	Elk Creek	6.00	.174	.317	.374	.085	.036		.012	170	1040.50	28.33	7.17	41.00	.5000	9	1.5000
33	ISLAND	Elk Creek	4.50	.187	.375	.375	.062				12	124.67	2.67	.67	3.56			
34	Winningham	Elk Creek	8.55	.279	.418	.162	.046	.046		.046	25	127.02	2.92	1.40	5.03	.2339	2	.2339
35	Zimmerly	Elk Creek	10.60	.063	.301	.587		.031		.015	56	202.83	5.28	.38	5.94	.0943	2	.1887
36	JA5	Lost Creek		.259	.115	.163	.326	.057		.076	29						6	
37	JA6	Lost Creek	62.00	.231	.101	.474	.087	.087		.018	159		2.56	1.03	4.45	.0806	24	.3871
38	JA7	Lost Creek	6.00	.181	.090	.681			.045		17		2.83	.67	3.67		1	.1667
39	JA8	Lost Creek		.151	.151	.348	.151	.090		.106	33						6	
40	JA12	Lost Creek		.197	.172	.296	.160	.074		.098	38						6	
41	JA14	Lost Creek	5.00	.080	.103	.494	.195	.080		.046	52	157.20	10.40	1.40	17.40	.8000	7	1.4000
42	JA16	Lost Creek	13.00	.213	.150	.504	.059	.045		.027	144		11.08	3.62	16.92	.4615	10	.7692
43	JA18	Lost Creek	6.50	.185	.161	.427	.057	.121		.046	102		15.69	4.92	26.62	1.2308	21	3.2308
44	JA19	Lost Creek	12.40	.352	.088	.488	.023	.035		.005	98		7.90	4.84	13.71	.0806	7	.5645
45	JA20	Lost Creek	11.50	.012	.086	.580	.234	.037	.012	.037	54		4.70	.09	7.04	.2609	4	.3478
46	JA23	Fawn Butte	14.94	.185	.374	.354	.057	.017		.007	290	1204.28	19.41	4.95	26.64	.2008	8	.5355
47	JA29	Lost Creek	1.20		.090	.727				.181	9		7.50		9.17	1.6667		

*Cubic meters

TABLE 3. Umpqua Basin Site Data

Record No.	Site No.	Site Name	No. of Projectile Points	No. of Bifaces	No. of Edge-Modified Flakes	No. of Cores	No. of Battered Cobble Tools	No. of Other Cobble Tools	No. of Ground-Stone Tools	Total No. of Artifacts (non-perishable)	Total Debitage	Total No. of Bone	Total No. of Bone Artifacts	Other Artifacts	Housepit	Midden	Burial	Hearth	Other Features
48	DO275	Sylmon	14	7	90	49	105	20	13	298									Y
49	DO274	Orchard	3	3	8	6	2	4		26	293	1							Y
50	DO36	Crispen	33	28	59	6	18	2	5	151	5300	1693						Y	Y
51	DO412	Coffee Crk	2	3	11	4	1			21	667	32							
52	DO413	Coffee Dk	5	3	8	1	3		1	21	126	38							
53	Tiller 1	Til 1	1	1	34					36	51	1							
54	Till 6	Till 6	3	1	52	6				62	124	6							
55	DO205	S.Umprs-U	45	42	104	18	6			215	7657	51000	105				Y		
56	DO205	S.Umprs-L	105	42	100	11	3	2	2	265	3821	23000	13	3				Y	
57	DO209	Hughes	15	15	11				2	43	896	1724	1	1					
58	DO212	Time Sq Rs	26	3	5		4			38	414	30000	1	3				Y	
59	DO396	Sprint	13	1	11	1			2	28	834	81							
60	DO219	Section CK	111	201	487	42	30	7	11	889	70182	4662	2					Y	Y
61	DO219	Section-I	44	88	225	20	13	4	6	400									
62	DO219	Section-III	25	42	89	6	5	1	2	170									
63	DO219	Section-II	42	71	173	16	12	2	3	319									
64	DO395	Grubbe	5	2	24	2	12	1	23	69	577								Y
65	DO58	Glide	9	36	67	18	18		3	151	3572	55							Y
66	DO61	Whistlers	3	1		1	5	1	6	17	48								
67	DO67	Winchester		2	1		2			5	83								
68	DO52	Gatchel	7	24	86	14	4	4	8	147	2939				Y			Y	Y
69	DO153	Narrows	66	80	196	44	167	17	11	581	8913	55	15	1	Y	Y	Y	Y	Y
70	DO153	Narrows-I	38	32	58	16	50	2	1	197			13						
71	DO153	Narrows-II	12	24	53	6	29		6	130									
72	DO153	Narrow-III	13	23	73	17	89	2	4	221			2						
73	DO153	Narrow-IV	2	1	12	5	10			30									
74	DO359	Swiftwatr	1				14			15	85								
75	DO383	Susan Ck	4	9	11	2	1		3	30	1836								Y
76	DO278	Bogus	22	27	70	5	5	1		130	3654	165							
77	DO126	Steamboat	10	1	13		4			28									
78	DO11	Rhody																	
79	DO40	Cavitt Creek		1	11					12									
80	DO401	Dry Ck	5	13	34		3	1		56	2760								
81	DO401	Dry Ck-E	2	7	18	2		1		30	1790								
82	DO401	Dry Ck-L	3	6	18		1			28	970								
83	DO372	ReynoldS	5	23	24	2	1			55	1835								
84	DO422	Island CMP	5	12	17		8			42	2174	1							
85	DO422	Island-E	3	12	13		6			34	1906								
86	DO422	Island-L	2		4		2			8	268								
87	DO418	Apple Bnch	4	3	11					18	1502	3							
88	DO265	Apple Ck	2	4	18		4		2	30	799								
89	DO421	Copeland	1	8	19					28	3293	51							
90	DO161	Medicine	12	10	17		1		1	41	4742								
91	DO187	Pwrfl-1	11	13	26	3	2		8	63	1326	31							Y
92	DO227	Pwrfl-2	17	30	47	9	4		2	109	2558	349		1					Y
93	DO379	Snuff Out		6	9	4				19	381								
94	DO397	Shivigny	16	15	21	12	2			66	2369	4							
95	DO289	Little Oak	4	21		1				26	415								
96	DO399	Snowbd	2	18	6	1	2			29	351								
97	DO160	Muddy	5	7	10					22									
98	DO398	Pwrline			1					1	55								
99	DO389	Limpy	96	22	89	3			11	221	3100	3294							

TABLE 4. Umpqua Basin Site Data, Computations

Record No.	Site No.	Site Name	Amount Excavated*	Percent Projectile Points	Percent Bifaces	Percent Edge-Modified Flakes	Percent Cores	Percent Battered Cobble Tools	Percent Other Cobblestones	Percent Groundstone	Total Chipped Stone Tools	Debitage Density	Total Non-Projectile Point Chipped Stone Tool Density	Projectile Point Density	Total Tool Density	Groundstone Density	Total Cobble Tools	Cobble Tool Density
48	DO275	Sylmon	23.00	.047	.023	.302	.164	.352	.067	.043	97		4.22	.61	12.96	.5652	125	5.4348
49	DO274	Orchard	3.60	.115	.115	.307	.230	.076	.153		11	81.39	3.06	.83	7.22		6	1.6667
50	DO36	Crispen	5.40	.218	.185	.390	.039	.119	.013	.033	87	981.48	16.11	6.11	27.96	.9259	20	3.7037
51	DO412	Coffee Crk	8.80	.095	.142	.523	.190	.047			14	75.80	1.59	.23	2.39		1	.1136
52	DO413	Coffee Crk	7.10	.238	.142	.381	.047	.142		.047	11	17.75	1.55	.70	2.96	.1408	3	.4225
53	TILLER 1	Til 1	3.30	.027	.027	.944					35	15.45	10.61	.30	10.91			
54	TILL 6	Till 6	2.20	.048	.016	.838	.096				53	56.36	24.09	1.36	28.18			
55	DO205	S.Umprs-U	4.90	.209	.195	.483	.083	.027			146	1562.65	29.8	9.18	43.88		6	1.2245
56	DO205	S.Umprs-L	3.50	.396	.158	.377	.041	.011			142	1091.71	40.57	30.00	75.71	.5714	5	1.4286
57	DO209	Hughes	3.40	.348	.348	.255				.046	26	263.53	7.65	4.41	12.65	.5882		
58	DO212	Time Sqrs	1.20	.684	.078	.131		.105			8	345.00	6.67	21.67	31.67		4	3.3333
59	DO396	Sprint	1.30	.464	.035	.392	.035			.071	12	641.54	9.23	10.00	21.54	1.5385		
60	DO219	Section Crk	22.30	.124	.226	.547	.047	.033		.012	688	3147.17	30.85	4.98	39.87	.4933	37	1.6592
61	DO219	Section-I		.110	.220	.562	.050	.032	.010	.015	313						17	
62	DO219	Section-III		.147	.247	.523	.035	.029		.011	131						6	
63	DO219	Section-II		.131	.222	.542	.050	.037			244						14	
64	DO395	Grubbe	3.30	.072	.029	.347	.029	.173	.014	.333	26	174.85	7.88	1.52	20.91	6.9697	13	3.9394
65	DO58	Glide	6.40	.059	.238	.443	.119	.119		.019	103	558.13	16.09	1.41	23.59	.4688	18	2.8125
66	DO61	Whistlers	.30	.176	.058		.058	.294	.058	.352	1	160.00	3.33	10.00	56.67	20.0000	6	20.0000
67	DO67	Winchester	2.00		.400	.200		.400			3	41.50	1.50		2.50		2	1.0000
68	DO52	Gatchel	6.60	.047	.163	.585	.095	.027	.027	.054	110	445.30	16.67	1.06	22.27	1.2121	8	1.2121
69	DO153	Narrows	22.60	.113	.137	.337	.075	.287	.029	.018	276	394.38	12.21	2.92	25.71	.4867	184	8.1416
70	DO153	Narrows-I		.192	.162	.294	.081	.253	.010		90						52	
71	DO153	Narrows-II		.092	.184	.407	.046	.223		.046	77						29	
72	DO153	Narrows-III		.058	.104	.330	.076	.402		.018	96						91	
73	DO153	Narrows-IV		.066	.033	.400	.166	.333			13						10	
74	DO359	Swiftwater	10.50	.066				.933			0	8.10		.10	1.43		14	1.3333
75	DO383	Susan Crk	8.60	.133	.300	.366	.066	.033		.100	20	213.49	2.33	.47	3.49	.3488	1	.1163
76	DO278	Bogus	22.50	.169	.207	.538	.038	.038			97	162.40	4.31	.98	5.78		6	.2667
77	DO126	Steamboat	2.40	.357	.035	.464		.142			14		5.83	4.17	11.67		4	1.6667
78	DO11	Rhody	.30								0							
79	DO40	Cavitt Crk	2.00		.083	.916					12		6.00		6.00			
80	DO401	Dry Creek	2.80	.089	.232	.607		.053	.017		47	985.71	16.79	1.79	20.00		4	1.4286
81	DO401	Dry Crk-E		.066	.233	.600	.066		.033		25						1	
82	DO401	Dry Crk-L		.107	.214	.642		.035			24						1	
83	DO372	ReynoldsS	6.80	.090	.418	.436	.036	.018			47	269.85	6.91	.74	8.09		1	.1471
84	DO422	Island Cmp	6.60	.119	.285	.404		.190			29	329.39	4.39	.76	6.36		8	1.2121
85	DO422	Island-E	4.40	.088	.352	.382		.176			25	433.18	5.68	.68	7.73		6	1.3636
86	DO422	Island-L	2.20	.250		.500		.250			4	121.82	1.82	.91	3.64		2	.9091
87	DO418	Apple Bnch	2.60	.222	.166	.611					14	577.69	5.38	1.54	6.92			
88	DO265	Apple Crk	2.30	.066	.133	.600		.133		.066	22	347.39	9.57	.87	13.04	.8696	4	1.7391
89	DO421	CopeelanD	1.10	.035	.285	.678					27	2993.64	24.55	.91	25.45			
90	DO161	Medicine	10.50	.292	.243	.414		.024		.024	27	451.62	2.57	1.14	3.90	.0952	1	.0952
91	DO187	Pwrfl-1	5.80	.174	.206	.412	.047	.031		.127	39	228.62	6.72	1.90	10.86	1.3793	2	.3448
92	DO227	Pwrfl-2	3.70	.156	.275	.431	.082	.036		.018	77	691.35	20.81	4.59	29.46	.5405	4	1.0811
93	DO379	Snuff Out	4.80		.315	.473	.210				15	79.38	3.13		3.96			
94	DO397	Shivigny	3.20	.242	.227	.318	.181	.030			36	740.31	11.25	5.00	20.63		2	.625
95	DO289	Little Oak	2.50	.153	.807		.038				21	166.00	8.40	1.60	10.40			
96	DO399	Snowbound	3.20	.069	.620	.206	.034	.069			24	109.69	7.50	.63	9.06		2	.625
97	DO160	Muddy	4.30	.227	.318	.454					17		3.95	1.16	5.12			
98	DO398	Powerline	1.60			1.000					1	34.38	.63		.63			
99	DO389	Limpy	2.25	.434	.099	.402	.013			.049	111	1377.78	49.33	42.67	98.22	4.8889		

*Cubic meters

The sites in the sample consist mainly of small test excavations and larger data recovery excavations conducted in the Rogue River basin, primarily in the eastern part, and in the drainage basins of the North and South Umpqua Rivers. Not all sites excavated in this area were included in this analysis, although as large a sample as possible was desired for this study. Those which were excluded did not have reports giving the very basic information used in this analysis, such as the numbers and types of artifacts recovered.

Several problems were encountered while doing the quantitative analyses. The most pervasive was the lack of congruence in report standards. The data used in this study were taken from reports for site excavations; it was sometimes difficult to determine even such essential information as numbers of artifacts recovered and amount of material excavated. The resulting raw data (Tables 1 and 2) represent my best assessment of an investigator's findings for the sites used in this study. In compiling this material, I was helped by the recent completion of the Cultural Resource Overview of the Umpqua National Forest, Southwestern Oregon (Beckham and Minor 1992). This document compiles, for the Umpqua Basin sites, several of the statistics (e.g., volume excavated) needed for this study.

Other problems inherent in a study of this sort reflect the sampling biases built into using site data generated primarily by project-oriented cultural resource management work. For example, there are no well-excavated, valley floor village sites in the sample, although there are village sites from the upper reaches of the main rivers and their tributaries. The few sites in the sample which do qualify as river/valley settlements were either minimally tested, heavily disturbed, or excavated by amateurs whose reports poorly present the quantitative data needed.

The sites in the Rogue Valley database are heavily dominated by dam-related project studies, hence most of the sites occur at moderate elevations along tributaries to the Rogue River. Conversely, many of the sites in the Umpqua Basin have been excavated in response to Forest Service and Department of Transportation road projects, and are in upland or travel corridor locations. Despite these limitations, the 83 sites examined in this study provide a healthy body of data, from which it is possible to derive useful conclusions regarding the past.

CHAPTER V

FUNCTIONAL ANALYSES: ROGUE BASIN SITES

The database from the Rogue Basin consists of 43 sites. It is heavily dominated by sites from the major dam-building projects of the last twenty years (Lost Creek Dam, Applegate Dam, Elk Creek Dam); information from a handful of other sites complements that from the dam project sites. The initial sequential numbers are those assigned to each site when entered into the database. These case numbers identify sites throughout the report. Where site data are separated into components, those components are given separate record numbers and analyzed separately.

Site Function Based on Qualitative Analysis

The initial qualitative analysis serves to introduce each site. In this analysis, a brief description of each site is given, as well as a functional designation. Generally the functional designation follows the original investigator's interpretation; occasionally I have rendered my own opinion where the site report does not indicate a functional type or that type seems at odds with the material presented.

1. 35CU84, Marial — seasonal camp

The site produced an abundance of chipped stone and cobble tools, as well as numerous debitage and bone fragments and one cobble paving stone feature. The assemblage covers millennia; no functional variation has been noted by the investigators, who consider it served as a seasonal encampment throughout its history.

2. Gold Hill village

The presence of "living areas," burials, hearths, abundant and varied artifacts including ceremonial/wealth items, and the site's location on the Rogue River contribute to its designation as a village site.

3. 35JO4, Ritsch village

The presence of housepits, bone, and a variety of stone tools, together with the site's location along the Rogue River contribute to its designation as a village site.

4. 35JO16, Marthaller village

This site is considered a village site due to its location along the Rogue River, the presence of housepits, hearths, midden deposit, and burials, as well as numerous tools and a variety of non-utilitarian implements such as a pipe, and decorated bone.

5. 35JA21, Saltsgaver seasonal camp/camas harvest site

This site is distinguished among the sample of sites by having over 100 camas-roasting ovens, near a camas-bearing wet meadow. The site also produced a midden deposit and a variety of stone implements. The site functioned as an encampment where seasonal tasks (camas harvest) was undertaken.

6. 35JA25, Far Hills village

This site is considered a small village based on the presence of hearths, residential floors, and (reported) numerous burials. In addition to stone tools, dentalium shells were reported; other non-utilitarian items such as beads, mineral pigment, and crystals were recovered. It is located along the Rogue River.

7. 35JA42, Applegate village

This is a late, contact period site which consists of several housepits, clearly defined, and their contents. The assemblage included masses of small bone fragments and debitage, and utilitarian and non-utilitarian items (pipes, beads, schist disc). The site serves as a good example of the small "homestead" type defined by Pettigrew and Lebow (1987) for this area.

8, 9, 10. 35JA47, Applegate — village (late); task/seasonal camp (early)

8 = Data from both components combined
9 = Early component
10 = Late component

This is a dual component site with housepits and a dense assemblage of artifacts and bone associated with the later component. An earlier component consists of an assemblage of stone tools indicative of a task site or a seasonal camp.

11. 35JA77, Salt Creek — seasonal camp

The site produced a variety of stone tools including cobble and groundstone artifacts. It is located above a creek at a moderate elevation. The artifacts and location contribute to its designation as a seasonal (summer) base camp.

12. 35JA133 — seasonal camp

A very minimal amount of excavation (.6 cubic meters) produced groundstone, cobble, and chipped stone tools and debitage, leading the excavator to designate it a seasonal camp.

13. 35JA189, Trail, Casey — village?

The site produced a dense deposit of chipped stone, groundstone, and cobble tools, as well as a midden deposit; housepits were suspected by the investigators and it is located along the Rogue River.

14. 35JA190, Trail, Casey — seasonal camp

A high density and variety of chipped stone, groundstone, and cobble tools suggest that this site is a seasonal encampment.

15. 35JA191, Reeder Reservoir — seasonal camp

A minimal amount of excavation at this upland site produced midden deposit, bone, a hearth, and chipped stone, groundstone, and cobble tools. The site's location, features, and artifacts suggest a seasonal camp.

16. 35JA197, Little Butte — seasonal camp

The site is located on an upland meadow, and produced a variety of chipped stone, groundstone, and cobble tools characteristic of upland base camps.

17. 35JA10, Duvalt (Elk Creek) — seasonal camp or task site

The site produced a variety of chipped stone, groundstone, and cobble tools which may indicate a seasonal camp. However, the excavator considered it a task site.

18. 35JA11, Ross (Elk Creek) — task site

Although housepits were reported for this site, none were located during the excavations and the investigators consider the relatively sparse assemblage of chipped stone and cobble tools to indicate a temporarily occupied task site.

19, 20, 21. 35JA27A, Joham 1 (Elk Creek) — village or seasonal camp or (late); seasonal camp or task site (early)

19 = Data from both components combined
20 = Late component
21 = Early component

This dual component site has midden deposit, a burial, and several rock features associated with an abundance of chipped stone, groundstone, and cobble tools from the later component. The earlier component is less dense and not associated with the features; the excavators suggest it was a seasonal, temporary use site.

22. 35JA27B, Elk Creek — task site or seasonal camp

The site has a moderate density of chipped stone, cobble, and groundstone artifacts, and several rock features. The investigators suggest it was a task site, though the variety of implements and presence of features may indicate a seasonal camp.

23. 35JA59, Elk Creek — village

Housepit, hearth, midden, postmolds, and abundance of fire-cracked rock (FCR) bone, debitage, and a variety of tools indicate that this was a village.

24. 35JA100, Elk Creek — village

The site contains housepits, midden, burials, hearths, postholes, and an abundance of bone fragments, a variety of implements, ceramics, and non-utilitarian objects such as pigment stones and crystals. It is a good example of a late period winter village, probably of the "homestead" type (i.e., small settlements).

25. 35JA101, Elk Creek — village or seasonal camp

Housepits were reported for this site, which was vandalized. Investigators found midden deposit and rock features. The site produced bone fragments, a variety of stone tools, and ceramics. The investigators consider it a permanent or semi-permanent village or camp site.

26. 35JA102, Elk Creek — task site

The site produced a low density of artifacts, primarily chipped stone with a few cobble and groundstone tools. The investigators suggest it was used on a short-term basis for certain tasks.

27. 35JA103, Elk Creek — task site

Although housepits were reported, the artifact assemblage is limited to chipped stone tools and debitage; the investigators class this as a short-term task site.

28. 35JA105, Elk Creek — task site

This site produced a very light assemblage of chipped stone artifacts, with one groundstone implement. It is classed as a task site by its investigators.

29. 35JA107, Elk Creek — seasonal camp

The site produced a variety of chipped stone, cobble, and groundstone tools, some bone, and some FCR. One feature of groundstone with FCR was excavated. The excavators conclude it was a seasonal camp.

30. 35JA110, Elk Creek — task site

A limited amount of excavation produced a small assemblage of chipped stone tools and debitage; the investigators consider this a task site.

31. 35JA112, Elk Creek — task site

Excavation produced a limited amount of chipped stone tools and debitage; this is considered a task site.

32. EC-2, Elk Creek — seasonal camp

The assemblage includes bone fragments and FCR, as well as a variety of chipped stone, cobble, and groundstone tools; one rock feature was excavated. The investigators consider this a seasonal camp.

33. Island site, Elk Creek — task site

A light assemblage of chipped stone tools and a small amount of bone indicates this was a task site.

34. Winningham, Elk Creek — task site

A small assemblage of chipped stone tools with a few cobble tools and groundstone led the investigators to classify this as a task site.

35. Zimmerly, Elk Creek — task site

An assemblage of predominantly chipped stone tools and debitage, with a few cobble and groundstone tools, prompted classification of this site as a task site.

36. 35JA5, Lost Creek — task site

An assemblage of chipped stone, cobble and groundstone tools on a the lowest terrace above the Rogue River led the investigator to consider this a fishing camp/task site.

37. 35JA6, Lost Creek — task site or seasonal camp?

The site produced a possible hearth, with chipped stone, cobble, and groundstone tools. The investigator considers it a task site/fishing site, since it is on the Rogue River; the assemblage and possible feature may indicate a seasonal camp.

38. 35JA7, Lost Creek — task site

This light lithic scatter produced a few chipped stone tools and was classified as a task site.

39. 35JA8, Lost Creek — seasonal camp?

The assemblage of chipped stone, cobble and groundstone artifacts, with two stone discs, appears to represent a task site or seasonal camp. However, the investigator mentions that housepits were reported, although these features were not noted during the excavation.

40. 35JA12, Lost Creek — village?

The report notes one housepit, and records a variety of chipped stone, cobble, and groundstone tools. The assemblage and feature suggest a village site.

41. 35JA14, Lost Creek — seasonal camp

The site contains chipped stone as well as cobble and groundstone tools, and a firedrill hearth. It could be a seasonal camp.

42. 35JA16, Lost Creek — seasonal camp

The site contains a variety of chipped stone tools, cobble tools, groundstone, and two stone discs, and one hearth. A mortar was cached at the site. The artifacts and feature suggest a seasonal camp.

43. 35JA18, Lost Creek — seasonal camp/village?

The presence of midden soils and a variety of tools including a stone disc, and a fairly dense deposit of materials indicates a seasonal camp or village site (no housepits were noted or reported).

44. 35JA19, Lost Creek — seasonal camp

The site has hearths and a variety of chipped stone and cobble tools, with one groundstone artifact; the features and tools suggest a seasonal camp.

45. 35JA20, Lost Creek — task site

A light recovery of chipped stone tools with a few cobble and groundstone artifacts suggests that this was a task site.

46. 25JA23, Fawn Butte (Lost Creek) — seasonal camp? village?

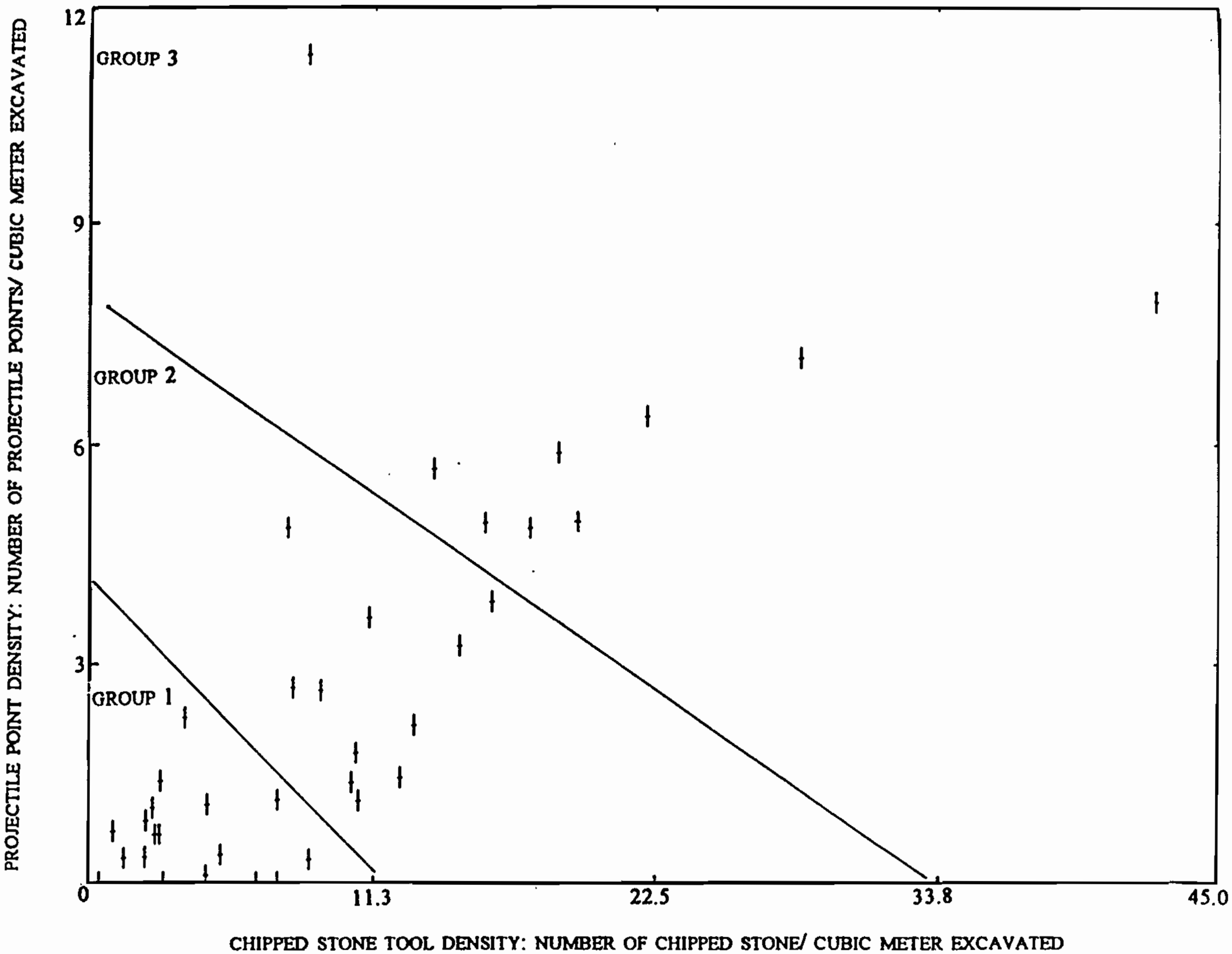
Previous investigations noted possible housepits and burials, though these were vandalized. A dense and varied assemblage suggests that it was a village or seasonal camp.

Density Measures

Density Measure 1: Projectile Points vs. Other Chipped Stone Tools

Figure 7 illustrates the density of site assemblages compared with one another. Density is computed as the number of items per cubic meter. In Density Measure 1, the density of projectile points for each site's assemblage is plotted against the density of other chipped stone implements for that same site. Each point on the scatterplot represents one site. There is a good correlation between these two types of density represented for each site; that is, those sites with a high density of projectile points generally also have a high density of other chipped stone tools, and vice versa.

The sites have been divided into three groups, based on my interpretation of breaks in the distribution of sites on the scatterplot. Group 1 includes those with low densities (i.e., task sites), Group 2 includes those with medium densities (i.e., seasonal camps), and Group 3 includes those with the highest densities (i.e., villages). The sites in these groups (reading generally from the lower left of the plot to the upper right) are presented in Table 5. The table lists the record number, site number and name, the Group to which it was assigned in the qualitative analysis, and the presence or absence of habitation (housepit, midden, burial) or other types of features (e.g., hearths, miscellaneous rock features).



Projectile point density, measured as number of projectile points/cubic meter, plotted against chipped stone tool density, measured as number of chipped stone tools/cubic meter. Each cross represents a site.

FIGURE 7. Rogue Basin Sites: Density Measure 1.

TABLE 5. Rogue Basin Sites, Density Measure 1
Density Groups Based on Projectile
Point/Other Chipped Stone Tools

Rec. No.	Site No.Name	Qual. Type	Hab Feat.	Oth. Feat.
Group 1				
28	JA105, Elk Ck.	task	no	no
31	JA112, Elk Ck.	task	no	no
26	JA102, Elk Ck.	task	no	no
30	JA110, Elk Ck.	task	no	no
3	Ritsch	village	yes	no
33	Island, Elk Ck.	task	no	no
38	JA7, Lost Ck	task	no	no
29	JA107, Elk Ck.	seas. camp	no	yes
37	JA6, Lost Ck.	task/seas camp	no	yes
34	Winningham, Elk Ck.	task	no	no
35	Zimmerly, Elk Ck.	task	no	no
45	JA20, Lost Ck.	task	no	no
14	JA190, Trail	seas. camp	no	no
12	JA133	seas. camp	no	no
18	JA11, Elk Ck.	task	?	no
27	JA103, Elk Ck.	task?	?	no
4	Marthaller	village	yes	yes
Group 2				
11	JA77, Salt Ck.	seas. camp	no	no
41	JA14, Lost Ck	task/seas.camp	no	no
22	JA27B, Elk Ck.	task/seas.camp	no	yes
5	JA21, Saltsgaver	seas. camp	yes	yes
6	Far Hills	village	yes	yes
25	JA102, Elk Ck	seas. camp/village	yes	yes
13	JA189, Trail	village	yes	no
8	35JA47, Applegate	village	yes	no
16	35JA197	seas. camp	no	no
42	JA16, Lost Ck.	seas. camp	no	no
44	JA19, Lost Ck.	task/seas. camp?	no	yes
Group 3				
17	JA10, Elk Ck.	seas. camp/task	no	no
43	JA18, Lost Ck	seas. camp/village	yes	no
8 7	JA42, Applegate	village	yes	no
46	JA23, Fawn Butte	village/seas. camp	yes	?
24	JA100, Elk Ck.	village/seas. camp	yes	yes
23	JA59, Elk Ck.	village	yes	yes
32	EC-2	seas. camp	no	yes
19	JA27A, Joham 1	village	yes	yes
15	JA191	seas. camp	yes	no

Density Measure 2: Debitage Density vs. Total Tool Density

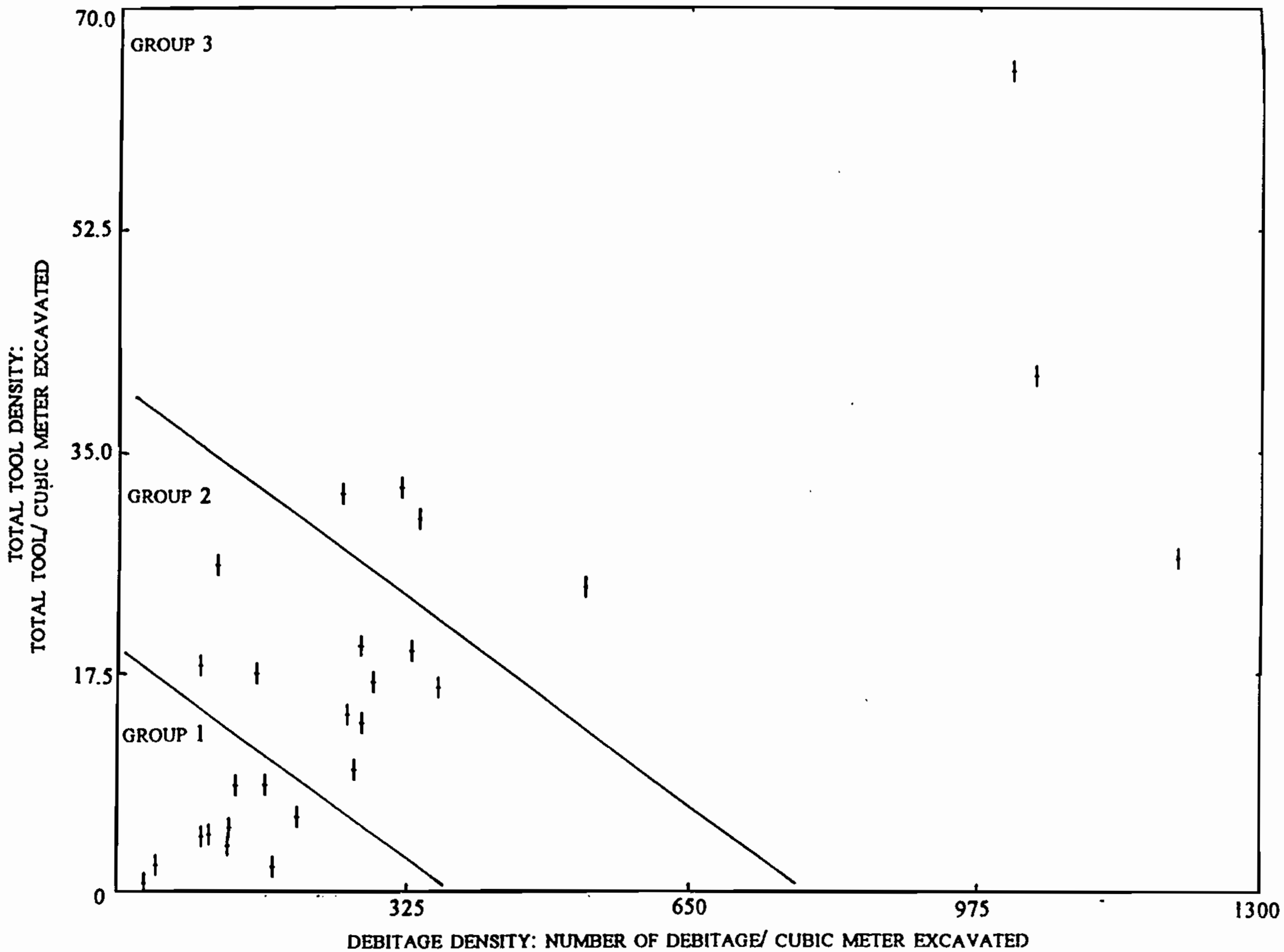
Figure 8 illustrates the results of the second density analysis, in which the density of debitage and the density of the total tool assemblage are shown for each site. Here, the density of all the stone tools present at each site is plotted against the density of debitage for each site. Each point represents a single site. This exercise produces a distribution similar to that of Figure 7; there is a high degree of correlation between the density of tools and the density of debitage present for each site. That is, sites with a high density of tools are likely to also have a high density of debitage; the reverse is also true.

Again, the sites were divided into three groups, based on my interpretation of breaks in the scatterplot. The groups are presented in Table 6. In this table, sites are presented reading from the lower-left (lowest density) corner to the upper right (highest density corner).[1]

There is considerable agreement between Density Measure 1, represented in Table 5, and Density Measure 2, represented in Table 6. Group 1 (low density sites) of Table 6, for example, is entirely contained

---

[1] Different excavation techniques produce different amounts of debitage; in this analysis, most debitage counts are those retrieved from screening with a 1/4" screen. Several investigators employed smaller screens for a fraction of the work, but did not report the debitage retrieved separately. In these cases the entire amount reported was used, giving those sites--several of the Elk Creek sites--a slightly higher debitage count than would be expected for only 1/4" screen. This slight skewing does not seem to have affected the analysis very much, since there is considerable agreement among site types with the different methods employed. Many sites had no report of total debitage collected, and are excluded from this analysis.



Total tool density, measured as number of tools/cubic meter, plotted against debitage density, measured as number of debitage/cubic meter. Each cross represents a site.

FIGURE 8. Rogue Basin Sites: Density Measure 2.

TABLE 6. Rogue Basin Sites, Density Measure 2
Site Density Measured by Debitage
and Total Tool Density

Rec. No.	Site No.Name	Qual. Type	Hab Feat.	Oth. Feat.
Group 1				
28	JA105, Elk Ck	task	no	no
26	JA102, Elk Ck.	task	no	no
33	Island, Elk Ck.	task	no	no
31	JA112, Elk Ck.	task	no	no
30	JA110, Elk Ck.	task	no	no
29	JA107, Elk Ck.	seas.camp	no	yes
34	Winningham, Elk Ck.	task	no	no
35	Zimmerly, Elk Ck.	task	no	no
4	JO16, Marthaller	village	yes	yes
14	JA190, Trail	seas. camp	no	no
Group 2				
5	Saltsgaver	seas. camp	yes	yes
27	JA103, Elk Ck.	task?	?	no
18	JA11, Elk Ck.	task?	?	no
11	JA77, Salt Creek	seas. camp	no	no
41	JA14, Lost Ck	seas. camp/task	no	no
15	JA191, Reader Res.	seas. camp	yes	yes
22	JA27B, Elk Ck	task/seas. camp	no	yes
8	JA47, Applegate	village	yes	no
25	JA101, Elk Ck	village/seas. camp	yes	yes
13	JA189, Trail	village	yes	no
Group 3				
16	JA197	seas. camp	no	no
24	JA100, Elk Ck.	village/homestead	yes	yes
23	JA59, Elk Ck.	village/homestead	yes	yes
12	JA133	seas. camp	no	no
46	JA23, Fawn Butte	village/seas. camp	yes	yes
32	EC-2, Elk Ck.	seas. camp	no	yes
19	JA27A, Joham 1	village/seas. camp	yes	yes

within Group 1 of Table 5; Group 2 in Table 6 overlaps Group 2 in Table 5 with three exceptions (#27 and #18, which are high in Group 1 in Table 5; and #15 which is in Group 3); Group 3 (high density sites) in Table 6 overlaps Group 3 in Table 5 with two exceptions (#16 which is in Group 2 of Table 5 and #12 which is in Group 1 of Table 5). Overall, 81 percent of the sites subjected to both density measures were placed in the same group with each measure.

In addition to this agreement, there is considerable correspondence between site densities and site types based on the qualitative assessment and the presence/absence of features. Those sites which may be described as village sites on the basis of habitation features (i.e housepits, middens, and burials) have higher densities than those which do not have such features. As an independent check on the density method, this evidence indicates that density measures can help determine site function. That the density measures seem to work is also probably due to the fact that the sites in the sample have fairly homogeneous depositional environments; highly deflated sites are not compared with those occurring in areas subject to rapid deposition. Also, similar excavation methods make site assemblages roughly comparable. Even though the size of the excavations varied widely, at all sites only a sample of material was excavated, and excavations were usually placed in those areas deemed likely to be most productive.

Only a few sites appear very out-of-place with regard to the data presented in the site reports and the investigators' assessments. Both the Marthaller (#4) and Ritsch (#5) sites appear in Group 1, which are low density sites interpreted as task sites. The Marthaller and Ritsch sites are located on broad river terraces at the confluence of the Applegate and the Rogue Rivers, and believed to be riverside villages based on the qualitative interpretation. The reports for these sites did not give good information regarding excavation procedures, and for both of these sites it was necessary to make very crude estimates of the amount excavated. It is possible that these estimates of volume excavated are inflated, which would bring the artifact density figures down. Alternatively, as riverside sites (among the few in the sample) the excavated material may have included considerable amounts of sterile flood deposits, again lowering the density estimates. Site #8 (JA47) is a dual component site, with a housepit settlement (i.e., village) clearly evident in the later component, but it appears in Group 2 (seasonal camps) in each analysis. The density figures were extracted from excavation measurements which applied to both components; however, the resultant lumping may have lowered the density measures, causing the later component to appear with those which represent seasonal camps.

Multidimensional Scaling: Comparison of Assemblage Richness and Evenness

The Multidimensional Scaling (MDS) analysis compares the sites across two dimensions as illustrated in Figure 9. Each site is placed in space according to its likeness to the other sites, with the most similar sites the closest to one another. (The dimensions are arbitrary measures of distance and do not have particular meaning.) In order to interpret the

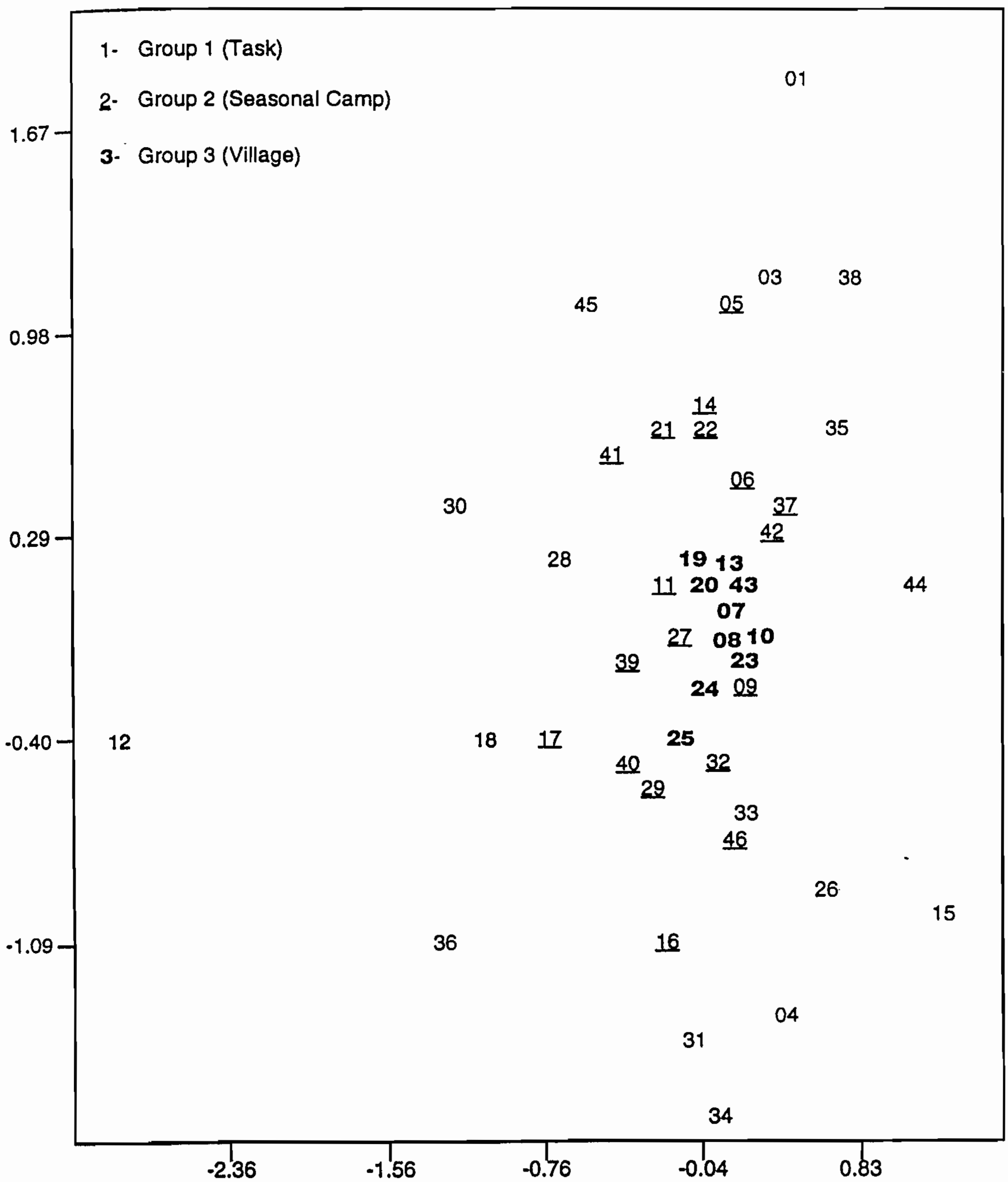


FIGURE 9. Rogue Basin: MDS plot of sites.

pattern, those sites which were most confidently assigned to a specific type based on both the density and qualitative analyses were identified on the scatterplot. It was discovered that village sites clustered in the middle of the scatter, with seasonal camps around them and task sites dispersed about the plot. This is precisely the pattern predicted initially (see Chapter IV).

The MDS plot clarifies a number of relationships between and among certain sites in the sample. Specifically, a number of sites with equivocal designations could be assigned more definitively to functional categories based on their closeness/distance to the central cluster of village sites. Sites #27 and 39, which may be classed as either seasonal camps or task sites, based on preceding analyses, appear fairly close to the village sites and have assemblages which are more "like" those sites. Hence, they are designated seasonal camps in this MDS analysis. Sites #44 and #18 are more distant from the village and seasonal camp sites, and therefore have assemblages less "like" those types. They are designated task sites in this analysis. Sites #21 and 14 are at some distance from the village group, but close to several seasonal camps; they are therefore designated seasonal camps. Sites #40 and #32 are at some distance from the central cluster but near village site #25, and may be considered at least seasonal camps.

The Ritsch (#3) and Marthaller (#4) sites appear as anomalies in this analysis. Though the qualitative assessment, based on the sites' locations, artifacts, and housepits and burials, strongly indicates that they are village sites, they do not cluster with the central group as predicted. Rather, they appear as task sites, among those dispersed about the central configuration of villages and seasonal camps. The reason they appear with the task sites may be because the data in the reports are not an accurate reflection of the reality of the archaeological assemblage. Neither site was professionally excavated, and systematic collection and cataloging of all artifacts may not have occurred.

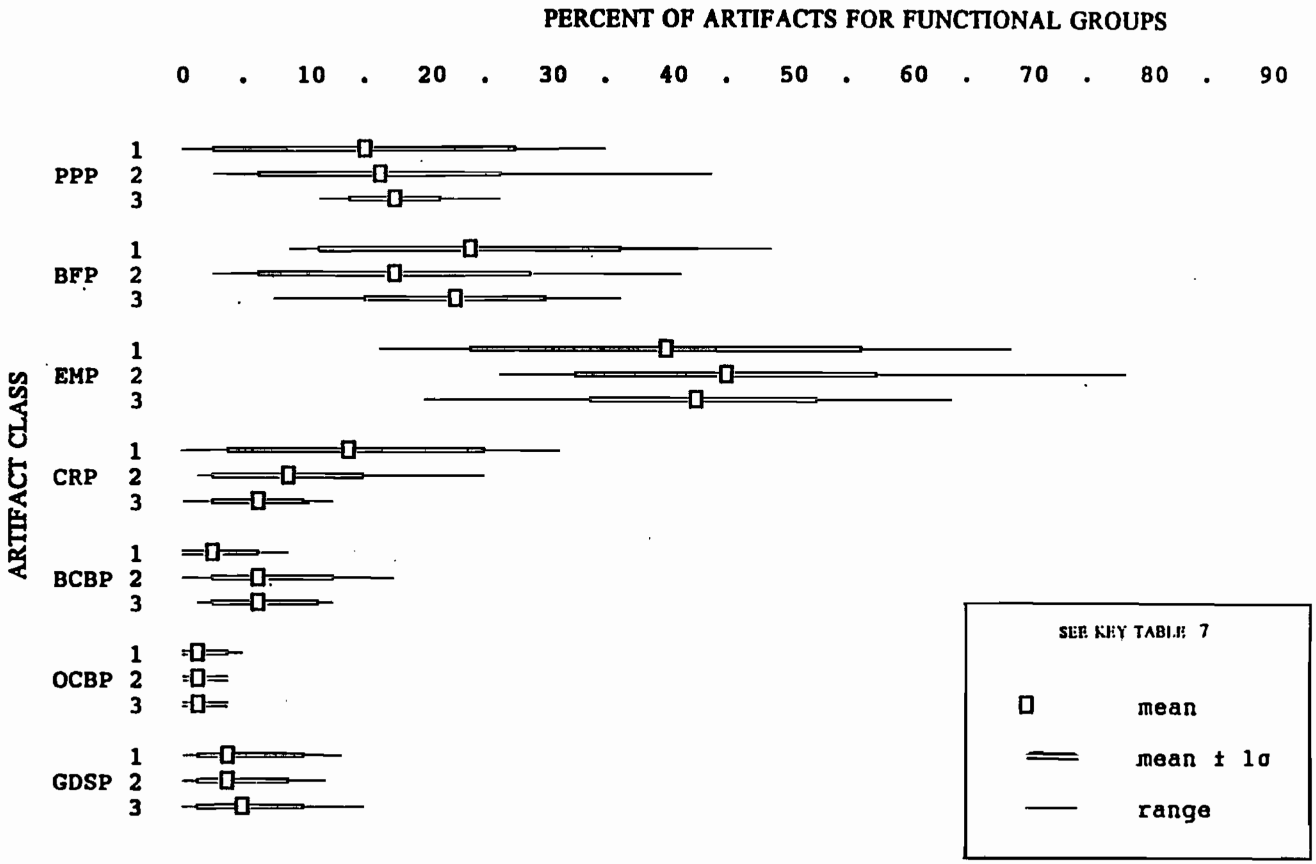
The MDS analysis groups sites based on similarities of artifact class percentages. Table 7 gives the range and standard deviations of the percentages of different tool classes for each type of site; these statistics are illustrated in Figure 10. The central cluster of sites, representing village sites, have the most uniform, and hence most generalized, chipped-stone assemblages. In the table, this fact is represented by the tightest range and lowest standard deviation for the tool types represented. The standard deviation is particularly instructive, since all classes have outliers which skew the ranges somewhat. The standard deviation is a better measure of how tightly clustered about a mean the distribution really is. Village sites also tend to have higher proportions of cobble and groundstone artifacts.

Seasonal camps show more variability among the tool classes, but generally less than that demonstrated by the task sites. The assemblages from the task sites are the most specialized, with some sites having high proportions of projectile points and low proportions of other types of tools, for example, and others having few projectile points but high proportions of other tools. This is represented in Table 7 and Figure 10 by the wide range of tool class proportions and comparatively high standard deviations for task sites

TABLE 7: Rogue Basin Sites: MDS Descriptive Statistics for Functional Groups

Tool Class	Group 1 Task	Group 2 Seasonal Camp	Group 3 Village
PPP			
Range	0 - 35	3 - 43	11 - 26
Mean	15	16	17
SD	11.8	9.9	4
BFP			
Range	8 - 47	3 - 40	7 - 37
Mean	24	17	22
SD	13	11	7
EMP			
Range	16 - 68	25 - 78	18 - 64
Mean	39	44	42
SD	16	13	10
CRP			
Range	0 - 33	1 - 25	0 - 11
Mean	14	9	6
SD	11	6	3
BCBP			
Range	0 - 9	0 - 17.7	1.4 - 12.6
Mean	3.2	7.2	6
SD	3.2	4.2	3.8
OCBP			
Range	0 - 4.5	0 - 3.6	0 - 4
Mean	0.4	0.7	0.8
SD	1.3	1	1.3
GDSP			
Range	0 - 14	0 - 12	0.7 - 15
Mean	4.2	4.5	5.1
SD	4.3	3.6	4.2

SD = Standard Deviation
PPP = % projectile points
EMP = % edge-modified tools
BCBP = % battered cobbles
OCBP = other cobble tools
BFP = % bifaces
CRP = % cores
GDSP = % groundstone



1 = task site; 2 - seasonal camps; 3 = village sites

FIGURE 10. Rogue Basin: MDS graph of artifact class percentages.

as a group. Task sites also tend to have lower proportions of cobble tools than the other sites.

Groundstone and Cobble Densities: Comparison with Feature Data

Densities for groundstone and cobble tools were computed for each site, and the sites arranged in order of increasing density for each artifact class. Feature data are added to this distribution of sites. Features consist of housepits, middens, and burials, hearths, and other rock features. In this analysis, housepits, middens, burials, are considered specifically to indicate village sites.

As in the other analyses, three groups were defined based on the density of groundstone tools (Table 8) and based on the density of cobble tools (Table 9). Sites were arranged in order of increasing density of groundstone and cobble tools, and the presence/absence of features was compared to this arrangement (Tables 8, 9, and 10).

As is readily visible from Tables 8 and 9, sites with higher densities of groundstone and cobble tools are likely to have features present. Furthermore, those with the highest densities of groundstone or cobble tools (Group 3 village sites) have the highest number of habitation features. These relationships are quantified in Table 10, which gives the density figures for each site group (i.e., Groups 1, 2, and 3), and compares these density figures to the number and types of features present for each group.

Thus, for the cobble density measure in Table 10, Group 1 task sites have cobble densities which range from 0 to .35 (items per cubic meter).

TABLE 8. Rogue Basin Sites: Groundstone Density and Features

Record No.	Site No.	Site Name	Amount Excavated*	Groundstone Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 1									
33	Island	Elk Creek	4.50						
27	JA103	Elk Creek	4.40						
38	JA7	Lost Creek	6.00						
30	JA110	Elk Creek	2.00						
3	JO4	Ritsch	144.00	.04860	Y				
26	JA102	Elk Creek	40.40	.07430					
37	JA6	Lost Creek	62.00	.08060				Y	
44	JA19	Lost Creek	12.40	.08060				Y	
28	JA105	Elk Creek	12.20	.08200					
31	JA112	Elk Creek	12.19	.08200					
35	Zimmerly	Elk Creek	10.60	.09430					
46	JA23	Fawn Butte	14.94	.20080					Y
34	Winningham	Elk Creek	8.55	.23390					
29	JA107	Elk Creek	107.70						
45	JA20	Lost Creek	11.50	.26090					
18	JA11	Elk Creek	3.10	.32260					
16	JA197	Little Butte	6.00	.33330					
Group 2									
8	JA47	Applegate	107.00	.37380	Y				
11	Salt Creek	Salt Creek	15.00	.40000					
42	JA16	Lost Creek	13.00	.46150	Y				
32	EC-2	Elk Creek	6.00	.50000					Y

TABLE 8. Continued

Record No.	Site No.	Site Name	Amount Excavated*	Groundstone Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 3									
23	JA59	Elk Creek	70.00	.61430		Y		Y	Y
15	JA191	Reeder	1.50	.66670		Y		Y	
41	JA14	Lost Creek	5.00	.80000					
24	JA100	Elk Creek	159.00	.80500	Y	Y	Y		Y
22	JA27B	Elk Creek	26.00	.84620					Y
17	JA10	Elk Creek	3.00	1.0000					
14	JA190	Trail	6.50	1.0769					
6	JA25	Far Hills	34.00	1.2059	Y		Y		Y
43	JA18	Lost Creek	6.50	1.2308		Y			
4	JO16	Marthaller	98.00	1.3061	Y	Y	Y	Y	
13	JA189	Trail	5.50	1.6364					
12	JA133	RRNF	0.60	1.6667					
5	JA21	Saltsgaver	10.00	1.7000		Y			Y
25	JA101	Elk Creek	21.10	1.7536		Y			Y
7	JA42	Applegate	42.00	1.8810	Y				
19	JA27A	Joham 1	24.00	3.6250			Y		Y

* Cubic meters
** Arranged in order of increasing density

TABLE 9. Rogue Basin Sites: Cobble Tool Density and Features

Record No.	Site No.	Site Name	Amount Excavated*	Cobble Tool Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 1									
33	Island	Elk Creek	4.50						
27	JA103	Elk Creek	4.40						
30	JA110	Elk Creek	2.00						
28	JA105	Elk Creek	12.20						
31	JA112	Elk Creek	12.19						
26	JA102	Elk Creek	40.40	.0495					
38	JA7	Lost Creek	6.00	.1667					
35	Zimmerly	Elk Creek	10.60	.1887					
34	Winningham	Elk Creek	8.55	.2339					
45	JA20	Lost Creek	11.50	.3478					
Group 2									
37	JA6	Lost Creek	62.00	.3871				Y	
3	JO4	Ritsch	144.00	.3889	Y				
8	JA47	Applegate	107.00	.4112	Y				
29	JA107	Elk Creek	107.70	.5014					Y
46	JA23	Fawn Butte	14.94	.5355					Y
44	JA19	Lost Creek	12.40	.5645				Y	
18	JA11	Elk Creek	3.10	.6452					
42	JA16	Lost Creek	13.00	.7692	Y				
11	SALT CRK	Salt Creek	15.00	.8000					
22	JA27B	Elk Creek	26.00	.8846					Y

TABLE 9. Continued

Record No.	Site No.	Site Name	Amount Exca-vated*	Cobble Tool Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 3									
23	JA59	Elk Creek	70.0	.8857		Y		Y	Y
13	JA189	Trail	5.5	.9091					
14	JA190	Trail	6.5	.9231					
24	JA100	Elk Creek	159.0	.9811	Y	Y	Y		Y
4	JO16	Marthaller	98.0	1.0816	Y	Y	Y	Y	
41	JA14	Lost Creek	5.0	1.4000					
32	EC-2	Elk Creek	6.0	1.5000					Y
25	JA101	Elk Creek	21.1	1.5166		Y			Y
16	JA197	Little Butte	6.0	2.0000					
6	JA25	Far Hills	34.0	2.1765	Y		Y		Y
15	JA191	Reeder	1.5	2.6667		Y		Y	
7	JA42	Applegate	42.0	3.0238	Y				
43	JA18	Lost Creek	6.5	3.2308		Y			
5	JA21	Saltsgaver	10.0	3.5000		Y			Y
17	JA10	Elk Creek	3.0	3.6667					
19	JA27A	Joham 1	24.0	4.7500			Y		Y
12	JA133	RRNF	0.6	5.0000					

* Cubic meters
** Sites arranged in order of increasing density

TABLE 10. Rogue Basin Sites: Groundstone/ Cobble Densities and Features

Site Type	N sites	Density Range	% SF	% MF	% HF	% All
Cobble Density						
Group 1	10	0 - .35	0	0	0	0
Group 2	10	.38 - .88	70%	0	30%	70%
Group 3	17	.86 - 5.0	18%	47%	59%	65%
Groundstone Density						
Group 1	17	0 - .33	29%	0%	6%	29%
Group 2	4	.37 - .5	75%	0%	50%	75%
Group 3	16	.61 - 3.6	19%	50%	62%	69%

% SF = Percent of sites in the group with only one type of feature present (i.e., either housepits, middens, burials, hearths or other rock features).

% MF = Percent of sites in the group with multiple types of features present (i.e., some combination of housepit, midden, burial, hearth, rock feature)

% HF = Percent of sites in the group with habitation features (i.e., housepit/living floor, midden, burial) present.

% All = The total percentage of sites in the group with any type features (%SF plus %MF).

These task sites, as a group, have no features of any type associated with them. Group 3 sites, however, have cobble densities which range from .86 to 5.0 (items per cubic meter). Within this group, 18 percent of the sites have a single feature (of any type), and 47 percent have multiple types of features (e.g., housepits and middens, burials and hearths). A total of 65 percent of the sites in Group 3 therefore have features of some type; and a total of 59 percent of the sites in this group have features which are specifically associated with village sites (i.e., housepits, middens, burials).

There is very good correlation between the presence/absence of features and the density of cobble and groundstone tools. Generally, sites with higher densities of cobbles and/or groundstone artifacts are more likely to include some type of feature. Specifically, those sites with multiple types of features and with habitation features (housepits, burials, middens) are more likely to occur in the group containing the highest density of cobble and/or groundstone (Group 3, village sites). Sites with the lowest densities of cobbles and/or groundstone have fewer features. This trend is even more apparent for cobble tools than for groundstone.

Site Function

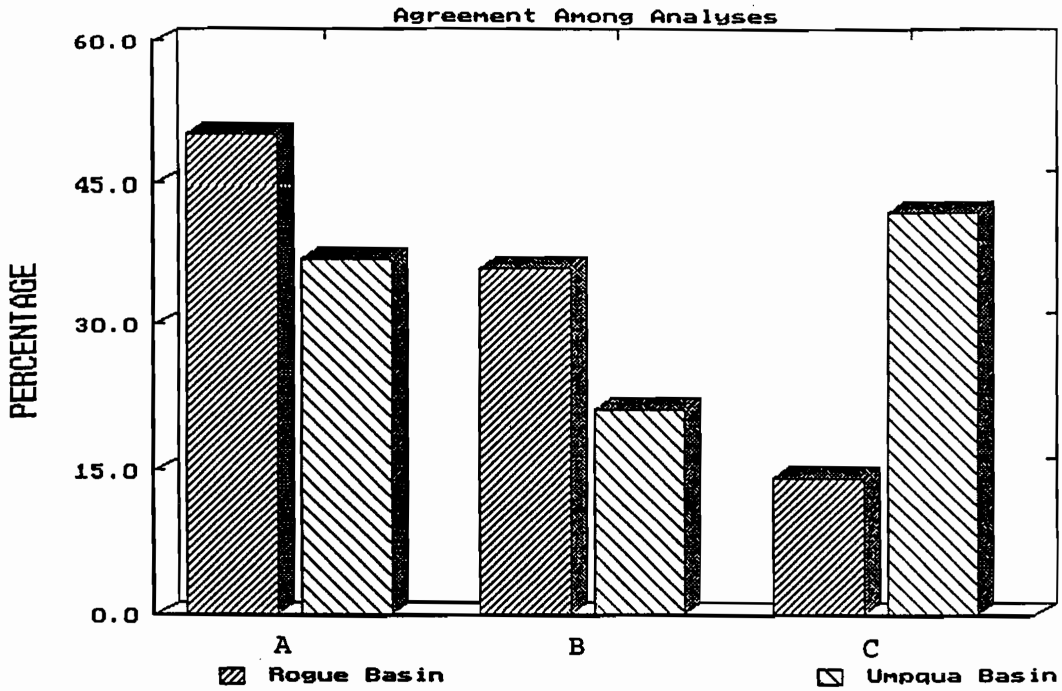
Table 11 lists the sites examined in this study, and each site's functional type based on the different analyses. In most cases, there is considerable agreement among the various measures, and the final type assignment is unequivocal. The agreement among the various methods is, in fact, astonishing (see Figure 11): 50 percent of the sites are placed in

TABLE 11. Rogue Basin, Functional Site Types

Record No.	Site No.	Site Name	Qualitative Assessment	Density Measure 1 Group	Density Measure 2 Group	Multi-Dimensional Scaling Group	Cobble Density Group	Ground-stone Density Group	Habitation Features Present	Other Features Present	Site type Final, Desig-nation
1	35CU84	Marial	2			2					2
2	JA01	Gold Hill	3								3
3	JO4	Ritsch	3	1		2	2	1	Y		3
4	JO16	Marthaller	3	1	1	1	3	3	Y	Y	3
5	JA21	Saltsgaver	2	2	2	2	3	3	Y	Y	2
6	JA25	Far Hills	2,3	2		2	3	3	Y	Y	2
7	JA42	Applegate	3	3		3	3	3	Y		3
8	JA47	Applegate	3	2	2	3	2	2,3	Y		
9	JA47-1	Applegate	2			2					2
10	JA47-2	Applegate	3			3			Y		3
11	35JA77	Salt Creek	2	2	2	2	2	2			2
12	JA133	RRNF	2	1	3	1	3	3			2
13	JA189	Trail	3	2	2	3	3	3			3
14	JA190	Trail	2	1	1	2	3	3			2
15	JA191	Reeder	2	3	2	1	3	3	Y	Y	2
16	JA197	Little Butte	2	2	3	2	3	2			2
17	JA10	Elk Creek	1,2	3		2	3	3			2
18	JA11	Elk Creek	1	1	2	1	2	1			1
19	JA27A	Joham 1	3	3	3	3	3	3	Y		
20	JA27A-1	Joham 1	3			3			Y		3
21	JA27A-2	Joham 1	2			2					2
22	JA27B	Elk Creek	2,3	2	2	2	2	3		Y	2
23	JA59	Elk Creek	3	3	3	3	3	3	Y	Y	3

TABLE 11. Continued

Record No.	Site No.	Site Name	Qualitative Assessment	Density Measure 1 Group	Density Measure 2 Group	Multi-Dimensional Scaling Group	Cobble Density Group	Ground-stone Density Group	Habitation Features Present	Other Features Present	Site type Final, Designation
24	JA100	Elk Creek	3	3	3	3	3	3	Y	Y	3
25	JA101	Elk Creek	2,3	2	2	3	3	3	Y	Y	3
26	JA102	Elk Creek	1	1	1	1	1	1			1
27	JA103	Elk Creek	1	1	2	2	1	1			2
28	JA105	Elk Creek	1	1	1	1	1	1			1
29	JA107	Elk Creek	2	1	1	2	2	1			2
30	JA110	Elk Creek	1	1	1	1	1	1			1
31	JA112	Elk Creek	1	1	1	1	1	1			1
32	EC-2	Elk Creek	2	3	3	2	3	2		Y	2
33	Island	Elk Creek	1	1	1	1	1	1			1
34	Winningham	Elk Creek	1	1	1	1	1	1			1
35	Zimmerly	Elk Creek	1	1	1	1	1	1			1
36	JA5	Lost Creek	1			1					1
37	JA6	Lost Creek	1	1		2	1,2	1		Y	2
38	JA7	Lost Creek	1	1		1	1	1			1
39	JA8	Lost Creek	1,2			2					2
40	JA12	Lost Creek	3			2			Y		3
41	JA14	Lost Creek	1,2	2	2	2	3	3			2
42	JA16	Lost Creek	2	2		2	2	2		Y	2
43	JA18	Lost Creek	2,3	3		3	3	3	Y		3
44	JA19	Lost Creek	1,2	2		1	2	1		Y	2
45	JA20	Lost Creek	1	1		1	1	1			1
46	JA23	Fawn Butte	2,3	3	3	2	2	1		Y	2



A = Percent of sites which were placed into the same group by all functional tests.

B = Percent of sites which were placed in two adjacent groups (Groups 1 and 2, or Groups 2 and 3) by all functional tests.

C = Percent of sites which were placed in all three groups, or in Groups 1 and 3, by all functional tests.

FIGURE 11. Rogue and Umpqua Basin, agreement among site function classifications.

the same category by every measure employed. An additional 36 percent differ by only one step among the measures employed. That is, for all measures, 36 percent of the sites are represented in no more than two groups, and those groups are adjacent groups (i.e., Groups 1 and 2, Groups 2 and 3). The remaining 14 percent of the sites appear in all three groups, or Groups 1 and 3, for the various measures, making interpretation of their function less straightforward.

The final category in Table 11 is the functional designation decided for use in the rest of this study. In most cases, as just noted, assignment to this category is unambiguous. Where the various methods used have placed a site in different categories, the final designation represents my best interpretation of the information available for that site. In making these designations, I have frequently relied on the original excavator's assessment of the site, taking into account the other data presented above. Final site designations, along with explanation when needed, are presented below.

Site Functional Assessments

1. CU 84 Marial — seasonal camp

2. Gold Hill — village

3. JO4, Ritsch — village

The Ritsch site falls outside the parameters defining the other habitation sites; its placement in the MDS scatterplot suggests a seasonal camp or task site. The most likely explanation for this anomaly is the fact that it was not professionally excavated, and systematic collection of all materials may not have taken place. It is classed as a village site because of the presence of habitation features and a variety of artifacts characteristic of village sites.

4. JO16 Marthaller — village

Like the Ritsch site, this site falls outside the parameters for artifact density and diversity defining other habitation sites, probably for similar reasons. It is classed as a village site on the basis of habitation features, location, and the variety of artifacts recovered.

5. JA21 Saltsgaver — seasonal camp

The site's features indicate that it was used primarily to process camas. It is a specialized seasonal camp.

6. JA25 Far Hills — seasonal camp

This possible village is removed from the tight cluster of village sites in the MDS data; possibly the reported burials and features are not associated with the portion of the site excavated. Although the high densities of cobble and groundstone artifacts argue for this as a village location, it is considered a seasonal camp on the basis of the MDS plot and the excavator's report.

7. JA42, Applegate — village

8. JA47, Applegate

9. JA47-1 Applegate, early component — seasonal camp

10. JA47-2 Applegate, late component — village

11. JA77, Salt Creek — seasonal camp

12. JA133 RRNF — seasonal camp

The very small amount of excavation may account for this site's placement in various groups for different functional measures. The excavator's opinion is relied on for the site's classification in Group 2.

13. JA189 Trail — village

14. JA190 Trail — seasonal camp

The site occurs with other Group 2 sites in the MDS analysis, in concurrence with the original investigator's assessment.

15. JA191 Reeder — seasonal camp

This site produced high densities of artifacts, including groundstone and cobble tools, but the MDS plot places it at some distance from the habitation sites. The very small amount of excavation may have skewed the assemblage. It is classed here as a seasonal camp, due to its upland location and the presence of midden and cobble tools.

16. JA197 Little Butte — seasonal camp

17. JA10, Elk Ck. — seasonal camp

18. JA11, Elk Ck. — task

19. JA27A, Joham

20. JA27A-1 Joham, Late component — village

21. JA27A-2 Joham, Early component — seasonal camp

22. JA27B Elk Ck. — seasonal camp

23. JA59 Elk Crk. — village

24. JA100 Elk Ck. — village

25. JA101 Elk Ck. — village

26. JA102 Elk Ck. — task

27. JA103 Elk Ck. — seasonal camp

The site was classed as a task site by excavators, and fell within the task group for one of the density measures and for the groundstone and cobble density analyses. However, one of the density measures placed the site in the seasonal camp group, and assemblage is close to those from seasonal camps and village sites in the MDS plot. Housepits were originally reported for this site (though not confirmed in the excavation). On the basis of the MDS plot and the second density measure, this site is placed with Group 2 seasonal camps.

28. JA105 Elk Ck. — task

29. JA107 Elk Ck. — seasonal camp

30. JA110 Elk Ck. — task

31. JA112 Elk Ck. — task

32. EC-2 Elk Ck. seasonal camp

The MDS plot places this site near other seasonal camps, rather than within the village cluster; it is placed in this group on that basis.

33. Island, Elk Ck.	task
34. Winningham, Elk Ck.	task
35. Zimmerly, Elk Ck.	task
36. JA5 Lost Ck.	task
37. JA6 Lost Ck.	seasonal camp
38. JA7 Lost Ck.	task
39. JA8 Lost Ck.	seasonal camp
40. JA12 Lost Ck.	village
41. JA14 Lost Ck.	seasonal camp
42. JA16 Lost Ck.	seasonal camp
43. JA18 Lost Ck.	village
44. JA19 Lost Ck.	seasonal camp
45. JA20 Lost Ck.	task
46. JA23, Fawn Butte	seasonal camp

CHAPTER VI

FUNCTIONAL ANALYSIS: UMPQUA BASIN SITES

There are 40 sites in the Umpqua Basin sample; 12 of these are in the South Umpqua drainage, and the remainder in the North Umpqua drainage basin. Several sites have multiple components, which are treated separately, resulting in 52 cases. As above, the qualitative analysis serves to introduce each site, and is followed by the quantitative measures. The initial sequential numbers are those assigned to each site when entered into the database. These case numbers identify sites throughout the report. Where site data are separated into components, those components are given separate record numbers and analyzed separately. Explanations of the different analyses are more fully discussed in the preceding chapter on Rogue Basin sites.

Site Function Based on Qualitative Analyses

48. DO275, Sylmon Valley School — seasonal camp/village?

Beckham and Minor (1992) consider this a potential village site, due to its location on the South Umpqua in the Umpqua Valley. Lyman, the investigator, considers this a seasonally occupied site (i.e., a seasonal camp). One possible earth oven was excavated, consisting of a concentration of fire-cracked rock which may indicate a camas oven. A comparatively large amount of cobble tools, including netsinkers, were recovered. My assessment is that it resembles more a seasonal camp site, occupied for a specific purpose, such as a fishing station.

49. DO274, Orchard — village/task?

The investigators consider this possibly a village due to its location in the Umpqua Valley along the South Umpqua River. However, the minimal amount of excavation produced a light assemblage of chipped stone and cobble tools; not a "village"-like assemblage.

50. DO36, Crispen — village/seasonal camp

This is a well-known use area of the Cow Creek Band of Umpqua Indians for processing riverine resources. It is assumed to be a village location. The site has been heavily disturbed.

51. DO412 Coffee Creek — seasonal camp?

The site is located at the confluence of Coffee Creek and the South Umpqua River, in a lowland setting, suggesting to the investigators that it was probably a village type of site. However, it has been very disturbed, and only a remnant remains. The test excavations produced a light assemblage of artifacts which the investigators considered more indicative of a seasonal camp.

52. DO413, Coffee Creek — seasonal camp?

The site is located across from DO412, and the same situation applies.

53. Tiller #1 — task

Located on a ridgetop, the site produced chipped stone tools and debitage. It appears to be a travel stop/task area.

54. Tiller #6 — task

The site is located on a ridgetop, and consists of a light lithic scatter. It appears to be a task/travel stop for refurbishing tools, or performing some immediate task. No cobble tools were recovered.

55. DO205 S. Umpqua Falls RS, upper — seasonal camp

This site is the upper of two rockshelters located above South Umpqua Falls. The falls were and still are an important food-gathering place for the Cow Creek Indians. The presence of burials and abundant chipped stone artifacts suggest at least a seasonal camp. The limited number of cobble tools together with the rock-shelter location suggest this did not serve as a winter village habitation. The investigators consider this a seasonal camp.

56. DO205 S. Umpqua Falls RS, lower — seasonal camp

The lower South Umpqua Falls rockshelter produced an abundance of chipped stone and bone. A Cow Creek informant camped there as a boy; it is known to the Cow Creek people for its proximity to the falls and the good summer and winter runs of fish. Fish were smoked at the falls then taken home. The artifacts recovered, informant testimony, and the site's location all suggest to the investigators that it was used as a seasonal base camp.

57. DO209, Hughes I RS — task

The comparatively light, predominantly chipped stone assemblage at this rockshelter indicates this was a task site.

58. DO212 Time Sq. RS — task

The investigators consider this rockshelter a task site, since the non-perishable items consist mainly of chipped stone--especially projectile point--artifacts. The assemblage includes perishable materials and hearths. It appears to be a hunting site with lots of points and bone; six hearths were also preserved.

59. DO396, Sprint — seasonal camp

The site is located at a good fishing spot for the Cow Creek Indians, near an important food gathering area. It has been heavily disturbed, and only a small portion of the site was tested. The comparatively dense assemblage of mainly chipped stone tools and the site's location suggest a seasonal camp.

60, 61, 62, 63. DO219, Section Creek — village (late); seasonal camp (early?)

60 = Combined data for the whole site
61 = Component I
62 = Component III
63 = Component II

The site is reportedly a Cow Creek village, with pit houses and sweat lodges in the vicinity. Three components were identified by the investigators. Cases 61 and 62 are the two later components; these are similar to one another and include an abundant and varied assemblage of chipped and flaked stone tools. Case 63 is the earliest component and has a lighter assemblage of artifacts, perhaps reflecting use of the area as a seasonal camp.

64. DO395, Grubbe Ranch — village/seasonal camp

The investigator suggests this site was a seasonal camp. A limited amount of excavation produced artifacts including abundant cobble tools. Large, well-formed cobble tools, such as mauls, pestles, and a "hammer" were found at the site by the property owner. Two features, a mussel shell lens and a cobble pavement, indicate at least a seasonal camp. The amount of cobble tools and the site's location along the North Umpqua at a low elevation suggest this may have been a village type of site.

65. DO528, Glide — village/seasonal camp

Housepits and burials were reported for this location (late); it is located near a prime fishing spot on the North Umpqua River. The small amount of excavation produced a variety of artifacts consistent with the interpretation of the site as a village.

66. DO61, Whistler's Bend — village/seasonal camp

A very small amount of excavation yielded a variety of artifacts and the indication of a deep, stratified deposit. The location along the North Umpqua River in the Umpqua valley suggests a village or seasonal camp site.

67. DO67, Winchester Bridge — village?

The site is along the North Umpqua River in the Umpqua valley, and is reportedly a winter village site. Burials have also been reported in the vicinity, and artifacts recovered. Only a small, undisturbed portion of the site was tested. Minimal excavations produced only a few chipped stone and cobble tools. The site may be the remnants of a village site, or a task site associated with a village nearby.

68. DO 52, Gatchel Site — village/seasonal camp?

Ethnographic testimony and the presence of "housefloors" at the site indicate it was a habitation site, possibly a village. A village is noted nearby at the confluence of Little River and the North Umpqua, and the site is on historically known native trails. The site produced a variety of chipped stone and cobble tools.

69, 70, 71, 72, 73, 74. DO153, Narrows — village/seasonal camp

69 = Site data for the whole site.
70 = Component I
71 = Component II

72 = Component III
73 = Component IV

There are four components, two early (III & IV) and two late (I & II). The later components include a burial and housepit (shallow), as well as a midden. The earlier components have hearths. The site was known as a fishing spot for the Cow Creeks, and a "kind of village" was noted for the opposite side of the river. The site is interpreted as a village type for the later two components, and seasonal camp in the earlier.

74. DO359, Swiftwater — task

This is a unique site, consisting of little chipped stone but an abundance of cobble tools. It is located on river terrace along the North Umpqua. The investigator suggests it may have been a fish processing site.

75. DO383, Susan Creek — task/seasonal camp

Test excavations at this site along the North Umpqua River produced a light assemblage of chipped and some groundstone tools, as well as a rock feature associated with groundstone. The comparatively light assemblage suggests a task site; the variety of artifacts and feature indicate possibly a seasonal camp site.

76. DO278, Bogus Creek — task

The site is located along the North Umpqua River and produced an assemblage of primarily chipped stone artifacts, suggesting the site was used as a hunting site. The low elevation may indicate a winter task site or seasonal camp.

77. DO126 Steamboat — task/seasonal camp?

Chipped stone and a few cobble tools at this site along Steamboat Creek suggest a task site or possibly a seasonal campsite.

78. DO11, Lower Rhody — task

The site consists of numerous rock cairns, presumably associated with vision quest activities. A small amount of excavation did not produce any artifacts. The site is a task-specific site.

79. DO40, Cavitt Creek task

The site is a small, light lithic scatter, near a known Cow Creek occupation site/fishery. Small bands camped in the area after contact. The minimal assemblage suggests this was a task site.

80, 81, 82. DO401, Dry Creek task/seasonal camp

80 = Combined data for the site.
81 = Early component
82 = Late component

The site is located on a terrace along the North Umpqua River, and has both a pre- and post-Mazama component. Test excavations suggest that the later component is sparser than the pre-Mazama one; it appears to reflect use as a hunting camp. The earlier component may represent a winter seasonal camp for the Early Archaic, based on recovery of cobble stones/groundstone and the low elevation location. As yet unpublished data recovery excavations, however, indicate that the upper component may also have served as a seasonal camp (O'Neill 1992).

83. DO372, Reynolds task

The primarily chipped stone assemblage suggests this site was an early hunting/task specific site at the confluence of several streams tributary to the North Umpqua.

84, 85, 86. DO422, Island Campground task/seasonal camp

84 = All data for the site
85 = Early component
86 = Late component

Test excavations of this site along the North Umpqua River yielded chipped and cobble tools. The higher density and greater variety of materials from the earlier component suggest it was a seasonal camp, whereas the later occupation was a task site.

87. DO418, Apple Creek Bench task

This site produced an assemblage of chipped stone tools, indicating a task site. It is located along the North Umpqua River, not far from other seasonal camps sites.

88. DO265, Apple Creek — task/seasonal camp

This early site along the North Umpqua produced an assemblage of chipped stone and cobble tools, indicating use as a seasonal camp or task site.

89. DO421, Copeland Creek — task/seasonal camp?

A small amount of excavation produced a high amount of debitage and a few chipped stone tools. The site is located at the juncture of trails at the confluence of the North Umpqua and Copeland Creek, and at a good fishing spot. The limited tool inventory suggests a task site; the location and high density of debitage indicate a seasonal camp.

90. DO161, Medicine Creek — task/seasonal camp?

Two components are present at this site: pre- and post-Mazama. The pre-Mazama component has chipped stone and cobble/groundstone tools, possibly reflecting use as a seasonal camp. The post-Mazama component is less dense, with fewer cobble tools. Both components are similar to the components at Dry Creek.

91. DO187, Powerful 1 — seasonal camp

Peeled ponderosa pine trees, bedrock mortars/stone bowls, and chipped stone tools in a large oak covered flat above the North Umpqua indicate a seasonal base camp.

92. DO227, Powerful 2 — seasonal camp/task?

This site produced a high density of chipped stone artifacts along with some groundstone. Peeled trees and vision quest cairns occur adjacent to the site, which is not far from Powerful 1. The location, on a small knoll above a pine/oak covered flat, suggests a task/hunting camp setting; the high density and variety of tools indicate a seasonal camp.

93. DO379, Snuff Out Site — task

Located along a ridge, the site produced an assemblage of chipped stone tools (no points), suggesting use as a task site or a travel stop.

94. DO397, Shivigny East — task

This site along a ridge produced a dense assemblage of chipped stone tools with a few cobble tools. It appears to be a hunting site.

95. DO289, Little Oak Flat task

This light lithic scatter in the uplands is considered a task site.

96. DO399, Snowbird task

This ridge site produced mainly a chipped stone assemblage and is interpreted as a task site.

97. DO160, Muddy task

This upland ridge site produced only chipped stone artifacts and is considered a task/travel site.

98. DO398, Powerline Site task

This ridge crest site produced a light assemblage of chipped stone tools, indicating a task/travel site.

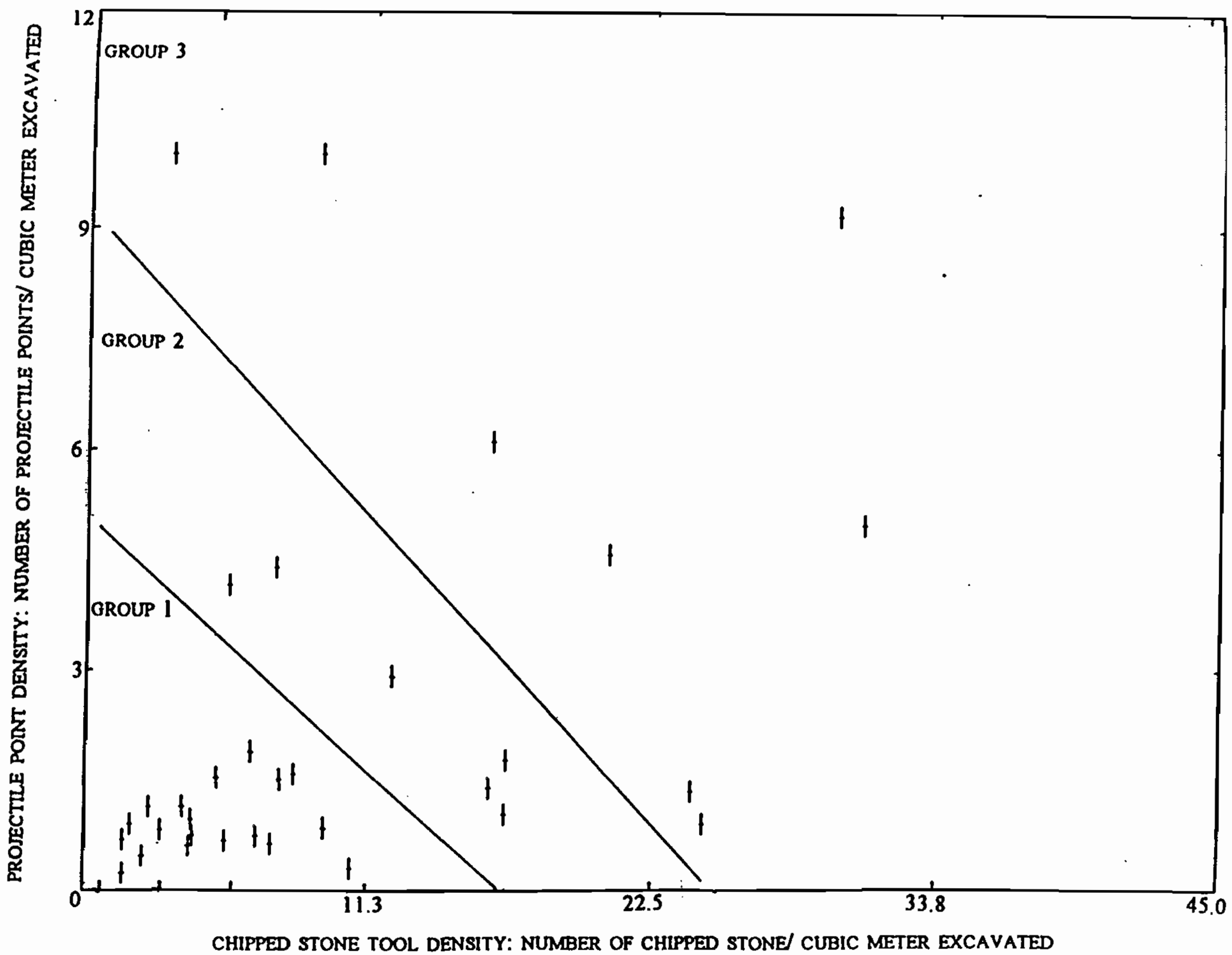
99. DO389, Limpy RS task/seasonal camp

This upland rock shelter produced a high density of predominantly chipped stone tools and debitage. A large number of projectile points suggest it was a hunting task site. The high density of materials reflects either a special depositional environment or use of the site as a seasonal camp, possibly for the purpose of hunting.

Density Measures

Density Measure 1: Projectile Points vs. Other Chipped Stone Tools

The first measure of density employed (Figure 12) is the comparison of projectile point density with the density of other chipped stone tools. This measure follows the same procedures as those explained for the Rogue Basin sites in Chapter VI. The plotted sites were divided into three groups based on apparent breaks in the scatterplot: Group 1 are low density sites, interpreted as task sites, Group 2 sites have intermediate densities and are



Projectile point density, measured as number of projectile points/cubic meter, plotted against chipped stone tool density, measured as number of chipped stone tools/cubic meter. Each cross represents a site.

FIGURE 12. Umpqua Basin Sites: Density Measure 1.

considered seasonal camps, and Group 3 sites have the highest densities and are considered villages (Table 12).

Density Measure 2: Debitage Density vs. Total Tool Density

In Figure 13 the density of debitage is plotted against the density of the total tool assemblage. Again, the procedures follow those outlined for the Rogue Basin sites in Chapter VI. The scatterplot was divided into three groups of increasing density, as above. Several sites (cases #55, 60, 89, and 99) have debitage densities too high to show on the scale used for the graph and are not represented in the scatterplot.

There is considerable overlap between functional groups for both measures. Nearly two thirds (63 percent) of the sites analysed for both measures appear in the same group for each measure. Also, as in the density analysis for the Rogue Basin sites, sites which are considered task sites by the investigators occur in Group 1 of both density measures, seasonal camps occur in Group 2, and village sites in Group 3. Sites with features are more likely to appear in Group 3 of both measures (Table 13).

TABLE 12. Umpqua Basin Sites: Density Measure 1
Density Groups Based on Projectile
Point/Other Chipped Stone Tools

Rec. No	Site Name/No.	Qual. Type	Hab. Feat.	Oth. Feat.
Group 1				
74	DO359 Swiftwater	task	no	no
98	DO398 Powerline	task	no	no
93	DO379 Snuff out	task	no	no
67	DO67 Winchester	village?	no	no
79	DO40 Cavitt Creek	task	no	no
51	DO412 Coffee Creek	task	no	no
75	DO383 Susan Creek	task/seas.camp	no	no
52	DO413 Coffee Creek	task?	no	no
86	DO422 Island-Late	task?	no	no
90	DO161 Medicine	task/seas.camp	no	no
49	DO274 Orchard	season camp/ village or task?	no	yes
48	DO275 Sylmon	seas.camp/vil.?	no	yes
97	DO160 Muddy	task	no	no
76	DO278 Bogus	task/seas.camp?	no	no
84	DO422 Island Cmpgrd	task/seas.camp?	no	no
85	DO422 Island-Early	seas. camp	no	no
83	DO372 Reynolds	task	no	no
96	DO399 Snowbird	task	no	no
87	DO418 Apple Crk Bnch	task	no	no
91	DO187 Powerful 1	seas.camp	no	no
64	DO395 Grubbe Ranch	vill/seas.camp	no	yes
95	DO289 Little Oak	task	no	no
88	DO265 Apple Crk	task	no	no
53	Tiller 1	task	no	no
Group 2				
77	DO126 Steamboat	task/seas.camp?	no	no
57	DO209 Hughes RS	task	no	no
69	DO153 Narrows	seas.camp/vil?	yes	yes
65	DO53 Glide	seas.camp/vil?	yes	yes
80	DO401 Dry Crk	task/seas.camp	no	no
68	DO52 Gatchel	vil./seas.camp	yes	yes

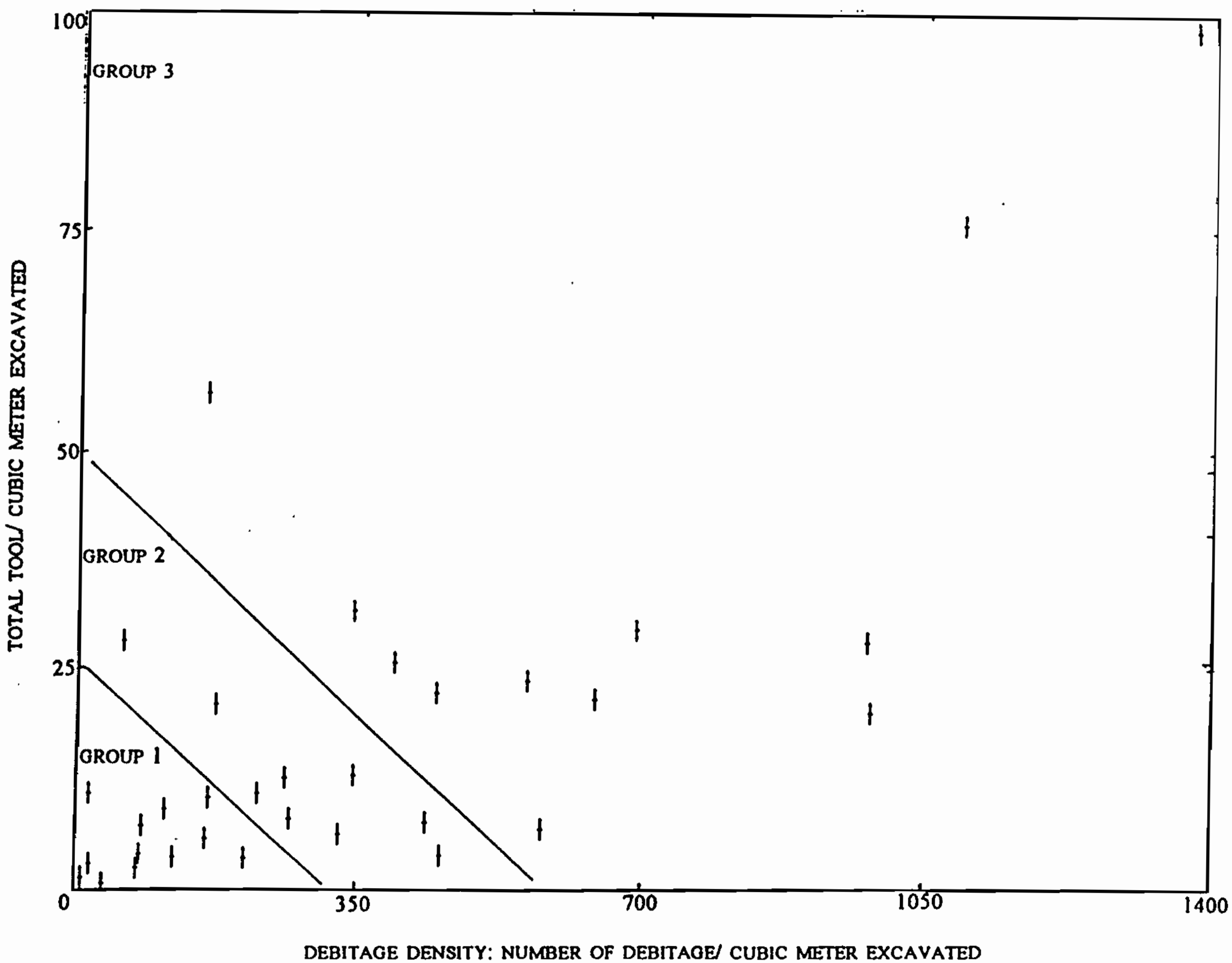
TABLE 12. Continued

Rec. No	Site Name/No.	Qual. Type	Hab. Feat.	Oth. Feat.
Group 3				
66	DO61 Whistlers	village?	no	no
58	DO212 Time Sq. RS	task?	no	yes
59	DO396 Sprint	task/seas.camp	no	no
50	DO36 Crispen	vil./seas.camp	no	yes
92	DO227 Powerful 2	task/seas.camp	no	yes
54	Tiller 6	task	no	no
89	DO421 Copeland	task/seas.camp	no	no
60	DO219 Section Crk	village/task	no	yes
55	DO205 S. Ump RS-Upper	seas. camp	yes	no
56	DO205 S. Ump RS-Lower	seas. camp	no	yes
99	DO389 Limpy	seas. camp	no	no

Multidimensional Scaling Analysis: Comparison of Assemblage Evenness and Richness

Figure 14 presents the results of the multidimensional scaling procedures. In interpreting this scatterplot, I proceeded in the same manner as for the Rogue River basin sites. Those sites which could be confidently assigned a functional type were identified, to see if there were any readily discernable groupings. Then those sites which were more ambiguous were assigned a type based on their proximity to other sites in the scatterplot.

Generally, the same pattern observed for the Rogue River drainage was also apparent here. The most likely village sites, (with exceptions noted below) clumped neatly in the center of the scatterplot, with seasonal camps closely associated on the periphery. Task sites were scattered beyond this central grouping.



Total tool density, measured as number of tools/cubic meter, plotted against debitage density, measured as number of debitage/cubic meter. Each cross represents a site.

FIGURE 13. Umpqua Basin Sites: Density Measure 2.

TABLE 13. Umpqua Basin Sites: Density Measure 2
Site Density Measures by Debitage
and Total Tool Density

Rec. No	Site Name/No.	Qual. Type	Hab. Feat.	Oth. Feat.
Group 1				
74	DO359 Swiftwater	task	no	no
98	DO399 Powerline	task	no	no
52	DO413 Coffee Crk	task?	no	no
93	DO379 Snuff Out	task	no	no
67	DO67 Winchester	village?	no	no
51	DO412 Coffee Crk	task?	no	no
53	Tiller 1	task	no	no
49	DO274 Orchard	seas.camp/vil.	no	yes
96	DO399 Snowbird	task	no	no
86	DO422 Island, late	seas. camp	no	no
76	DO278 Bogus	task	no	no
95	DO289 Little Oak	task	no	no
66	DO61 Whistlers	village?	no	no
75	DO383 Susan Crk	task/seas.camp	no	no
Group 2				
54	Tiller 6	task	no	no
64	DO395 Grubbe	vil./seas.camp	no	yes
91	DO187 Powerful 1	res base	no	no
57	DO209 Hughes	task	no	no
83	DO372 Reynolds	task	no	no
88	DO265 Apple Crk	task/seas.camp	no	no
84	DO422 Island Camp	task/seas.camp	no	no
85	DO422 Island-Early	seas. camp	no	no
90	DO161 Medicine	task/seas.camp	no	no
Group 3				
58	DO212 Time Sq.	task	no	yes
69	DO153 Narrows	seas. camp	yes	yes
68	DO52 Gatchel	vil./seas.camp	yes	yes
65	DO58 Glide	village	no	yes
59	DO396 Sprint	seas. camp	no	no
87	DO418 Apple Bnch	task	no	no

TABLE 13. Continued

Rec. No	Site Name/No.	Qual. Type	Hab. Feat.	Oth. Feat.
92	DO227 Powerful 2	seas. camp	no	yes
50	DO36 Crispen	vil/seas.camp	no	yes
80	DO421 Dry Crk	task/seas.camp	no	no
89	DO421 Copeland	task/seas.camp	no	no
55	DO205 S. Ump RS-Upper	seas. camp	yes	no
60	DO219 Section Crk	village	no	yes
56	DO205 S. Ump. RS-Lower	seas. camp	no	yes
99	DO389 Limpy	seas. camp	no	no

However, this pattern is not so clearly expressed in this scatterplot as it is in the Rogue Basin. Two groups of sites occur in unexpected associations. One group, identified as Group 5 on the scatterplot (Figure 14) were considered probable task sites on the basis of qualitative and density data. Yet these sites occur closely associated with the village and seasonal camp sites on the MDS plot. This group consists mostly of low elevation sites located along the North or South Umpqua, with comparatively low densities of chipped stone tools. Based on their association with village sites on the plot, however, the distribution of artifact types within these sites apparently has more in common with village sites than with single-purpose task sites. That is, the assemblages from these sites are more generalized than specialized, suggesting that a range of activities are represented at these sites, rather than a single purpose. Their low densities do not imply the intensive occupation of a village site, but may represent the accomplishments of a small family group camped at an area for a period of

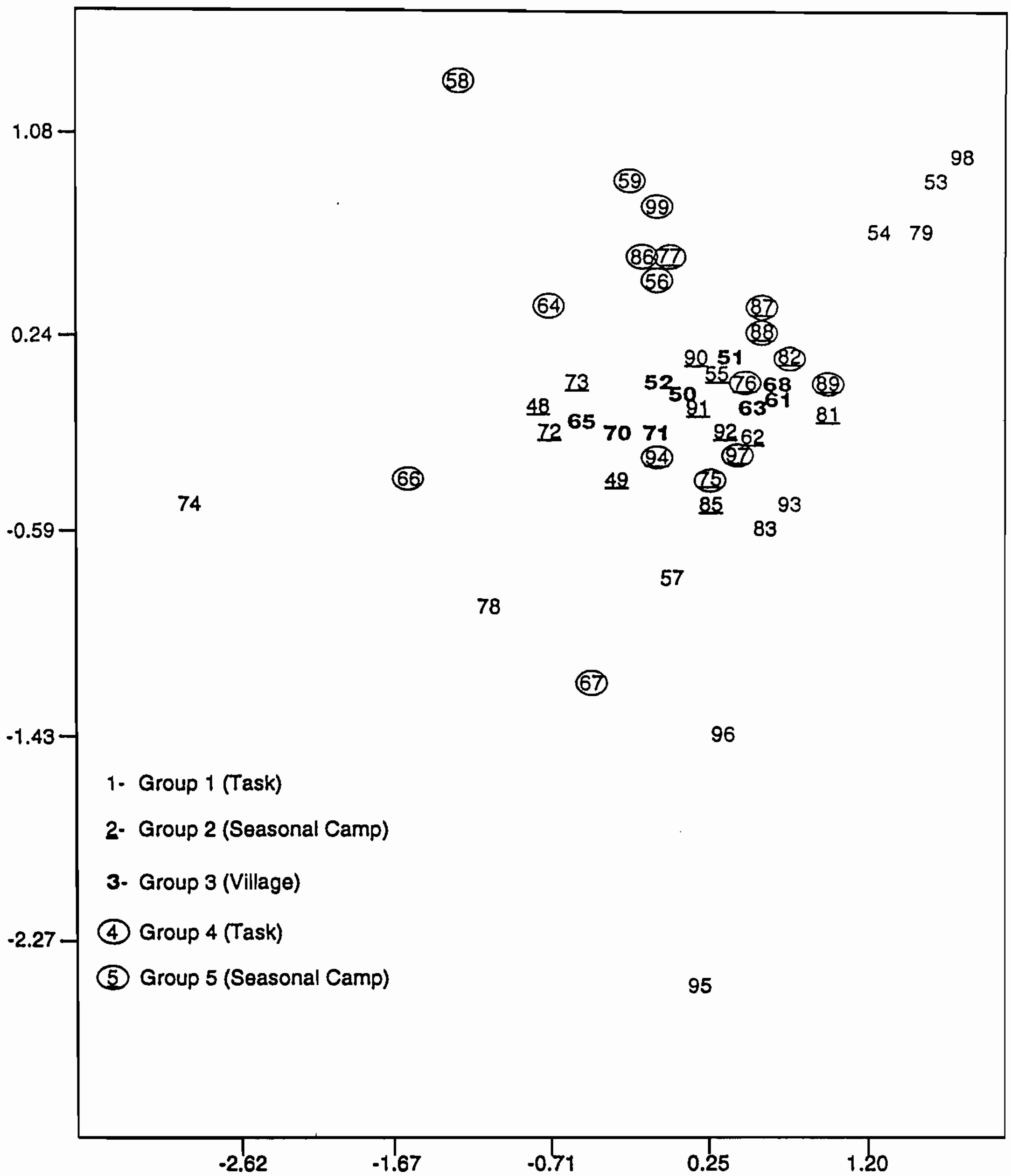


FIGURE 14. Umpqua Basin: MDS plot of sites.

time. As such, they would fit more closely within the "seasonal camp" functional designation than the "task" site category. These sites are classed as seasonal camps in the MDS analysis (Table 14).

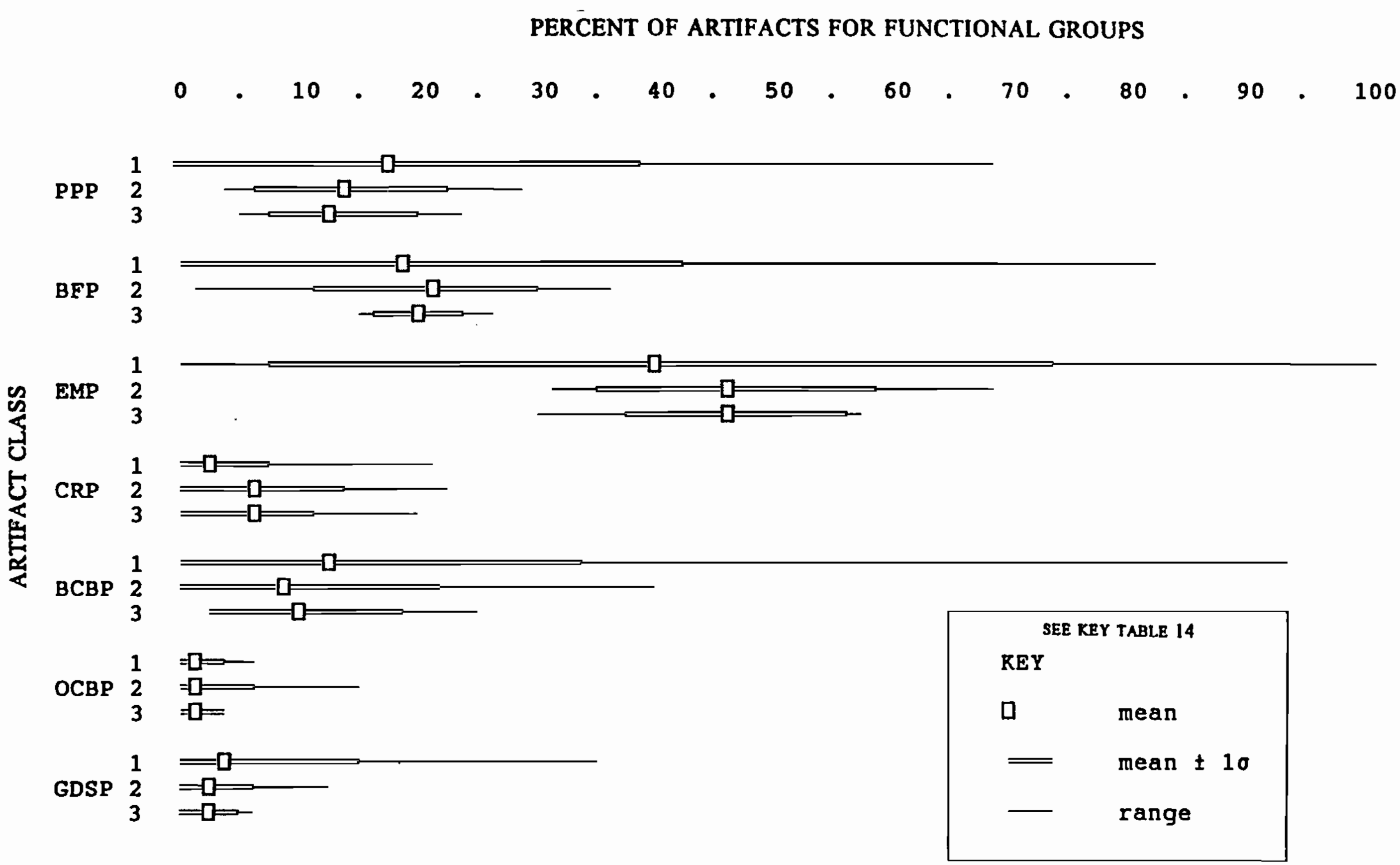
The second group of anomalous sites were designated as seasonal camps based on the qualitative and density data (Group 4 in Figure 14). However, these sites occur outside the main cluster of village/seasonal camp sites, in a pattern more characteristic of task sites. Four of these sites are characterized by high density, specialized assemblages with high proportions of projectile points. These include cases 58, 59, 99, and 56; three of these are rockshelter sites. The specialized assemblages suggest a focused use to these sites, the primary characteristic of task sites. Therefore, these are classed as task sites in this MDS part of the analysis. The remaining sites in Group 4 include two sites (86 and 77) considered probable task sites but closely associated with the first four due to comparatively high proportions of projectile points. The remaining three sites in the group (cases 64, 66, and 67) were possibly seasonal camps or village sites which do not cluster with the central group. These sites are also classed as task sites in this part of the analysis, based on their location in the scatterplot.

Table 12 and Figure 15 present the descriptive statistics for the three classes of sites. Group 4 sites are included in the task sites; Group 5 sites are included with the seasonal camp sites. In all cases, the standard deviation, which is one measure of variability within the group, is lowest for the central cluster of village sites. The range of variability is also greatest in all but one category (the exception is the miscellaneous category "other

TABLE 14. Umpqua Basin Sites: MDS Descriptive Statistics for Functional Groups

Tool Class	Group 1 Task	Group 2 Seasonal Camp	Group 3 Village
PPP			
Range	0-68	4-29	5-24
Mean	18	14	13
SD	20	8	6
BFP			
Range	0-81	2-35	14-25
Mean	18	20	19
SD	23	9	4
EMP			
Range	0-100	30-68	29-56
Mean	39	46	46
SD	32	12	9
CRP			
Range	0-21	0-23	3-19
Mean	3	7	7
SD	5	7	5
BCBP			
Range	0-93	0-40	2.7-25
Mean	12	9	10.2
SD	22	13	8.2
OCBP			
Range	0-5.8	0-15	0-2.7
Mean	.4	1.5	.7
SD	1.3	3.8	.9
GDSP			
Range	0-35	0-12.7	0-5.4
Mean	4.2	2.2	2.4
SD	10.4	3.8	1.9

SD = Standard Deviation
PPP = % projectile points
EMP = % edge-modified tools
BCBP = % battered cobbles
OCBP = % other cobble tools
BFP = % bifaces
CRP = % cores
GDSP = % groundstone



1 - task sites; 2 = seasonal camps; 3 = village sites

FIGURE 15. Umpqua Basin: MDS graph of artifact class percentages.

cobble tools") for the task sites, as would be expected for sites representing a variety of single purposes. Like the Rogue Basin sites, the greatest variability is represented in the task-site assemblages and the least in the village sites.

Groundstone and Cobble Tool Densities: Comparison with Feature Data

Tables 15 and 16 list the sites in order of increasing density of cobble and groundstone tools. As in the analysis for the Rogue Basin sites, three groups are distinguished on the basis of increasing density, and compared to the presence/absence of habitation and other features.

Table 17 shows the strong association of cobble and groundstone artifacts with sites having features. Like the Rogue Basin sites, habitation features (i.e., housepits, middens, and burials) and multiple types of features occur only with the most dense assemblages of these heavy artifacts.

Site Function

Table 18 lists the sites examined in this study, and each site's functional type based on the different analyses. Overall there is good agreement among the various methods employed, although agreement is not as consistent as for the Rogue Basin sites (see Figure 11). Slightly over one-third (37%) of the sites (or site components) fell into the same group using every measure employed; of these, many are site components which were subjected only to the MDS analyses, not the density measures. Another 21 percent of the sites differed by only one step among the

TABLE 15. Umpqua Basin Sites: Groundstone Density and Features

Record No.	Site No.	Site Name	Amount Exca-vated*	Ground-stone Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 1									
58	DO212	Time Sq Rs	1.2					Y	
49	DO274	Orchard	3.6						Y
51	DO412	Coffee Creek	8.8						
53	Tiller 1	Til 1	3.3						
54	Till 6	Till 6	2.2						
55	DO205	S.Umprs-U	4.9				Y		
67	DO67	Winchester	2.0						
79	DO40	Cavitt Creek	2.0						
80	DO401	Dry Creek	2.8						
74	DO359	Swiftwater	10.5						
86	DO422	Island-L	2.2						
76	DO278	Bogus	22.5						
77	DO126	Steamboat	2.4						
78	DO11	Rhody	0.3						
85	DO422	Island-E	4.4						
97	DO160	Muddy	4.3						
83	DO372	Reynolds	6.8						
89	DO421	Copeeland	1.1						
84	DO422	Island Camp	6.6						
96	DO399	Snowbird	3.2						
87	DO418	Apple Bunch	2.6						
93	DO379	Snuff Out	4.8						
94	DO397	Shivigny	3.2						

TABLE 15. Continued

Record No.	Site No.	Site Name	Amount Exca-vated*	Ground-stone Density**	Housepit	Midden	Burial	Hearth	Other Features
95	DO289	Little Oak	2.50						
98	DO398	Powerline	1.60						
Group 2									
90	DO161	Medicine	10.50	.0952					
52	DO413	Coffee Dk	7.10	.1408					
75	DO383	Susan Creek	8.60	.3488					Y
Group 3									
65	DO58	Glide	6.40	.4688					Y
69	DO153	Narrows	22.60	.4867	Y	Y	Y	Y	Y
60	DO219	Section Creek	22.30	.4933				Y	Y
92	DO227	Pwrfl-2	3.70	.5405					Y
48	DO275	Sylmon	23.00	.5652					Y
56	DO205	S.Umprs-L	3.50	.5714				1	
57	DO209	Hughes	3.40	.5882					
88	DO265	Apple Creek	2.30	.8696					
50	DO36	Crispen	5.40	.9259				Y	Y
68	DO52	Gatchel	6.60	1.2121	Y			Y	Y
91	DO187	Pwrfl-1	5.80	1.3793					Y
59	DO396	Sprint	1.30	1.5385					
99	DO389	Limpy	2.25	4.8889					
64	DO395	Grubbe	3.30	6.9697					Y

*Cubic meters
**Arranged in order of increasing density

TABLE 16. Umpqua Basin Cobble Tool Density and Features

Record No.	Site No.	Site Name	Amount Exca-vated*	Cobble Tool Density**	Housepit	Midden	Burial	Hearth	Other Features
Group 1									
89	DO421	CopelandD	1.1						
95	DO289	Little Oak	2.5						
97	DO160	Muddy	4.3						
87	DO418	Apple Bnch	2.6						
53	Tiller 1	Til 1	3.3						
54	Till 6	Till 6	2.2						
98	DO398	Powerline	1.6						
57	DO209	Hughes	3.4						
79	DO40	Cavitt Creek	2						
78	DO11	Rhody	0.3						
59	DO396	Sprint	1.3						
93	DO379	Snuff Out	4.8						
99	DO389	Limpy	2.25						
90	DO161	Medicine	10.5	.0952					
51	DO412	Coffee Creek	8.8	.1136					
75	DO383	Susan Creek	8.6	.1163					Y
83	DO372	Reynolds	6.8	.1471					
76	DO278	Bogus	22.5	.2667					
Group 2									
91	DO187	Pwrfl-1	5.8	.3448					Y
52	DO413	Coffee Dk	7.1	.4225					
96	DO399	Snowbound	3.2	.6250					
94	DO397	Shivigny	3.2	.6250					
86	DO422	Island-L	2.2	.9091					

TABLE 16. Continued

Record No.	Site No.	Site Name	Amount Excavated*	Cobble Tool Density**	Housepit	Midden	Burial	Hearth	Other Features
67	DO67	Winchester	2.0	1.0000					
92	DO227	Pwrfl-2	3.7	1.0811					Y
Group 3									
84	DO422	Island Camp	6.6	1.2121					
68	DO52	Gatchel	6.6	1.2121	Y			Y	Y
55	DO205	S.Umprs-U	4.9	1.2245			Y		
74	DO359	Swiftwater	10.5	1.3333					
85	DO422	Island-E	4.4	1.3636					
80	DO401	Dry Creek	2.8	1.4286					
56	DO205	S.Umprs-L	3.5	1.4286				1	
60	DO219	Section Creek	22.3	1.6592				Y	Y
49	DO274	Orchard	3.6	1.6667					Y
77	DO126	Steamboat	2.4	1.6667					
88	DO265	Apple Creek	2.3	1.7391					
65	DO58	Glide	6.4	2.8125					Y
58	DO212	Time Sq Rs	1.2	3.3333				Y	
50	DO36	Crispen	5.4	3.7037				Y	Y
64	DO395	Grubbe	3.3	3.9394					Y
48	DO275	Sylmon	23.0	5.4348					Y

*Cubic meters
**Arranged in order of increasing density

TABLE 17. Umpqua Basin Sites: Groundstone/ Cobble Densities and Features

Site Type	N sites	Density Range	% SF	% MF	% HF	% All
Cobble Density						
Group 1	18	0 - .27	6%	0	0	6%
Group 2	7	.34 - 1.1	28%	0	0	28%
Group 3	17	1.2-20	41%	24%	18%	65%
Groundstone Density						
Group 1	24	0-0	12%	0	4%	12%
Group 2	3	.09-.35	33%	0	0	33%
Group 3	15	.46-20	33%	27%	13%	60%

% SF = Percent of sites in the group with only one type of feature present (i.e., either housepits, middens, burials, hearths of other rock features).

% MF = Percent of sites in the group with multiple types of features present (i.e., some combination of housepit, midden, burial, hearth, and rock features).

% HF = Percent of sites in the group with habitation features (i.e., housepit/living floor, midden, burials) present.

% All = The total percentage of sites in the group with features (%SF plus %MF).

TABLE 18. Umpqua Basin Sites: Functional Site Types Concordance of Functional Measures and Final Site Type Designations

Record No.	Site No.	Site Name	Qualitative Assessment	Density Measure 1 Group	Density Measure 2 Group	Multi-Dimensional Scaling Group	Cobble Density Group	Ground-stone Density Group	Habitation Features Present	Other Features Present	Site type Final, Desig-nation
48	DO275	Sylmon	2,3	1		2	3	3		Y	2
49	DO274	Orchard	3	1	1	2	3	1		Y	2
50	DO36	Crispen	3	3	3	3	3	3		Y	3
51	DO412	Coffee CK	?	1	1	3	1	1			3
52	DO413	Coffee DK	?	1	1	3	2	2			3
53	Tiller 1	Til 1	1	1	1	1	1	1			1
54	Till 6	Till 6	1	3	2	1	1	1			1
55	DO205	S.Umprs-U	2	3	3	2,3	3	1	Y		2
56	DO205	S.Umprs-L	2	3	3	1	3	3		Y	2
57	DO209	Hughes	1	2	2	1	1	3			1
58	DO212	Time Sq Rs	1,2	3	3	1	3	1		Y	2
59	DO396	Sprint	2	3	3	1	1	3			2
60	DO219	Sectopm Ck	3	3	3	3	3	3		Y	
61	DO219	Section-I	3			3					3
62	DO219	Section-III	2			2					2
63	DO219	Section-II	3			3					3
64	DO395	Grubbe	2,3	1	2	1	3	3		Y	2
65	DO58	Glide	3	2	3	3	3	3		Y	3
66	DO61	WhistleRS	3?	3	1	1	3	3			3
67	DO67	Winchester	2,3	1	1	1	2	1			1
68	DO52	Gatchel	3	2	3	3	3	3	Y	Y	3
69	DO153	Narrows	2,3	2	3		3	3	Y	Y	
70	DO153	Narrows-I	3			3					3
71	DO153	Narrows-II	3			3					3

TABLE 18. Continued

Record No.	Site No.	Site Name	Qualitative Assessment	Density Measure 1 Group	Density Measure 2 Group	Multi-Dimensional Scaling Group	Cobble Density Group	Ground-stone Density Group	Habitation Features Present	Other Features Present	Site type Final, Desig-nation
72	DO153	Narrow-III	2			2					2
73	DO153	Narrow-IV	2			2					2
74	DO359	Swiftwater	1	1	1		3	1			1
75	DO383	Susan Creek	1	1	1	2	1	2		Y	2
76	DO278	Bogus	1	1	1	2	1	1			2
77	DO126	Steamboat	1,2	2		1	3	1			1
78	DO11	Rhody	1			1				Y	1
79	DO40	Cavitt Creek	1	1		1	1	1			1
80	DO401	Dry Creek	2,3	2	3		3	1			
81	DO401	Dry Creek-E	2			2					2
82	DO401	Dry Creek-L	1			2					2
83	DO372	Reynolds	1	1	2	1	1	1			1
84	DO422	Island Camp	1,2	2	2		3	1			
85	DO422	Island-E	2			2					2
86	DO422	Island-L	1			1					1
87	DO418	Apple Bnch	1,2	1	3	2	1	1			2
88	DO265	Apple Creek	1,2	1	2	2	3	3			2
89	DO421	Copeland	1,2	3	3	2	1	1			2
90	DO161	Medicine	1,2	1	2	2	1	2			2
91	DO187	Pwrfl-1	2	1	2	2,3	2	3		Y	2
92	DO227	Pwrfl-2	2	3	3	2,3	2	3		Y	2
93	DO379	Snuff Out	1	1	1	1	1	1			1
94	DO397	Shivigny	1	2	3	2	2	1			2
95	DO289	Little Oak	1	1	1	1	1	1			1
96	DO399	Snowbird	1	1		1	2	1			1
97	DO160	Muddy	1	1		2	1	1			1
98	DO398	Powerline	1	1	1	1	1	1			1
99	DO389	Limpy	1,2	3	3	1	1	3			2

measures employed. That is, with every measure employed 21 percent of the sites are represented in no more than two groups, and those groups are adjacent groups (Groups 1 and 2, Groups 2 and 3). The remaining 42 percent of the sites fell within all three groups, or in Groups 1 and 3, for various tests. This variability makes the interpretation of site function somewhat more difficult than for the Rogue Basin sites. Specific site designations, based on the qualitative and quantitative data, are discussed below. This final designation represents my best interpretation of the information available for each site, including qualitative data not represented in the quantitative analyses.

Site Functional Assessments

48. DO275 Sylmon — seasonal camp

The excavator considers this a seasonal camp (Lyman 1985); Beckham and Minor (1992) consider it a possible village due to its location. The comparatively low density of chipped stone tools is matched by a high density of cobble tools. It does not cluster with other habitation sites in the sample. I suspect that Lyman's assessment is correct; it is a seasonal fishing camp.

49. DO274 Orchard — seasonal camp

Although the location is good for a village, the assemblage does not support that designation; it has a low density of chipped stone and groundstone tools, and no habitation features. It is more likely a seasonal camp; the high density of cobble tools may indicate fishing as a focus.

50. DO36 Crispen — village

51. DO412 Coffee Creek — village

Despite the minimal assemblage, the site's location and close association with other habitation sites in the MDS analysis argues for its function as a village.

52. DO413 Coffee Creek village

The same reasoning applies to this site as to DO412.

53. Tiller 1 task

54. Tiller 6 task

This is a high density site with a narrow range of artifacts; it is considered a task site.

55. DO205 South Umpqua Rockshelter seasonal camp

Upper Shelter

This site has a high density of chipped and cobble tools, as well as habitation features (burials) and a strong association with village sites in the MDS analysis. It is classed as a seasonal camp because its location seems to preclude a village habitation. However, it is worth noting that, compared to other sites in the sample, it is very similar to village sites.

56. DO205 South Umpqua Rockshelter seasonal camp

Lower Shelter

This rockshelter has a high density of materials, including both chipped and cobble tools. It also has a high proportion of projectile points, which places it with the more specialized task sites in the MDS analysis. The presence of a feature and the cobble/groundstone densities suggest that it was a seasonal encampment, with a focus on hunting.

57. DO209 Hughes Rockshelter task

Artifact densities may be somewhat inflated for this site, due to preservation conditions in rockshelters compared to open-air sites. The MDS analysis places it in Group 1, which seems the best classification based on site location and assemblage.

58. DO212 Time Square Rockshelter task/seasonal camp

This is a high density site with a specialized assemblage dominated by projectile points. The presence of bone, hearths, and groundstone suggests this was a seasonal camp focused on hunting.

59. DO396 Sprint — seasonal camp

This is at/near a known fishing spot; and may be a seasonal camp for fishing. It is a fairly high density site with an assemblage dominated by projectile points; however groundstone also occurs. It is considered a seasonal camp, focused on hunting/fishing.

60. DO210 Section Ck

61 Component 1	village
62 Component III	seasonal camp
63 Component II	village

64. DO395 Grubbe — seasonal camp

This site has a comparatively low density of chipped stone and high density of cobble/groundstone artifacts. The MDS analysis places it at some distance from other habitation sites. Since it has features and cobble tools, it is classed as a seasonal camp.

65. DO58 Glide — village

66. DO61 Whistlers — village?

The very small amount of excavation may be responsible for the unlikely "Group 1" placement in Table 11 and in the MDS analysis. The site's location and the investigator's report, as well as high densities of cobble and groundstone artifacts, provides a justification for placing it in Group 3.

67. DO67 Winchester — task

The site's location suggests a village but the other indicators place it in the task site group. It may have been associated with a village nearby.

68. DO52 Gatchel — village

69. DO153 Narrows

70 Component I	village
71 Component II	village
72 Component III	seasonal camp
73 Component IV	seasonal camp

74. DO359 Swiftwater — task

The high density of cobble tools at this site is thought to reflect a task focus on fishing.

75. DO383 Susan Ck — seasonal camp

This is a low-density site with a generalized assemblage, grouped near other seasonal camp sites.

76. DO278 Bogus — seasonal camp

This site is designated a seasonal camp primarily on the basis of its strong association with other sites having more generalized, less specialized assemblages.

77. DO126 Steamboat — task

78. DO11 Lower Rhody — task

79. DO40 Cavitt Ck — task

80. DO410 Dry Ck

81. Early component — seasonal camp
82. Late component — seasonal camp

83. DO375 Reynolds — task

84. DO422 Island

85. Early component — seasonal camp
86. Late component — task

87. DO418 Apple Bench — seasonal camp

This site has a high density of debitage and a generalized tool assemblage, and is associated with other seasonal camp sites along the North Umpqua in the MDS analysis.

88. DO265 Apple Creek — seasonal c. camp

This is a low density site with a generalized tool assemblage, associated with other such sites in the MDS analysis, also located along the North Umpqua.

89. DO421 Copeland — seasonal camp

The site is designated a seasonal camp based on the high density of chipped stone artifacts and its association with other Group 2 sites in the MDS analysis.

<u>90. DO161 Medicine</u> seasonal camp

This is a mixed assemblage of pre- and post-Mazama artifacts; the earlier component, at least, seems to resemble that of a Group 2 site and may dominate the materials from the site.

<u>91. DO187 Powerful</u> seasonal camp

This site is closely associated with village sites in the MDS analysis, but is considered a seasonal camp due to density and location considerations. It is worth noting, however, that the assemblage proportions are similar to lowland village type sites.

<u>92. DO227 Powerful</u> seasonal camp

The same considerations apply to this site as to the previous one.

<u>93. DO397 Snuff Out</u> task

<u>94. DO387 Shivigny</u> seasonal camp

This site is considered a seasonal camp due to its high density and close association to Group 2 and 3 sites in the MDS analysis.

<u>95. DO289 Little Oak Flat</u> task

<u>96. DO399 Snowbird</u> task

<u>97. DO160 Muddy</u> task

<u>98. DO398 Powerline</u> task

<u>99. DO389 Limpy Rockshelter</u> seasonal camp

This high density site has an assemblage dominated by projectile points, as well as some groundstone artifacts. The specialized focus of the assemblage plus the other artifacts indicate that this was a seasonal camp focused on hunting.

CHAPTER VII

SUBSISTENCE AND SETTLEMENT PATTERNS

The purpose of this chapter is to define the subsistence and settlement patterns represented by the sites in this study. These sites have each been assigned to a specific functional category, based on the analyses in the previous chapters. Now it is necessary to group them chronologically, in order to define the patterns extant during different periods and to address the question of culture change.

In this chapter, sites are placed into two chronological periods: the Middle Archaic, from about 6,000 to 2,000 BP, and the Late Archaic, from about 2,000 BP to the time of historic settlement (Beckham and Minor 1992).[1] Several sites also have components from the Early Archaic, about 8,500 BP to 6,000 BP, although this time period is not considered in this analysis due to the sparsity of data. The site types present in each period are used to infer the subsistence/settlement regime which characterized those times.

---

[1]Tighter timeframes were precluded by the desire to include as many sites as possible. Since the chronological data available for this body of sites is highly variable, it was necessary to use the broadest categories in order to include them all.

Site Chronology

The two time periods used, the Middle and Late Archaic, are broad chronological categories. In both the Umpqua and Rogue Basins recent studies have produced finer-grained chronologies. Many of the sites in this study were used to formulate these chronologies, and hence have already been assigned to various local sequences. Table 19 presents the local sequences used for the Umpqua and Rogue Basins, and the correspondence of these sequences to the two broad periods used in this study.

In making chronological assignments, I used the previous work done for sites in the Umpqua and Rogue Basins. For the Umpqua Basin, the recent cultural resource overview for the Umpqua National Forest summarizes the temporal information available for many of the sites included here (Beckham and Minor 1992:64-70). The overview draws upon statistical analyses done by O'Neill (O'Neill 1989b; 1991b), which cluster sites into temporal groups based on projectile points. An example of the point types used in that statistical analysis is presented in Figure 16. I have followed Beckham and Minor's (1992) cultural resource overview to date many of the Umpqua Basin sites, based on the cluster analysis.

In the Rogue Basin, work at the Elk Creek sites has produced considerable information regarding chronology pertinent to the area. Pettigrew and Lebow (1987) first defined a chronological sequence based on point types, which was then refined by Nilsson and Kelly (1991). The Elk Creek sites in this study are placed into the Middle and Late periods based on a correlation between this Rogue Basin chronology and the broader

TABLE 19. Chronological Periods in Southwest Oregon

Years BP	Archaic (Beckham, Minor and Toepel 1981)	Umpqua (Beckham and Minor 1992)	Rogue (Nilsson and Kelly 1991)
0			
		PROTOHISTORIC	
	500----------	----------	ROGUE 2 SUBPHASE
	LATE ARCHAIC	FORMATIVE	
	1000----------	----------	
		LATE	1650----------
		ARCHAIC	
2000----------	----------	----------	ROGUE 1 SUBPHASE
			2250----------
			COQUILLE
4000	MIDDLE ARCHAIC	MIDDLE ARCHAIC	
			4500----------
6000----------	----------	----------	
			MARIAL
	EARLY ARCHAIC	EARLY ARCHAIC	
			8500----------
10,000----------	----------	----------	

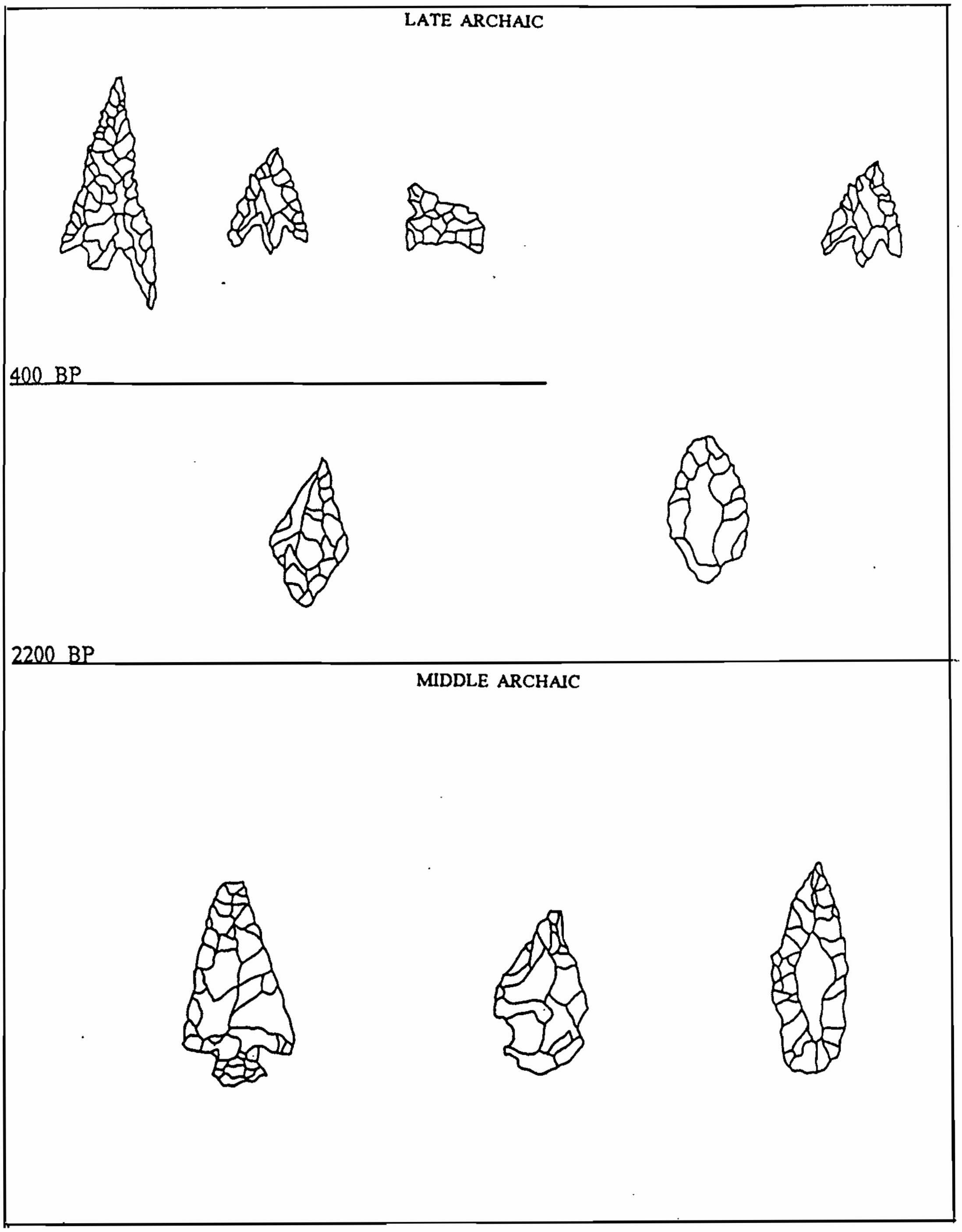


FIGURE 16. Umpqua Basin projectile points (after O'Neill 1989b).

Archaic sequence (Table 19). The chronology defines projectile point sequences for the Rogue Basin; the point types are illustrated in Figure 17 for reference.

Work at Elk Creek has also defined a hydration curve applicable to sites in this region (Figure 18). The hydration dates derived from this curve have proven consistent with dates derived from radiocarbon studies, and provide another useful means for dating sites in the Rogue Basin. The three most common types of obsidian used in the Rogue Basin appear to hydrate at the same rate, making it possible to compare hydration readings among these sites. All the hydration readings given below (expressed in microns) are from one of these three sources.

Pottery is another important chronological indicator for the Rogue Basin. It was produced between about 1100 and 400 BP (Mack 1989). Sites with pottery, therefore, have a Late Archaic component.

Although many sites in this study have multiple chronological indicators, some only have projectile points present. Many of the site reports, however, were produced before the point chronologies discussed above were developed. Where this was the case, I assigned the site to a time period based on correlations with point styles defined in the Rogue or Umpqua Basin chronology, as illustrated in Figures 16 and 17, or based on the gross characteristics distinguishing Middle Archaic atlatl dart points (large, broad-stemmed) and Late Archaic arrowpoints (small, narrow-stemmed).

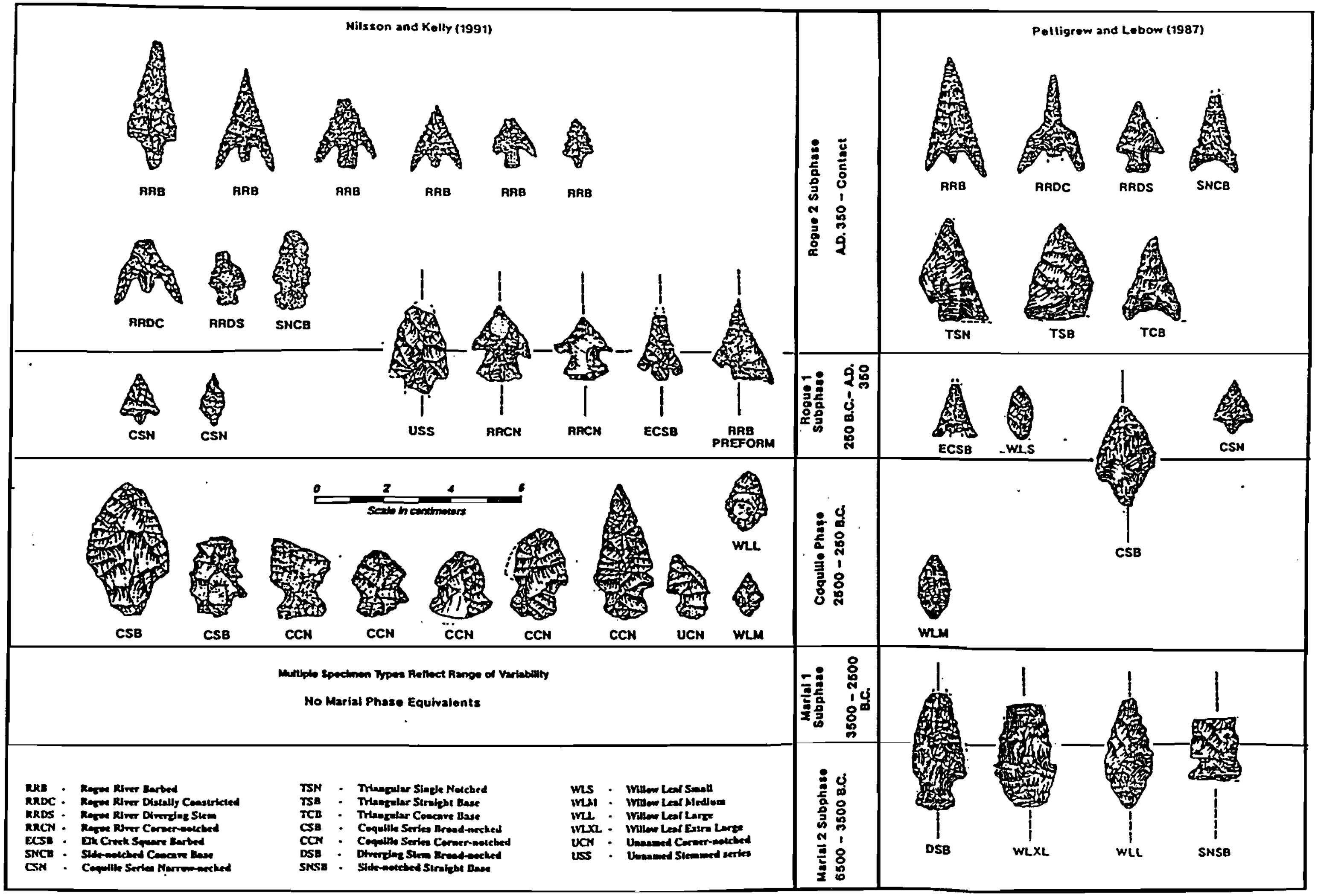


FIGURE 17. Rogue Basin Points (Nilsson and Kelly 1991; reduced 50% of original).

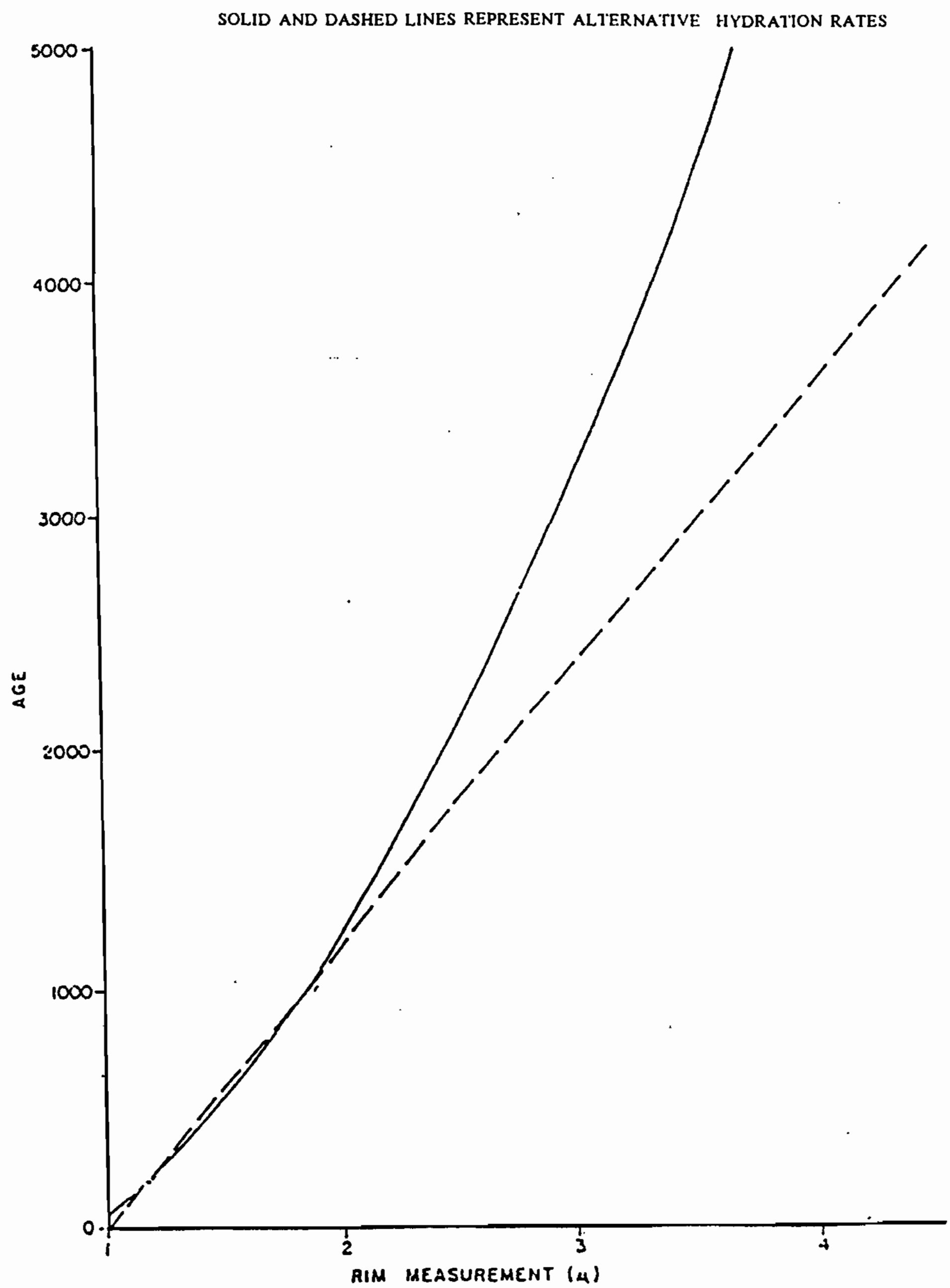


FIGURE 18. Rogue Basin hydration curve: plotted regression line from 1986 Elk Creek Obsidian hydration (from Pettigrew and Lebow 1987).

The site summaries which follow briefly present the chronological information provided in each site's report which was used to place that site into either the Middle or Late Archaic period. As just noted, sites which have already been placed into chronological sequences based on previous research were kept in those sequences, and related to the Middle/Late Archaic periods based on the correspondences expressed in Table 19.

Rogue Basin Site Chronology

1. 35CU84, Marial — Early, Middle, Late

Marial is a well-stratified site with radiocarbon-dated components from 2810 ±50 years BP at 60 centimeters below the surface to 8560 ±190 BP at 430 centimeters below the surface. The site produced projectile point styles characteristic of Early, Middle, and Late Archaic sites elsewhere in western Oregon. Occupation during all three major periods is attested by the projectile point styles, stratigraphy, and radiocarbon dates.

2. Gold Hill — Middle, Late

The site is dated mainly on the basis of projectile point styles. Points from the site include ovate styles characteristic of the Middle Archaic as well as arrowpoints from the Late Archaic (Figure 17).

3. JO4, Ritsch Site — Late

The site produced two radiocarbon dated components, both in the Late Archaic period. The later component was dated 460 ± 90 BP and the earlier at 1150 ±100 and 1400 ±80 BP. Both components were associated with the smaller stemmed, triangular, or barbed points characteristic of the Late Archaic in the Rogue Valley (Figure 17).

4. JA16, Marthaller — Middle, Late

Projectile points include large ovate and broad-stemmed types characteristic of the Middle Archaic, as well as small arrowpoints typical of Late Archaic types in the Rogue Valley (Figure 17).

5. JA21, Saltsgaver Middle, Late

The site yielded two radiocarbon dates of 5310 ±140 BP and 1900 ±90 BP; the dates were obtained on charred wood and nut or camas fragments from the bottom of two of the oven features. The earlier date was from material collected during preliminary investigations in the 1960s. A lengthy period of use is also indicated by obsidian hydration readings, which range from 2.2 to 5.5 microns; using the hydration rate established for the Rogue Basin this suggests use of the site from about 5,000 BP. Arrowpoints characteristic of the Late Archaic were found on the surface of the site (Figure 17).

6. JA25, Far Hills Middle

This site is dated on the basis of its projectile point assemblage, which includes mainly willow-leaf and corner-notched types characteristic of the Coquille Phase and transitional Rogue River 1 phase as defined by Nilsson and Kelly (1991), with a few arrowpoints from the Late Archaic period (Figure 17). The site assemblage analyzed here appears to derive primarily from an occupation during the later part of the Middle Archaic.

7. JA42, Applegate Late

This is a single-component site from the latter part of the Late Archaic, and the only site in the whole study project to have documented historic trade goods, which place the site between about A.D. 1750 and 1850.

8. JA47, Applegate see 9, 10

9. JA47, Applegate Middle

This component is stratigraphically earlier than the later one (see below), and is dated to the Middle Archaic on the basis of very large, broad-stemmed points characteristic of the earlier part of this period and similar to points from about 5,000 BP at Marial (Figure 17).

10. JA47, Applegate Late

This component is stratigraphically later than the one noted above. It contains small arrowpoints similar to those identified for the Rogue 2 subphase at Elk Creek (Figure 17).

11. JA77, Salt Creek Site Late

The site is dated on the basis of the projectile points. These consist mainly of Late Archaic (Rogue 2 subphase) points, with possibly a few willow-leaf forms from the earlier period (Nilsson and Kelly 1991). The late period is clearly indicated; the earlier "points" illustrated may in fact be knives.

12. JA133, RRNF No date

No datable material was recovered from this site.

13. JA189, Trail Late

Radiocarbon dates from the site place it at about 1700 to 650 BP. Pottery found at the site dates it to between about 1100 and 400 BP. Projectile points are those from the Rogue Phase (Figure 17). These chronological indicators place this site in the Late Archaic.

14. JA190, Trail Late

Radiocarbon dates of about 750 - 310 BP (Connolly 1990) place this site in the Late Archaic, though a few projectile points may date from a slightly earlier period, either Rogue 1 or the later part of the Coquille period (Figure 17).

15. JA191, Reeder Late

The projectile points are characteristic of the Rogue 2 subphase (Figure 17).

16. JA197, Little Butte Late

The majority of the projectile points are Rogue 2 subphase types; obsidian hydration readings between 1.0 and 2.4 microns also place the site in the Rogue 2 subphase and hence the Late Archaic (Table 19). An earlier, Coquille occupation is lightly expressed by a few points and hydration readings; however the later period is better expressed and this site is categorized as a Late Archaic site on that basis (Nilsson and Kelly 1991).

17. JA10, Elk Creek Late

The site is dated to the Late Archaic on the basis of projectile points characteristic of the Rogue period (Figure 17).

18. JA11, Elk Creek Late

Only one Rogue 2-style point was found (Figure 17); the site is assigned to the Late Archaic on the basis of that point.

19. 35JA27A, Elk Creek see 20, 21

<u>20. JA27A-1 Joham 1</u> Late

This component is dominated by points from the Rogue 2 subphase (Figure 17) and contains ceramics; the most intensive period of use occurs after about 1000 BP. Obsidian hydration data from this component include a strong cluster of readings from about 1.0 to 2.5 microns, also consistent with the Late Archaic date.

<u>21. JA271-2 Joham 1</u> Middle

This component contains broad-necked and willow-leaf point styles characteristic of the Coquille and possibly Marial phases, which place it in the Middle Archaic (Table 19). Obsidian hydration data range from about 3.0 microns to 5.0 microns, consistent with the Middle Archaic (Figure 18).

<u>22. JA27B, Elk Creek</u> Middle

Projectile points fit the Coquille and possibly Marial types, with a medium-sized willow-leaf type dominant. Obsidian hydration data range from about 2.0 microns to 4.0 microns, with most use indicated between 3.0 and 4.0 microns. The point and obsidian data place this primarily in the Middle Archaic (Figure 17 and Figure 18).

<u>23. JA59, Elk Creek</u> Late

The projectile points and obsidian hydration data place the main period of use of this site in the Rogue 2 subphase, with an indication of some use during earlier periods (Figure 17). The hydration data ranges from 1.0 to about 5.0 microns, with the great majority of readings between 1.0 and 3.0 microns (Figure 18).

<u>24. JA100, Elk Creek</u> Late

A series of radiocarbon dates ranging from 1070 $\pm$ 110 to 50 $\pm$ 60 BP for the main occupation period, plus projectile points, the presence of ceramics, and obsidian hydration data (1.2 - 2.0 microns) all place the main period of site use in the Late Archaic. A few hydration readings, however, and a small sample of projectile points indicate use of the site at an earlier period, during the Middle Archaic.

<u>25. JA101, Elk Creek</u> Late

Radiocarbon dates of 1210 $\pm$120 and 680 $\pm$90 BP, together with hydration data (1.3 - 1.9 microns) and many Rogue 2 subphase points place the main period of site use in the Late Archaic. Some use during the Middle Archaic period is also indicated, however, by the hydration data (3.1 - 4.9 microns) and one point characteristic of the Coquille phase (Figure 17 and Figure 18).

26. JA102, Elk Creek — Middle

Projectile points from this site resemble those from the Coquille, and possibly Marial, phases (Figure 17). These place its period of primary use in the Middle Archaic, though a few Late Archaic points were also recovered.

27. JA103, Elk Creek — Middle, Late

This task site produced one Coquille phase point and hydration values ranging from 1.1 to 6.1 microns, suggesting intermittent use over a long period of time, covering the Middle and Late Archaic.

28. JA105, Elk Creek — Middle

This site produced hydration readings clustered between 3.5 and 4.2 microns, and is dated to the Middle Archaic on that basis (Figure 18).

29. JA10, Elk Creek — Middle

Projectile points from this site place the period of greatest use in the Coquille phase. Obsidian hydration data, with an average of 3.3 microns and standard deviation of 1.2 microns, also indicate Middle Archaic use, with some use during the following period (Figure 17 and Figure 18).

30. JA110, Elk Creek — Late

This site is dated to the Rogue 2 subphase on the basis of a small sample of hydration readings, which range from 1.2 - 3.0 microns (Figure 17).

31. JA112, Elk Creek — Middle

This site has hydration readings with a range of 2.4 to 5.9 microns, with most clustered around 3.5, which place it in the Coquille phase time span. Coquille type projectile points confirm this assessment; however, two Rogue 2 subphase points attest some use at a later period (Figure 17 and Figure 18).

32. EC-2, Elk Creek — Middle, Late

The site produced an abundance of Rogue phase projectile points and a few Coquille phase points. Hydration readings range from 1.2 to 6.7

microns, however, indicating that the site was occupied during both periods; it is assigned to both time periods on that basis.

<u>33. Island, Elk Creek</u> Middle, Late

This site produced projectile points and hydration readings from both the Coquille and Rogue phases (2.7 - 3.6 microns and 1.8 - 2.0 microns, respectively) (Figure 17 and Figure 18). It was probably used intermittently throughout that time.

<u>34. Winningham, Elk Creek</u> Late

Late style projectile points and hydration readings generally smaller than 2.7 microns place this site in the Rogue phase (Table 19 and Figure 17 and Figure 18).

<u>35. Zimmerly, Elk Creek</u> Middle

Projectile point types and hydration readings place the main period of use at this site in the Coquille phase, although a few hydration readings smaller than 2.6 suggest occasional use during the Late Archaic (Table 19 and Figure 18).

<u>36. JA5, Lost Creek</u> Late?

Davis (1983) terms this a late period site, though no specific chronological indicators are provided in his report.

<u>37. JA6, Lost Creek</u> Late

A radiocarbon date from a hearth of 550 $\pm$ 80 BP, plus arrow points place the main period of use in the Late Archaic, though larger side-notched and willow-leaf points indicate some use at an earlier period.

<u>38. JA7, Lost Creek</u> No date

<u>39. JA8, Lost Creek</u> Late

The site is dated to the Rogue 2 subphase on the basis of projectile point styles (Figure 17).

<u>40. JA12, Lost Creek</u> Late

The site produced Rogue 2 subphase style points, and is dated to the Late Archaic on that basis (Figure 17).

<u>41. JA14, Lost Creek</u> Middle

The site produced broad-necked and lanceolate points characteristic of the Coquille and Rogue 1 subphase, and is dated to the Middle Archaic (probably the latter part) on that basis (Figure 17).

<u>42. JA16, Lost Creek</u> Late

Two radiocarbon dates, from unspecified samples, date the site to 1120 $\pm$75 and 1660 $\pm$80 BP. The points are primarily Rogue 2 phase types, confirming a Late Archaic period of use. However, the occurrence of broad-stemmed points also suggests some use at an earlier period.

<u>43. JA28, Lost Creek</u> Middle, Late

The projectile points illustrated for this site suggest a time span of use from about 3000 - 1500 BP, with the best fit in the Rogue 1 subphase (Figure 17). Since this subphase is transitional between the Middle and Late Archaic, the site is classed with each period.

<u>44. JA19, Lost Creek</u> Late

A radiocarbon date of 1120 $\pm$75 BP plus Rogue 2 subphase style points date the main period of occupation to the Late Archaic, though finds of broad-necked side-notched and willow-leaf points indicate earlier use.

<u>45. JA20, Lost Creek</u> No date

<u>46. JA23, Fawn Butte</u> Late

The Rogue 2 subphase is strongly represented at the site by numerous projectile points, hydration data, ceramics, and a radiocarbon date of 260 $\pm$60 from a concentration of fire-cracked rock with bone and charcoal. Earlier use is lightly represented by a few Coquille points and hydration readings.

Umpqua Basin Site Chronology

<u>48. DO275, Sylmon</u> Late

The site produced Late style projectile points, and clusters with sites placed in the Late Archaic (Beckham and Minor 1992:68).

49. DO274, Orchard Middle
This site produced stemmed and broad-necked points which are characteristic of the Middle period, and is classed in this time frame on that basis (Figure 16).

50. DO36, Crispen Late

A radiocarbon date of 620 ±60 BP, plus the cluster analysis (Beckham and Minor 1992:68) place this site in the Late Archaic. The occurrence of broad-necked points, however, indicates the possibility of earlier use of the site.

51. DO412, Coffee Creek Late

A radiocarbon date of 1500 ±60 BP dates the site to the Late Archaic, though broad-necked dart points indicate possible use during an earlier period.

52. DO413, Coffee Creek Late

A radiocarbon date of 1050 ±60 BP dates this site to the Late Archaic, as do the small barbed and corner-notched projectile points (Figure 16).

53. Tiller 1 No date

54. Tiller 6 No date

55. DO205, S. Umpqua Rockshelter, Upper Middle

A radiocarbon date of 3190 ±50 BP as well as a predominance of stemmed atlatl dart points places this site in the Middle Archaic. It also clusters with other Middle Archaic sites (Beckham and Minor 1992:68).

56. DO205, S. Umpqua Rockshelter, Lower Late

A radiocarbon date of 600 ±50 BP as well as numerous arrowpoints place this site in the Late Archaic, as does cluster analysis (Beckham and Minor 1992:68).

57. DO209, Hughes Rockshelter Middle

This site clusters with other Middle Archaic sites (Beckham and Minor 1992:68). It is placed in the Middle Archaic on that basis. Some later occupation is indicated, however, by barbed arrowpoints and a radiocarbon date of 1025±110 BP from the upper levels.

58. DO212, Time Square Rockshelter Late

This site clusters with other Late period sites (Beckham and Minor 1992:68). A series of radiocarbon dates between 3240 $\pm$ 60 and 800 $\pm$ 80 BP and suggest that use began during the Middle Archaic, however. Numerous Late period points indicate that the dominant use was during the Late Archaic.

59. DO396, Sprint Late

Late period points and ethnographic evidence place this site in the Late Archaic.

60. DO219, Section Creek see 61, 62, 63

61. DO219, Section Creek-1 Late

A radiocarbon date of about 150$\pm$50 BP, plus Late period points, place this component in the Late Archaic; it also clusters with other Late Archaic sites (Beckham and Minor 1992:68).

62. DO219, Section Creek-III Middle

Projectile points and cluster analysis place this component in the Middle Archaic (Beckham and Minor 1992:68). Obsidian hydration data from the site confirm this date.

63. DO219, Section Creek-II Late

Radiocarbon dates of about 520$\pm$50 to 1540$\pm$70 BP plus cluster analysis place this site in the Late Archaic (Beckham and Minor 1992:68).

64. DO395, Grubbe Ranch Late

The site produced evidence for several undated occupation episodes; however the Late Archaic, is represented by narrow-necked arrow points.

65. DO58, Glide Middle

The assemblage clusters with the Middle Archaic group (Beckham and Minor 1992:68) and is placed in the Middle Archaic on that basis. A few Late period points suggest use at a later date.

66. DO61, Whistlers Bend No date

67. DO67, Winchester Bridge — Late

The site is dated to the Late Archaic on the basis of historic accounts.

68. DO5, Gatchel — Late

Historic references place use of this site in the Late Archaic, although a small number of projectile points and an atlatl weight indicate use during an earlier period.

69. DO153, Narrows — see 70,71,72,73

70. DO153, Narrows-I — Late

Radiocarbon dates of 330 ± 80 to 90 ± 70 BP place this component in the Late Archaic. It also clusters with other Late period sites (Beckham and Minor 1992:68).

71. DO153, Narrows-II — Late

Radiocarbon dates of 1020 ± 60 and 450 ± 70 BP place this component in the Late Archaic.

72. DO153, Narrows-III — Middle

A radiocarbon date of 5090 ±80 BP places this site in the Middle Archaic; it also clusters with other sites in this time frame (Beckham and Minor 1992:68).

73. DO153, Narrows-IV — Middle, Early?

The radiocarbon date of 6270 ±130 BP places this site in the Middle/Early Archaic time frame. It clusters with other assemblages from the early sites along the North Umpqua (Beckham and Minor 1992:68).

74. DO359, Swiftwater — No date

75. DO383, Susan Creek — Late

A radiocarbon date of 660 ±70 BP from a hearth places this site in the Late Archaic; small, Late Archaic arrowpoints support this evidence (Figure 16).

76. DO278, Bogus Creek — Middle, Early?

Cluster analysis places this site in the earliest group (Beckham and Minor 1992:68); however projectile points, hydration data, and a post-

Mazama deposition of artifacts suggest the main period of use was during the Middle Archaic.

77. DO126, Steamboat Middle

Large lanceolate and side-notched points indicate a Middle Archaic occupation (Figure 16).

78. DO11, Rhody Late

Lichen growth on the rock cairns at this site suggest use at some time during the last few hundred years, during the Late Archaic.

79. DO40, Cavitt Creek No date

80. DO401, Dry Creek See 81, 82

81. DO401, Dry Creek-E Early

This component lies under Mazama ash and is radiocarbon dated at about the time of the eruption 6800 years ago. The assemblage includes andesite bifaces and projectile points similar to the "Borax Lake" assemblage in California. The points, stratigraphy, and C14 place the site in the Early Archaic.

82. DO401, Dry Creek-L Middle

Few projectile points were recovered from the site. The main clue to dating the post-Mazama component comes from hydration data. Two samples of 3.8 and 4.2 microns indicate a Middle Archaic occupation, on analogy with Rogue Basin obsidian dates.

83. DO372, Reynolds Middle

The site clusters with the early sites (Beckham and Minor 1992:68). Points from the site indicate a Middle Archaic occupation, probably beginning early in that period.

84. DO422, Island See 85, 86

85. DO422, Island-E Middle

Two broad-stemmed projectile points date this earlier component to the Middle Archaic.

86. DO422, Island-L — Late

The Late Archaic component is indicated by two composite charcoal samples of about 1210 ± 70 and 1040 ± 90 BP and two barbed arrowpoints.

87. DO418, Apple Bench — Middle

The site is dated to the Middle Archaic on the basis of a few fragmentary lanceolate points.

88. DO265, Apple Creek — Middle

The site is dated to the Middle Archaic on the basis of a radiocarbon date of 3500 ± 110 BP on a feature, as well as on the presence of broad-necked points and obsidian hydration readings which cluster between 3.8 and 5.1 microns. On analogy with the Rogue Basin hydration curve, these hydration readings would place the site in the Middle Archaic, or earlier.

89. DO421, Copeland — Middle

The site is dated to the Middle Archaic on the basis of one Coquille style projectile point.

90. DO161, Medicine Creek — Early, Middle, Late

The pre-Mazama component of this site is similar to the Dry Creek site and dates from the Early Archaic. The post-Mazama component includes both atlatl and arrow points, and was used during both the Middle and Late Archaic.

91. DO187, Powerful 1 — Late

Arrowpoints from the site date it to the Late Archaic period.

92. DO227, Powerful 2 — Middle, Late

Both narrow-stemmed arrow points and broad-necked atlatl dart points date this site to the Middle and Late Archaic.

93. DO379, Snuff Out — No date

94. DO397, Shivigny East — Late

This site clusters with other Late Archaic sites (Beckham and Minor 1992:68).

95. DO289, Little Oak Flat — Late

One arrowpoint and hydration readings ranging from .9 to 1.4 microns place this site in the Late Archaic.

96. DO399, Snowbird — Middle

One broad-necked and one lanceolate point indicate a Middle Archaic occupation (Figure 16).

97. DO160, Muddy — Middle

Corner-notched and broad-necked points indicate a Middle Archaic occupation.

98. DO398, Powerline — No date

99. DO389, Limpy — Late

Numerous arrowpoints and a radiocarbon date of 430 +60 BP place this site in the Late Archaic. It also clusters with other Late period sites (Beckham and Minor 1992:68).

Subsistence and Settlement Change in Prehistoric Southwest Oregon

Two potential subsistence/settlement regimes were identified for this area. The first consists of a collector regime, exemplified by the aboriginal cultural patterns extant at the time of contact. The second is a more mobile regime, hypothesized for an earlier period in the region, and possibly correlated with different environmental conditions. The collector pattern is manifest on the landscape through the existence of three broad classes of sites: villages, seasonal camps, and task sites. The mobile regime, however, produces only two broad classes of sites: seasonal camps and task sites.

In order to consider the possibility of change in the subsistence/ settlement patterns, it was first necessary to place each site in the database into one of the three categories of sites just mentioned. The foregoing analyses utilized a variety of techniques, with a high degree of agreement among them, to place sites into these functional categories. These functional categories are the components used to reconstruct past settlement systems. In order to derive these past systems, it is necessary to relate the sites to one another in time; the preceding chronological analysis provides the information necessary to accomplish this task. Table 20 presents the functional and chronological information for sites from the Rogue Basin and the Umpqua Basin; this information is summarized in Table 21.

The collector regime is well represented during the Late Archaic in both the Umpqua Basin and the Rogue Basin. The settlement pattern for both these areas during this period includes villages, seasonal camps, and task sites. As discussed in Chapter III, these three site types together form the core of the collector settlement pattern. For the Late Archaic in both regions, more than one third of the sites are village sites; almost half the sites are seasonal camps; the remainder are task sites.

There is a profound difference between the subsistence/settlement patterns of the Middle and Late Archaic periods in both the Umpqua and Rogue Basin samples. In both areas--and most dramatically in the Umpqua sample--there is a much lower percentage of village sites and higher percentage of seasonal camp sites during the Middle Archaic. For the Rogue Basin, only 17 percent of the sites are villages; 56 percent are seasonal camps, and 27 percent are task sites. In the Umpqua Basin sample, less than one percent of the sites are villages, almost three-quarters

TABLE 20. Site Functional Designations and Temporal Period

Ref. No.	Site No.	Elev.	Site Name	Functional Type	Period
			Middle Archaic Sites		
Rogue Basin Sites					
1	35CU84	950	Marial	seas. camp	E,M,L
2	35JA1	1000	Gold Hill	village	M,L
4	35JO16	950	Marthaller	village	M,L
5	35JA21	1200	Saltsgaver	seas. camp	M,L
6	35JA25	1450	Far Hills	seas. camp	M
19	35JA27A	1700	Elk Creek		
21	JA27-2	1700		seas. camp	M
22	35JA27B	1700	Elk Creek	seas. camp	M
26	35JA102	1750	Elk Creek	task	M
27	35JA103	1800	Elk Creek	seas. camp	M,L
28	35JA105	1600	Elk Creek	task	M
29	35JA107	1600	Elk Creek	seas. camp	M
31	35JA112	1700	Elk Creek	task	M
32	EC-2	1900	Elk Creek	seas. camp	M,L
33	Island	1700	Elk Creek	task	M,L
35	Zimmerly	1700	Elk Creek	task	M
41	35JA14	2000	Lost Creek	seas. camp	M
43	35JA18	2000	Lost Creek	village	M,L
Umpqua Basin Sites					
49	35DO274	440	Orchard	seas. camp	M
55	35DO205	1700	S.Ump.RS-U	seas. camp	M
57	35DO209	2150	Hughes I	task	M
60	35DO219	1840	Section Crk		
62	DO219-3	1840		seas. camp	M
65	35DO58	700	Glide	village	M
72	DO153-3	800		seas. camp	M
73	DO153-4	800		seas. camp	M
76	35DO278	1050	Bogus	seas. camp	E?,M
77	35DO126	1600	Steamboat	task	M
80	35DO401	1500	Dry Creek		
81	DO401-E	1500		seas. camp	E
82	DO401-L	1500		seas. camp	M
83	35DO372	1600	Reynolds	task	M
84	35DO422	1300	Island		

TABLE 20. Continued

Ref. No.	Site No.	Elev.	Site Name	Functional Type	Period
85	DO422-E	1300		seas. camp	M
87	35DO418	1400	Apple Bench	seas. camp	M
88	35DO265	1200	Apple Creek	seas. camp	M
89	35DO421	1600	Copeland Crk	seas. camp	M
90	35DO161	2200	Medicine Crk	seas. camp	E,M,L
92	35DO227	2200	Powerful 2	seas. camp	M,L
95	35DO289	3200	Little Oak	task	M
96	35DO399	5200	Snowbird	task	M
97	35DO160	3400	Muddy	task	M
			<u>Late Archaic Sites</u>		
<u>Rogue Basin Sites</u>					
1	35CU84	950	Marial seas. camp		E,M,L
2	35JA1	1000	Gold Hill	village M,L	
3	35JO4	950	Ritsch	village L	
4	35JO16	950	Marthaller	village M,L	
5	35JA21	1200	Saltsgaver	seas. camp	M,L
7	35JA42	1750	Applegate	village L	
8	35JA47	1800	Applegate		
10	JA47-2	1800		village L	
11	35JA77	2800	Salt Creek	seas. camp	L
13	35JA189	1550	Trail	village L	
14	35JA190	1460	Trail	seas. camp	L
15	35JA191	3000	Reeder	seas. camp	L
16	35JA197	3600	Little Butte	seas. camp	L
17	35JA10	2000	Elk Creek	seas. camp	L
18	35JA11	1600	Elk Creek	task	L
19-21	35JA27A	1700	Elk Creek		
20	JA27A-1	1700		village L	
23	35JA59	1680	Elk Creek	village L	
24	35JA100	1600	Elk Creek	village L	
25	35JA101	1650	Elk Creek	village L	
27	35JA103	1800	Elk Creek	seas. camp	M,L
30	35JA110	1700	Elk Creek	task	L
32	EC-2	1900	Elk Creek	seas. camp	M,L
33	Island	1700	Elk Creek	task	M,L
34	Winningham	1600	Elk Creek	task	L
36	35JA5	1300	Lost Creek	task	L?
37	35JA6	1500	Lost Creek	seas. camp	L

TABLE 20. Continued

Ref. No.	Site No.	Elev.	Site Name	Functional Type	Period
39	35JA8	1500	Lost Creek	seas. camp	L
40	35JA12	1500	Lost Creek	village	L
42	35JA16	1500	Lost Creek	seas. camp	L
43	35JA18	2000	Lost Creek	village	M,L
44	35JA19	2000	Lost Creek	seas. camp	L
46	35JA23	1950	Fawn Butte	seas. camp	L
Umpqua Basin Sites					
48	35DO275	450	Sylmon	seas. camp	L
50	35DO36	900	Crispen	village	L
51	35DO412	900	Coffee Creek	village	L
52	35DO413	900	Coffee Creek	village	L
56	35DO205	1700	S.Ump.RS-L	seas. camp	L
58	35DO212	2600	Time Sq. RS	seas. camp	L
59	35DO396	900	Sprint	seas. camp	L
61	DO219-1	1840		village	L
63	DO219-2	1840		village	L
64	35DO395	550	Grubbe	seas. camp	L
67	35DO67	480	Winchester	task	L
68	35DO252	1000	Gatchel	village	L
69	35DO153	800	Narrows		
70	DO153-1	800		village	L
71	DO153-2	800		village	L
75	35DO383	900	Susan Crk	seas. camp	L
78	35DO11	3400	Lower Rhody	task	L
84	35DO422	1300	Island		
86	DO422-L	1300		task	L
90	35DO161	2200	Medicine Crk	seas. camp	E,M,L
91	35DO187	2400	Powerful 1	seas. camp	L
92	35DO227	2200	Powerful 2	seas. camp	M,L
94	35DO397	3280	Shivigny	seas. camp	L
95	35DO289	3200	Little Oak	task	L
99	35DO389	3000	Limpy RS	seas. camp	L

Notes: Occupation Periods (sites not listed were not datable):
E = Early Archaic (8,000 - 6,000 BP)
M = Middle Archaic (6,000 - 2,000 BP)
L = Late Archaic (2,000 - 150 BP)

TABLE 21. Functional Site Types by Chronological Period

Site Type	Rogue Basin Mid N	%	Late N	%	Umpqua Basin Mid N	%	Late N	%
Task	5	27%	5	16%	5	25%	4	17%
Seas. camp	10	56%	14	45%	14	70%	11	48%
Village	3	17%	12	39%	1	5.9%	8	35%
	18	100%	31	100%	20	100%	23	100%

of the sites are seasonal camps, and the remaining 26 percent are task sites (see Figure 19 and Figure 20). The mobile model predicts a high percentage of seasonal camps, complemented by task sites. The distribution of site types for the Middle Archaic in both the Umpqua and Rogue Basins corresponds well to the predictions of the mobile model.

Though the mobile pattern appears characteristic of the Middle Archaic, the transition to a more sedentary regime may have begun in some places during this period. Two of the three Middle Archaic village sites in the Rogue sample (the Marthaller site [#4] and the Gold Hill site [#2]) are from lower elevations and further down the Rogue than most of the other sites in the sample. Neither of these sites has a well-dated assemblage of materials; review of the projectile points suggests that intensive occupation began about 3,000 years ago, but this estimate needs corroboration from further studies. Possibly the village pattern appeared earlier along the mainstem of

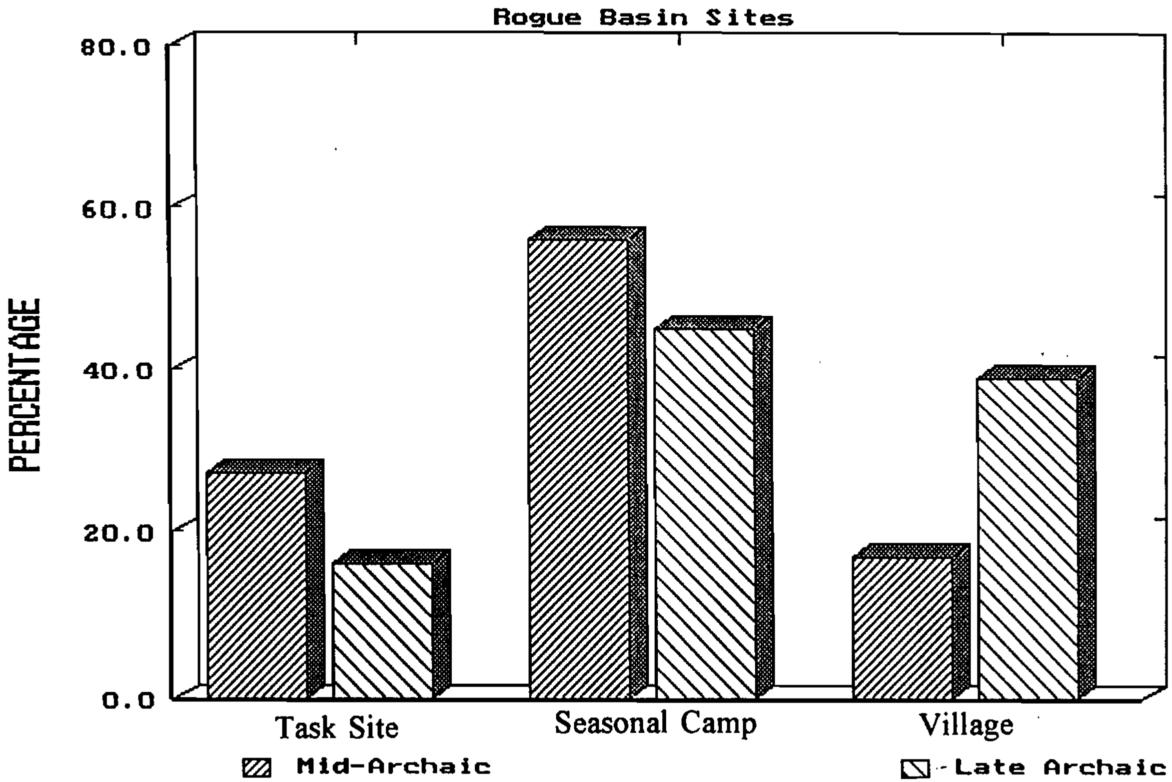


FIGURE 19. Functional site types by period: Rogue Basin Sites.

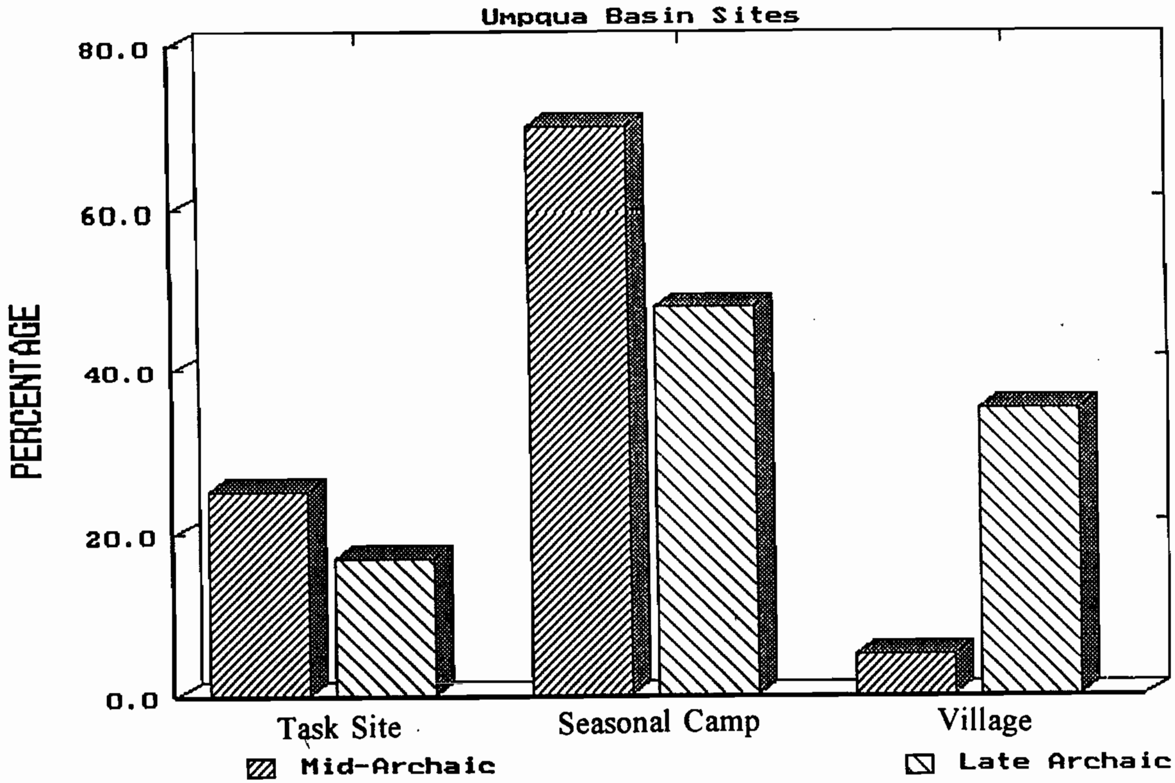


FIGURE 19. Functional site types by period: Umpqua Basin Sites.

the Rogue than it did along its tributaries and upper reaches, where most of the other village sites in the sample are located. The third Middle Archaic village site in the Rogue basin--JA18--is dated to the Rogue 1 subphase, a period transitional from the Middle to the Late Archaic. This site may represent the inception of the village pattern in the upper part of the Rogue River drainage.

The one Middle Archaic village site in the Umpqua sample is located at Glide, along the North Umpqua River. This is a large site which has only been minimally excavated; it is possible that components were mixed and the village-like assemblage actually pertains to a later (undated) component. Alternatively, it is possible that a village pattern began along the major rivers in the Umpqua Valley, probably towards the end of the Middle Archaic.

Although it would be instructive to compare site locations between the two time periods, to see if there were significant shifts in way peoples utilized the landscape, the sample bias inherent in these CRM-based excavations precludes a detailed analysis of this question, although a few general comments are possible. The location of the sites in the sample represent the location of federal projects; this bias constrains the interpretation of changes in landscape use over time.

In the Rogue Basin sample, almost all of the sites come from three areas selected for reservoir construction. All of these sites, therefore, are at moderate elevations in the foothills above the Rogue Valley, and are near perennial, fish-bearing streams (Elk Creek, Lost Creek, Applegate River) or along the upper reaches of the Rogue near the confluences of Elk and Lost

Creeks. There are few sites from the floor of the valley or from the uplands[2] above 2600 feet elevation.

For the Umpqua Basin, many sites were investigated due to highway construction projects; consequently, they occur along travel corridors following the main water ways (the North and South Umpqua Rivers and their tributaries). Like the sites in the Rogue Basin, these sites tend to be at moderate elevations, in the foothills of the valley, and adjacent to perennial streams. A small sample of sites were investigated as part of other projects, particularly timber sales, and occur in the forested uplands. While the Umpqua Basin sample is not as heavily skewed towards a particular type of landscape as is that of the Rogue Basin, it also lacks a good sample of excavated sites from the valley floor, as well as from higher elevations.

The locations of the sites do, however, permit several generalizations. First, there is considerable overlap between the two periods. The majority of the sites in both the Rogue and the Umpqua Basin samples, for both the Middle and Late Archaic Periods, are located at moderate elevations, near perennial fish-bearing streams, and in the low foothills above the valley floors. These locations are within the Interior Valley Zone today. This zone is the most productive of staple resources used by past inhabitants, and was occupied throughout both periods in this region's prehistory. Second, all three types of sites occur within this zone. Although upland resources may have been significant for prehistoric people, the occurrance of seasonal

---

[2] In this discussion, I use uplands to refer to lands above 2600 feet elevation, which is about where the forests begin above the Interior Valley Zone, following the scheme outlined in Chapter III.

camps and task sites indicates that the resources needed during both periods were available at these moderate elevations, at least for part of the year.

The site locations also affirm certain characteristics of the two subsistence/settlement models. None of the village sites occurs at elevations above 2000 feet in either the Rogue or Umpqua Basin sample for either time period, and all are located along fish-bearing rivers or streams. This is in accordance with expectations based on the collector model, which predicts that villages will occur at lower elevations along fish-bearing streams. Nine sites from the entire sample (with dated assemblages) occur in the uplands above 2600 feet. These sites are either seasonal camps or task sites, as would be expected from either of the two subsistence/settlement system models used. Two of these are task sites from the Middle Archaic (5% of all Middle Archaic sites) and seven are either seasonal camps or task sites from the Late Archaic (13% of all Late Archaic sites).

The subsistence/settlement pattern changes defined here between the Middle and Late Archaic have implications for future research which will be explored further in the concluding chapter. The next chapter evaluates the methods used to assign the sites to functional categories, and presents a template for placing sites in southwestern Oregon into functional types based on the work done here.

CHAPTER VIII

EVALUATION OF METHODS USED

In this chapter I briefly examine the "sample size" problem, a concern which arises in analysis of site function based on assemblage diversity. I discuss below the steps taken in this study to sort sites into functional categories despite widely differing sample sizes, measured both in terms of the amount excavated and in terms of total number of artifacts in the sample. Following this discussion, I present a template for comparing other assemblages in the Rogue Basin and North and South Umpqua Basins to the sites analyzed in this study. This should provide a basis for further discussion concerning the methods used in this study, as well as assist in the identification of site types in future excavations in this area.

The Sample Size Problem

Defining the Issue

> Dig all of a large site, and you might get a base camp; dig half of the same site, and you've got a field camp; take a surface collection, and it will look like a location. (Thomas 1989:90)[1]

There is considerable agreement that the diversity of an assemblage is an important clue to the function of the site (Cowgill 1989; Leonard and

---

[1]Thomas's site categories here approximately correspond to the village, seasonal camp, task site classifications used here.

Jones 1989; Thomas 1989). Diversity may be conceived, as it is in this study, as measured through the richness and evenness of an assemblage. The richness of an assemblage is defined as the number of categories represented in a sample, and evenness (uniformity) as the manner in which a quantity is distributed among those categories (Leonard and Jones 1989:2). Richness and evenness are sometimes taken as operating independently, and diversity measures include indices for measuring these as distinct phenomena (Dunnell 1989:143). Density of artifacts is also recognized as a potential measure of inter-site diversity, and indicative of site function (Lyman 1991:85). There is less agreement about the utility of using such measures, which are fraught with problems engendered by sample size differences, in the case of the richness/evenness measures, or site formation processes in the case of density measures (Grayson 1989:79; Lyman 1991:3).

In particular, the debate has focused on the richness and evenness of site assemblages. A number of archaeologists have shown that the richness of an assemblage is often a direct function of its size. For example, in two recent studies scholars have taken a number of sites in a research area, plotted the number of categories of artifact types present at each site against the total number of artifacts recovered, and discovered a good correlation between the size of the sample and the richness of the assemblage. These scholars have concluded that caution is important when assessing diversity, measured as richness, from samples of different sizes. They argue that corrective mathematical measures are necessary to overcome sample size bias (Jones, Beck, and Grayson 1989; Thomas 1989). Evenness (uniformity) is also implicated as a measure subject to sample size bias (Jones et al. 1989).

Implicit in the debate over sample size is a notion that small samples cannot tell us anything about a site's function, and that small excavations or excavations which recover only a few tools have little real value. Though in fact the debate centers primarily on artifact type richness within a sample as a measure of diversity, diversity is also implicated as a difficult concept to use, in general, in determining site functions. The often quoted saying at the beginning of this section has served to discourage attempts to use inter-site comparisons of diversity as a measure of site functional differences.

This idea that small samples have little to contribute presents a logical paradox. This problem is especially evident where sample size is taken as number of artifacts recovered. If (as many agree) habitation sites are significantly different from seasonal camps or task sites because they accumulate greater numbers and types of artifacts, how can we distinguish task sites from these other assemblages? Task sites will never (by definition) produce assemblages containing as many or as varied artifacts as habitation sites. The fact that the richness of an assemblage is frequently related to the size of the sample makes it difficult to assess the underlying cultural differences which may, in fact, contribute to the size of the sample (Plog and Hegmon 1993). That is, habitation sites (e.g., villages) are both richer and more dense than task sites.[2] Thus, a sample of excavated site matrix from a habitation site is invariably going to have both more artifacts and a more varied assemblage than one from a task site, other things (e.g., site depositional factors, excavation strategies) being equal. Richness and density are frequently confounded in the archaeological record as a result of site function, and the differences between sites in both these factors may reflect valid distinctions in site function.

The task of assessing evenness is also subject to confusion. Although evenness is frequently measured as a distinct phenomenon, it is necessarily dependent upon the richness of a site's assemblage when it is construed as percentages of artifact classes. Whenever a class of artifacts is added to an assemblage, the percentages of artifacts in the other classes must shift; richer assemblages must be more even (uniform) than more specialized assemblages. Consequently, evenness measures will be subject to sample size bias just as richness is. Rather than isolating these two

---

[2]Thomas's graph (1989:74) which shows the linear correlation between sample size and artifact class richness also demonstrates another interesting phenomenon. The sites used consist of "sites" and "non-sites". Sites are places of dense accumulations of materials which might correspond to habitation areas; non-sites are locations used for a shorter term which might correspond to task sites. If one looks at the lower end of the regression line (divided at .600 on his graph), 60% of the sites are "non-sites", whereas at the upper end, 67% of the sites are "sites". Thus the majority of those at the lower end of the regression line have smaller and less rich assemblages and are primarily "non-sites", whereas those at the upper end have larger and richer assemblages and are primarily "sites". Contrary to his intention, Thomas may be demonstrating not only that sample size (possibly interpreted as density) and artifact class richness are linked, but that both these factors, taken together, relate to site type.

phenomena, it is perhaps better to recognize their interdependence and assess them together.

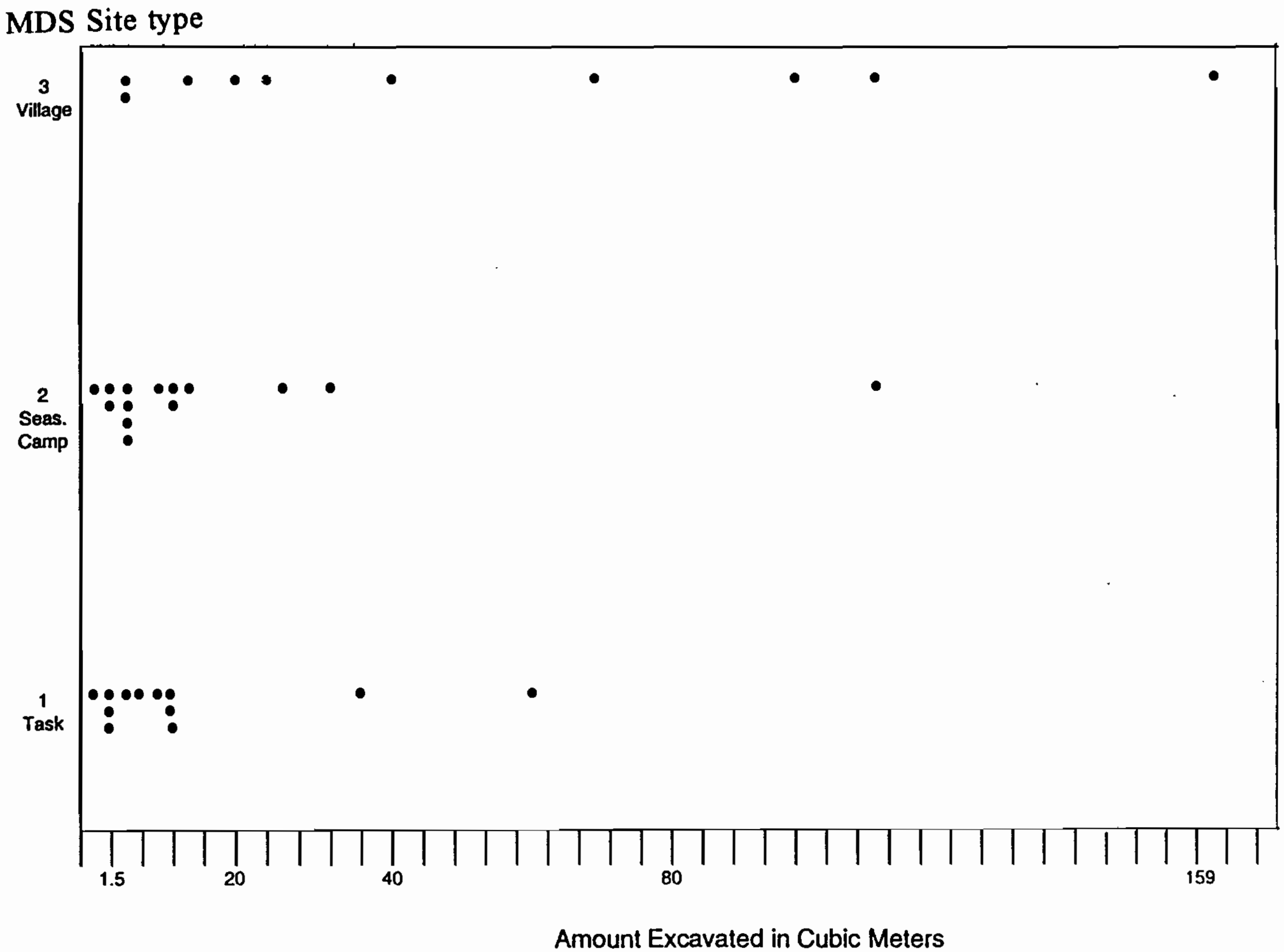
Most of the data upon which this project is based come from excavations conducted as part of cultural resource management concerns. Generally, the "sample size" concern has been ignored in this CRM work, where small-scale (inexpensive) test excavations are used to assess a site and determine the necessity of further work. Definition of a site's function is frequently based on a handful of artifacts from the site, along with other site-specific factors such as location, features, and the archaeologist's experience at other sites. The basic rule-of-thumb, to paraphrase Thomas, is "if you dig a little and get a lot [of artifacts of different types], it's a village site; if you dig a lot and get a little, it's a task site."

Not infrequently, sites which produce a comparatively dense and rich assemblage from a small test excavation are also designated as worthy of further (data recovery) excavation. Given this bias, the problem of sample size should be further compounded for this study. Not only do some sites produce more artifacts than others, the more productive sites also tend to have more site matrix excavated, and hence to produce larger samples measured as either amount excavated or the total number of tools recovered. If the premise stated in the quote at the beginning of this section is correct, then there should be a direct correlation between those sites designated as village/camp/task sites and sample size, measured both as total number of tools produced and as amount excavated. Yet, as the following analysis shows, this is not entirely the case.

Sample Size and Site Type Analysis

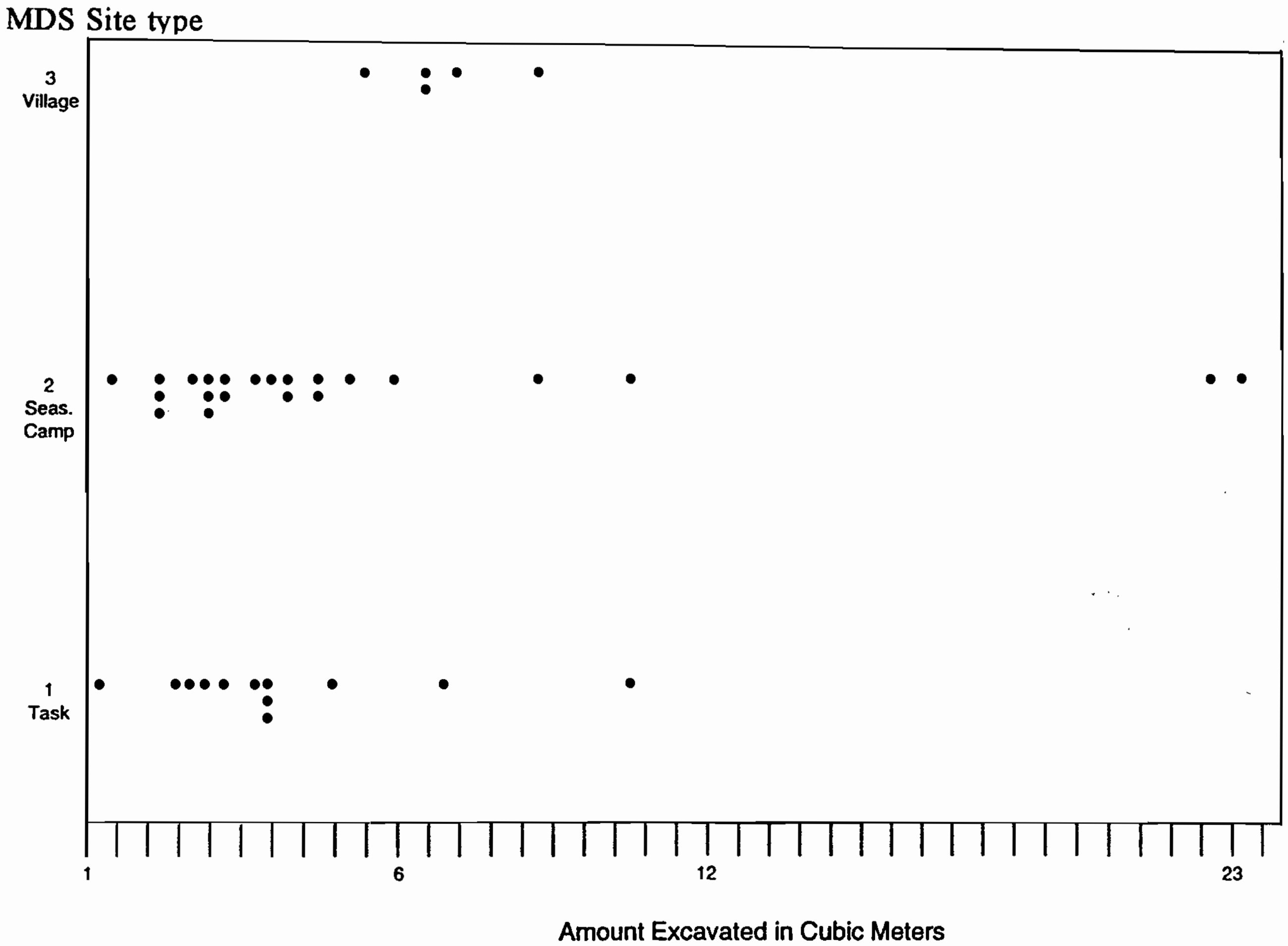
Figures 21-24 illustrate the relationship between site type and sample size. In the foregoing discussion sample size referred to the number of artifacts in a site's assemblage. However, sample size may also be construed as the amount excavated at a site (see Thomas's quote at the beginning of this chapter). The following figures compare site types to sample sizes. The site types used in these figures are the types derived from the multidimensional (MDS) scaling analysis, since this is the analysis which compares sites based on the diversity (i.e., richness and evenness) of their assemblages.

Sample size in Figures 21 and 22 is given as the amount excavated. In these figures, the amount excavated is plotted along the horizontal axis, and the three site types are plotted along the vertical axis. Each dot represents a site assemblage. In the Rogue Basin (Figure 21), there have been both small and large excavations, with projects ranging from one cubic meter to over a 150 cubic meters in size. Despite this diversity in sample size, both large and small excavations yielded assemblages from all three types of sites. There are three village sites from excavations of less than twenty cubic meters, for example, and two from even smaller samples (about 6 cubic meters). Conversely, there are three seasonal camps from excavations exceeding 20 cubic meters, and two task sites from these larger excavations. In the Umpqua Basin (Figure 22), all the excavations are less than 23 cubic meters. Nonetheless, a similar amount of overlap is demonstrated. Excavations ranging in size from six to twelve cubic meters,



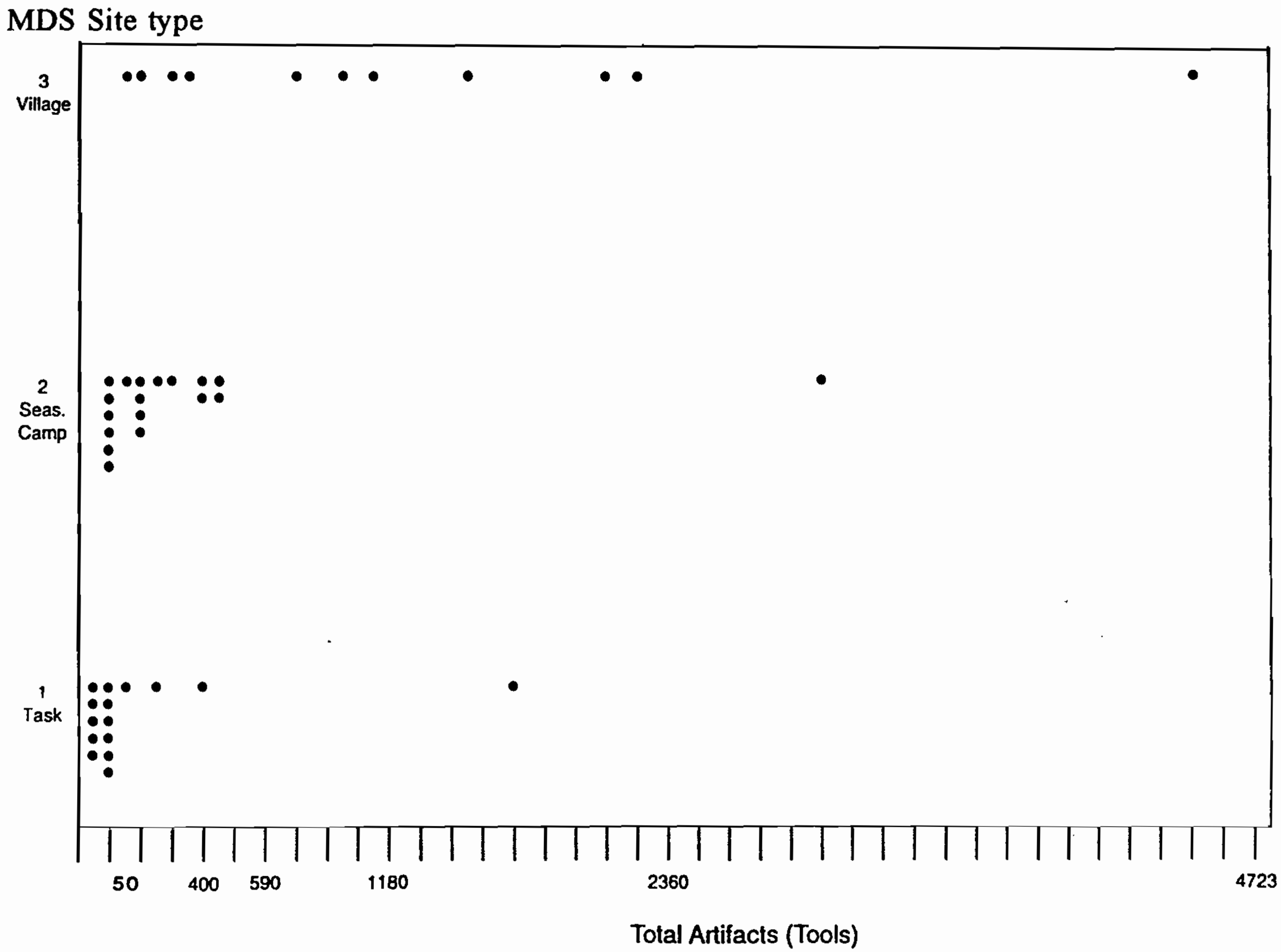
Plot of sites illustrating overlap of MDS determined functional types for differing sample sizes. Sample size based on amount excavated; each dot represents a site assemblage.

FIGURE 21. Rogue Basin Sites: Site type and amount excavated.



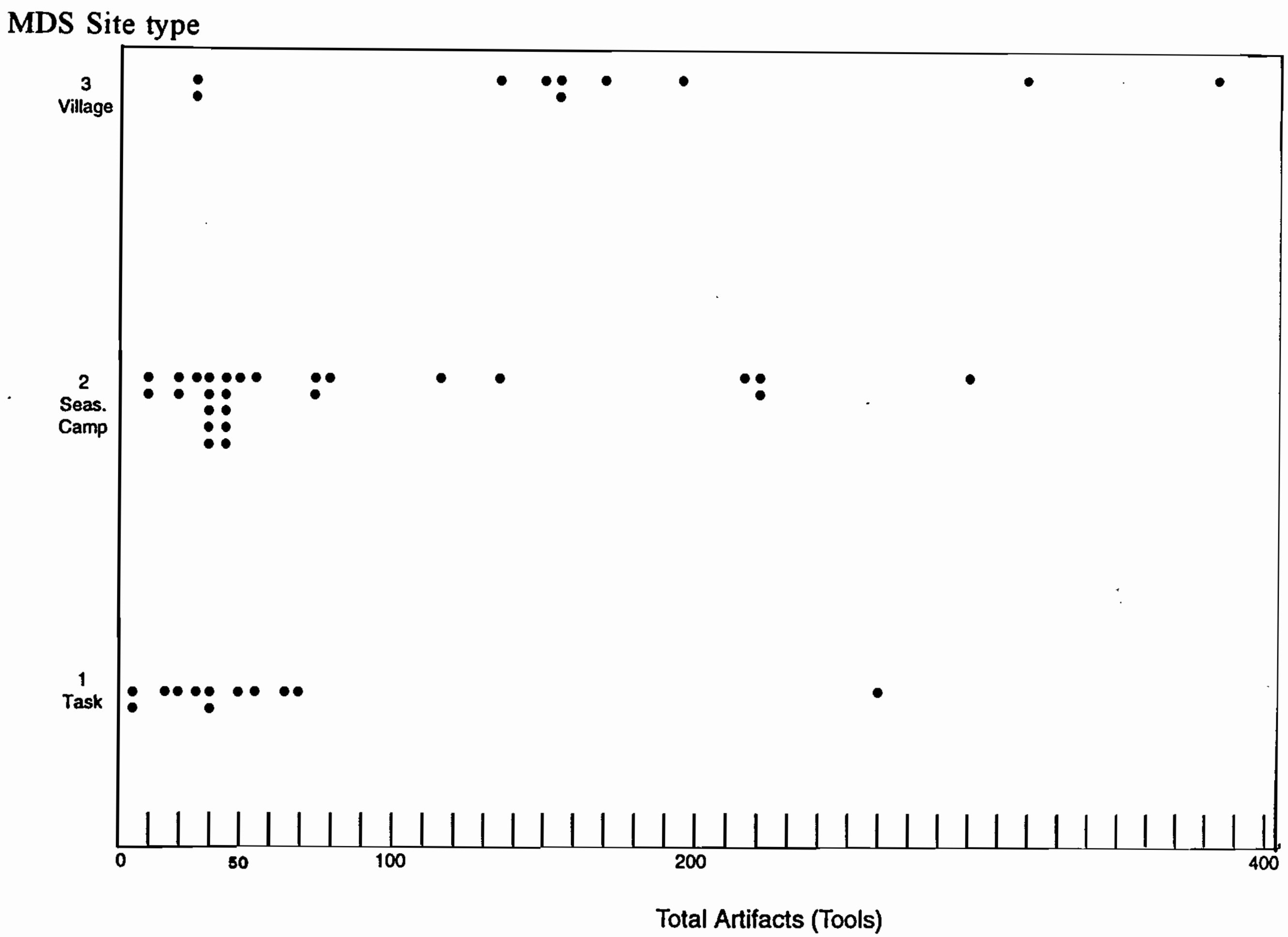
Plot of sites illustrating overlap of MDS determined functional types for differing sample sizes. Sample size based on amount excavated; each dot represents a site assemblage.

FIGURE 22. Umpqua Basin Sites: Site type and amount excavated.



Plot of sites illustrating overlap of MDS determined functional types for differing sample sizes. Sample size based on amount excavated; each dot represents a site assemblage.

FIGURE 23. Rogue Basin Sites: Site type and total artifact (tool) sample.



Plot of sites illustrating overlap of MDS determined functional types for differing sample sizes. Sample size based on amount excavated; each dot represents a site assemblage.

FIGURE 24. Umpqua Basin Sites: Site type and total artifact (tool) sample.

for example, include all the village sites in the sample as well as three seasonal camps and two task sites.

Despite the bias inherent in the excavation methods (i.e., to excavate larger samples of more productive sites), the overlap demonstrated in Figures 21 and 22 shows that assemblages from small excavations of village sites are qualitatively different from small excavations of task sites, and that assemblages from large excavations of task sites are qualitatively different from large excavations of village sites. Even if a small amount of a village site is excavated, the resulting assemblages will be diverse, and if a large amount of a task site is excavated, the resulting assemblage will be speacialized. That is, the size of the excavation at a site does not necessarily bias the interpretation of that site's assemblage based on the diversity of the artifacts from that site.

In Figures 23 and 24, sample size is given as the total number of stone tools in an assemblage. In these figures, the size of the tool assemblage is plotted along the horizontal axis, and the MDS-derived site types along the vertical axis. Despite the fact that task sites generally produce much lighter and smaller assemblages, there is still overlap among the three types for varying sizes of assemblage samples. In the Rogue Basin (Figure 23) for example, assemblages of about 150 to 400 tools include four of the village sites, nine of the seasonal camps, and three of the task sites. Assemblages larger than 400 tools include more of the village sites, but also a few seasonal camps and one task site. For the Umpqua Basin (Figure 24) there is also important overlap. For example, assemblages of less than 50 artifacts include two of the village sites, 15 of the seasonal camps, and seven of the task sites. Assemblages between 50 and 200 items include six village sites, seven seasonal camps, and four task sites.

Again, this overlap among site types with similar-sized samples demonstrates that sample size does not necessarily bias the interpretation of a site's function based on the diversity of artifacts in a site's assemblage. Despite the biases inherent in comparing assemblages from different types of sites--where task sites by definition have lighter assemblages than village sites--it is still possible to distinguish differences among the three type of sites despite the size of the sample. A small assemblage from a village site has the characteristics of a village assemblage, and the same holds true for task and seasonal camp sites. That is, a large assemblage of tools from a specialized (i.e., task) site will not necessarily be as diverse and uniform as a small assemblage of tools from a generalized (i.e., village) site.

The reasons why the sample size problem does not pose a significant problem in this study are examined in the next section.

Resolution of the Sample Size Problem in this Study

The measures used to define site functions in this study relied heavily on assemblage diversity. That these measures seem to work consistently despite differences in sample sizes, measured as both numbers of artifacts and amount excavated, is due to a number of factors:

1. Critics of the use of diversity as a measure of site function focus on efforts to define site function based on richness and evenness indices, whereas the efforts here are more broadly based.

2. Sites which are compared in this study are fairly homogeneous in terms of site formation processes, and have been subjected to excavation methods which are also fairly consistent.

3. The focus has been on comparative, not absolute, measures of diversity.

First, as noted above, those most concerned with the "sample size" problem in archaeology have focused on quantitative measures of richness to assess site diversity as a reflection of site function. This measure may confound site artifact density with richness, two important characteristics of a site which often operate in the same direction in terms of site function. The problem rests in disentangling these two factors and comparing the results to see what type of a site is indicated. In this analysis, density was measured separately, as the number of artifacts per unit of material excavated. This yielded figures which were comparable site-to-site no matter how many total artifacts were recovered or how many cubic meters of soil were excavated.

As noted above, richness and evenness are measures of diversity which are necessarily linked. In this analysis, no attempt was made to distinguish these two factors, but both were considered together in the multidimensional scaling analysis. Evenness was measured by converting numbers of artifacts in each category into percentages, which also served to make assemblages from sites with widely differing numbers of tools comparable.

Unlike the attempts to create indices of diversity for richness and evenness, the MDS analysis did not assess each site on the basis of its place on a numerical scale of more to less diverse. Rather, this analysis sorted sites in space based on their dissimilarities to one another. These similarities/differences in turn included both richness and evenness, taken together. This approach is both more flexible and less definitive than attempts to construct a numerical index either for richness or evenness. It allows the investigator to utilize complex data and to compare sites, but the interpretation of the resulting scatterplot is not as clear-cut as is that of a numerical measure. In this analysis, reference to outside data (features, previous analyses) helped to interpret the scatterplot, then in turn the scatterplot was used to help classify sites. This method represents another way to work with the diversity data and deserves further exploration. Richness and evenness are important characteristics of site assemblages and should be used to help determine site function. Focusing on mathematical indices for these measures may not, however, be the best way to work with such data.

A second reason the analyses completed in this study were successful is due to the fact that sites come from fairly homogeneous environments. Density is an important measure of site function, but comparing site artifact densities presumes a uniform depositional environment. That seems to be the case in the present instance, perhaps to a greater degree than in other studies. Most of the sites in this sample are open-air sites in moderately forested environments. Site formation processes are not widely different; most sites have been similarly subjected to the effects of climatic regimes and cycles, vegetation growth and decay, and the actions of burrowing animals. In a few cases, where density measures for sites were very different from what might be expected based on other site data, the sites in question did not fit the usual pattern. These anomalous sites consisted of two riverside terrace and several rockshelter sites. Two village sites are located downriver from most of the other sites in the Rogue Basin sample, in an area probably more prone to heavy flooding and soil deposition than the upriver areas. Artifact densities were lower than expected for these village sites; possibly cycles of flooding and deposition contributed greater overburden to the cultural matrix and "diluted" the site assemblages compared to sites further upstream. It is also possible that at these particular sites the collection strategy focused on "interesting" artifacts, overlooking the more mundane tool types and consequently deflating the density of the sample. Conversely, the rockshelter sites produced very dense assemblages, possibly due to the lack of soil deposition and disturbance from plants and animals in these places compared to open-air sites.

Finally, the methods employed here sought to derive functional types by comparing sites within a geographic area to one another, rather than by devising numeric measures against which to compare sites. This resulted in the definition of three site types based on their <u>relative</u> assemblage diversity.

This relative scale was then anchored to outside data, through the comparison of site types with habitation feature data. In this way, various measures of site diversity were utilized and compared, each serving as a check for the other, with the end results compared to site functional data which were not directly a measure of assemblage diversity. Despite the difficulties of working with diversity data, which have been so well enumerated by other researchers, these simple methods have proven fruitful.

Methods for Functional Type Determination

The methods used in this study produce numerical results which should be applicable to other sites in the study area (and in other environmentally and culturally comparable regions). These results, in terms of density and diversity figures, provide empirically derived guidelines for assessing the functions of sites excavated in this area in the future. Further investigations may modify the suggestions presented below.

The following summarizes the results of these analyses, for easy reference. The groups noted (Groups 1-3) are those derived in the analyses for each measure (see Chapters IV, V, VI). Figures are given for the Rogue Basin and the North and South Umpqua sites separately.

Density Measures

Tables 22 and 23 provide the density data derived from the analyses completed above. These tables present the range in density for different categories of artifacts for the three types of sites.

TABLE 22. Rogue Basin Sites: Density Measures
(Measurements per Cubic Meter Excavated)

Group	Point Density	Chipped Stone Tool Density
Density Measure 1: Projectile Point vs. Chipped Stone Tool		
1	0 - 3	0 - 9
2	1 - 5	8 - 16
3	5 - 12	8 - 42
Density Measure 2: Total Tool Density vs. Debitage Density		
Group	Total Tool Density vs.	Debitage Density
1	0 - 9	25 - 200
2	9 - 25	100 - 350
3	25 - 65	250 - 200
Density Measures for Groundstone and Cobble Tools		
Group	Groundstone Density	Other Cobble Tools
1	0 - .33	0 - .35
2	.37 - .5	.38 - .88
3	.61 - 3.60	.86 - 5.00

Notes: Group 1 = Least dense assemblages (task sites)
Group 2 = Moderately dense assemblages (seasonal camps)
Group 3 = Most dense assemblages (village sites)

Chipped stone tools = all chipped stone except projectile points
Total tool density = all stone tools
Groundstone = manos, pestles, metates, grinding slabs, stone bowls, mortars
Other cobble tools = battered cobbles as well as other cobble tools such as cobble spalls, netsinkers, shaft abraders, cobble choppers.

TABLE 23. Umpqua Basin Sites: Density Measures
(Measurements per Cubic Meter Excavated)

Group	Projectile Point Density	Other Chipped Stone
	Density Measure 1 Projectile Point vs. Chipped Stone Tool Density	
1	0 - 2	0 - 11
2	1 - 5	5 - 17
3	1 - 40	3 - 50
	Density Measure 2 Total Tool Density vs. Debitage Density	
Group	Total Tool Density	Debitage Density
1	1 - 11	0 - 210
2	4 - 28	55 - 450
3	6 - 98	350 - 3000
	Groundstone and Cobble Tool Densities	
Group	Groundstone	Other Cobble Tool
1	0 - 0 *	0 - .27
2	.09 - .35	.34 - 1.10
3	.46 - 20.00	1.2 - 20.00

*The "0 - 0" range should be interpreted as a very low density rather than complete absence of these type of tools at all Group 1 sites; these items occur in such low densities that there may not have been sufficient excavation to recover any at Group 1 sites in this sample.

<u>Notes</u>: Group 1 = Least dense sites (task sites)
Group 2 = Moderately dense sites (seasonal camps)
Group 3 = Most dense sites (village sites)

Chipped stone tools = all chipped stone except projectile points
Total tool density = all stone tools
Groundstone = manos, pestles, metates, grinding slabs, stone bowls, mortars
Other cobble tools = battered cobbles as well as other cobble tools such as cobble spalls, netsinkers, shaft abraders, cobble choppers.

It should be possible to compare other assemblages from this region to this data to ascertain their relationship to the sites analyzed in this study.

Multidimensional Scaling

The MDS procedure proved useful as one element in comparing site assemblages to one another. Since it could be impractical for investigators to run an MDS analysis on each new site investigated, the Tables 24 and 25 provide descriptive statistics for comparing assemblages from other sites to the group of sites analyzed here. The groups (Groups 1-3) are those identified during the MDS analysis (see Chapters V and VI, and see Figures 10 and 15).

TABLE 24. Rogue Basin Sites: MDS Group Statistics

Tool Class	Group 1 Task	Group 2 Seasonal Camp	Group 3 Village
PPP			
Range	0 - 35	3 - 43	11 - 26
Mean	15	16	17
SD	11.8	9.9	4
BFP			
Range	8 - 47	3 - 40	7 - 37
Mean	24	17	22
SD	13	11	7
EMP			
Range	16 - 68	25 - 78	18 - 64
Mean	39	44	42
SD	16	13	10
CRP			
Range	0 - 33	1 - 25	0 - 11
Mean	14	9	6
SD	11	6	3
BCBP			
Range	0 - 9	0 - 17.7	1.4 - 12.6
Mean	3.2	7.2	6
SD	3.2	4.2	3.8
OCBP			
Range	0 - 4.5	0 - 3.6	0 - 4
Mean	0.4	0.7	0.8
SD	1.3	1	1.3
GDSP			
Range	0 - 14	0 - 12	0.7 - 15
Mean	4.2	4.5	5.1
SD	4.3	3.6	4.2

SD = Standard Deviation
PPP = % projectile points
EMP = % edge-modified tools
BCBP = % battered cobbles
OCBP = other cobble tools
BFP = % bifaces
CRP = % cores
GDSP = % groundstone

TABLE 25. Umpqua Basin Sites: MDS Group Statistics

Tool Class	Group 1 Task	Group 2 Seasonal Camp	Group 3 Village
PPP			
Range	0-68	4-29	5-24
Mean	18	14	13
SD	20	8	6
BFP			
Range	0-81	2-35	14-25
Mean	18	20	19
SD	23	9	4
EMP			
Range	0-100	30-68	29-56
Mean	39	46	46
SD	32	12	9
CRP			
Range	0-21	0-23	3-19
Mean	3	7	7
SD	5	7	5
BCBP			
Range	0-93	0-40	2.7-25
Mean	12	9	10.2
SD	22	13	8.2
OCBP			
Range	0-5.8	0-15	0-2.7
Mean	.4	1.5	.7
SD	1.3	3.8	.9
GDSP			
Range	0-35	0-12.7	0-5.4
Mean	4.2	2.2	2.4
SD	10.4	3.8	1.9

SD = Standard Deviation
PPP = % projectile points
EMP = % edge-modified tools
BCBP = % battered cobbles
OCBP = % other cobble tools
BFP = % bifaces
CRP = % cores
GDSP = % groundstone

CHAPTER IX

SUMMARY AND CONCLUSIONS: CULTURE CHANGE IN PREHISTORIC SOUTHWEST OREGON

This study has raised two fundamental issues pertinent to archaeological research in southwest Oregon. The first is the issue of culture change over the long term, as reflected in the prehistoric subsistence and settlement patterns of the region. The second is the ability of Cultural Resource Management (CRM) studies to contribute to questions of broad interest and general anthropological concern. These issues are addressed using data from 83 excavated sites in the region. The sites occur in the eastern part of the Rogue River drainage basin, which is treated as one unit (Rogue Basin sites), and in the drainage basins of the North and South Umpqua Rivers, which is treated as another unit (Umpqua Basin sites).

The results of this analysis demonstrate a change in subsistence/settlement regimes beginning along the main stem of the Rogue River some time during the latter part of the Middle Archaic period. A mobile pattern characterized earlier times, with a more sedentary regime spreading throughout the region during the last 2,000 years. The methods developed to analyze the CRM data in this study provide a means for comparing the diverse archaeological assemblages generated by this type of work.

Culture Change: Middle and Late Archaic Subsistence/Settlement Systems

Subsistence/settlement systems, especially for hunter-gatherers--operate at the intersection of human culture and the natural environment. The identification of change in these systems thus raises the possibility of corresponding changes in the environment within which these systems operated. Two subsistence/settlement systems are identified by this study as existing at different times in the prehistoric past in southwest Oregon. Identification of the primary characteristics of the environments within which they existed is essential background to the current analysis, and identifies issues for further research.

The study area lies within interior southwest Oregon, encompassing the valleys, rivers, foothills, and mountains of the western Cascades. The climate is characterized by cool, wet winters, and warm, dry summers; in the winter, precipitation falls mainly as snow at the higher elevations. Today, the environment of southwest Oregon may be described in terms of different vegetation zones, generally changing with increasing altitude (following Franklin and Dyrness 1988). The lowest elevation zone, from the valley floors to an elevation of about 2600 feet, consists of the Interior Valley Zone. Prior to modern land use practices, this zone included grasslands and meadows on the valley floor, open savannahs of scattered oaks and grasses, and woodlands of oak and pine on the foothills. Chaparral communities, consisting of brushy species such as manzanita and buckbrush, occur throughout this zone. These plant communities furnished many of the staple resources needed by the native peoples, such as acorns and camas, as well as abundant forage for game animals. Rivers and streams flowing through these interior valleys were sources of abundant anadromous fish, with fish runs every season of the year. Coniferous forests cover the uplands above the Interior Valley Zone. These forests are punctuated by wet and dry meadows, which provided summer browse for game animals as well as plant foods during the warmer months of the year. Aboriginal inhabitants of this area managed the environment through such practices as annual burning, in order to enhance valuable resources such as acorns, and forage for ungulates.

This configuration of resources, however, may not have been characteristic of the entire time of human habitation in this region. Major climatic changes during the Holocene altered vegetation communities in the Pacific Northwest. A warmer and drier climate prevailed in the early Holocene; this xeric interval reached its maximum at about 9,000 BP in the Pacific Northwest. By 6,000 BP the climate had begun to cool, but was still warmer and drier than at present. By about 3,000 BP the transition to a wetter and cooler (mesic) regime, accompanied by modern vegetation patterns, had occurred throughout the region. Within the Pacific Northwest, the timing of the transition to this later regime appears to fluctuate, and is unknown for southwest Oregon.

There is as yet little specific information regarding the effects of a warmer and drier climate on the environment of southwest Oregon. Vegetation communities which characterize the lowlands may have expanded, with an increase in grasslands, chaparral, and savannah types of communities, and a decrease in coniferous forests. Speculative studies regarding the nature of the prehistoric environment during this xeric interval suggest significant differences in the distribution and abundance of staple foods between this and later mesic period. During the xeric period, changes in hydrology may have limited fish runs to the winter season; oaks may have expanded throughout the area, but acorn production may have been unpredictable and fluctuating due to drought conditions; camas may have been restricted to upland meadows. A more open, less forested environment may have promoted forage for deer and other game species, however. A warmer climate may have permitted occupation of upper elevations for longer during the year. Though hypothetical, these distinctions between the early xeric and later mesic climates present significant contrasts against which the prehistoric subsistence/settlement systems may be compared (Table 26).

Two different subsistence/settlement systems were modelled for this region. Differences among hunter-gatherer subsistence/settlement patterns may be expressed as differences in mobility, as in the contrasts between foragers/collectors, travelers/processors, and immediate-return/delayed-return systems. These contrasts share a distinction between those who move themselves among resources, using them as they become available, and those who process and store foods at permanent and stable home bases. Though the latter type of subsistence/settlement regime may include seasonal movements to obtain food and materials, it is tethered to a central place of habitation. Such "collector" regimes utilize resources more

TABLE 26. Climate Change and Resource Abundance (Dates BP)

	Xeric	Transition Mesic
	10,000 ....6,000......???.......3,000............150 BP	
	(hypothetical)	
Fish	less/winter only	abundant/predictable
Acorns	less/expanded range, but unpredictable crop	harvests more abundant/ predictable
Camas	less/upland meadows	abundant/lowland and upland
Deer/game	more abundant/wide ranging	abundant/more restricted by winter snows
Upland use	more open for longer during the year	more restricted for longer during the year

intensively, including foods--such as seeds--which may take more time to harvest and process than other items, such as game. The more mobile regimes do not rely as heavily on storage and may not exploit the environment's resources as intensively. These differences constitute the basis of two contrasting subsistence/settlement patterns postulated for this area: the collector model and the mobile model.

At the time of historic contact, the people of southwest Oregon participated in a semi-sedentary collector regime. As illustrated by the available ethnographic information, groups in this area inhabited permanent winter villages, and dispersed into the countryside and uplands during the warmer months to collect and process foods which were returned to the villages for storage. During these months people occupied temporary camps located near important resources, such as oak groves, fishing spots, and meadows. In both winter and summer, smaller parties, such as a group of hunters, departed from the villages and camps to accomplish specific tasks. Such forays included hunting parties, spiritual quests, medicine gathering, and other short-term, specific tasks. Winter villages were located at lower elevations, near permanent sources of water and fish-bearing streams. Seasonal camps occurred at all elevations, associated with the particular resources available. Task sites also occurred at all elevations.

Archaeological work in this region suggests that the contrasting mobile pattern prevailed earlier in this region's history. According to this model, small groups moved about the landscape, provisioning themselves with available materials but with little emphasis on processing or storing foods. These groups did not inhabit permanent villages, but lived in a series of temporary camps throughout the year, from which specialized groups would depart to obtain specific resources or accomplish specific tasks. Sites associated with this pattern are seasonal camps and task sites. Seasonal camps would be located throughout a group's territory, including upland and lowland locations, and associated with seasonally available resources. Task sites would be associated with seasonal camps, and located throughout the territory.

Based on both the environmental review and the ethnographic/ archaeological models, it was hypothesized that the mobile pattern prevailed earlier in this region's prehistory, and the collector pattern later. A subsistence/settlement pattern associated with the mobile model would consist of seasonal camps and task sites, located throughout both upland and lowland areas, associated with seasonally available resources. Conversely, the subsequent cooler and wetter regime may have influenced the development of the collector period. A subsistence/settlement pattern associated with the collector pattern consists of three types of sites--village, seasonal camp, and task sites (Table 27).

TABLE 27. Site Type and Subsistence/Settlement Models

Site Type Present	Mobile Model	Collector Model
Village		X
Seasonal Camp	X	X
Task site	X	X

The archaeological settlement patterns of these two contrasting modes embody a different mix of functional site types. The semi-sedentary collector pattern consists of villages, seasonal camps, and task sites. The mobile pattern consists of seasonal camps and task sites. The central analytic task of this dissertation was to categorize the sites in the database according to these functional types, then to determine which settlement systems were extant at different times in the past, based on the types of sites present at different time periods.

Sites were placed into functional categories on the basis of qualitative information and quantitative tests. This exercise provides the major methodological contribution of this study, and is discussed in more detail below. Once the sites were assigned to functional categories, they were placed into one of two broad temporal periods, based primarily on previous work in this region which has dated many of the sites. The two time periods used are the Middle Archaic, 6,000-2,000 BP, and the Late Archaic, 2,000-150 BP.

There is a significant difference between the types of sites present during the two time periods (see Table 28, and Figures 19 and 20). Site types from these time periods demonstrate a shift from a mobile pattern to a semi-sedentary collector one. This shift is evident in the proportions of different types of sites present during the two periods. For the Middle Archaic period in the Rogue Basin only 17 percent of the sites are villages, while the remainder are seasonal camps and task sites. For the Middle Archaic in the Umpqua Basin, less than 1 percent of the sites are village sites. Sites from the Middle Archaic in both areas are primarily seasonal camps and task sites, as predicted by the mobile model. For the Late Archaic in both the Rogue and Umpqua Basins, more than one-third of the sites are villages, almost half the sites are seasonal camps, and the remainder are task sites. This pattern of village sites, seasonal camps, and task sites is predicted by the collector model.

TABLE 28. Middle and Late Archaic Functional Site Types

Site Type	Middle Archaic Rogue N = 18	Middle Archaic Umpqua N = 20	Late Archaic Rogue N = 31	Late Archaic Umpqua N = 23
Task	27%	25%	16%	17%
Seas. Camp	56%	70%	45%	48%
Village	17%	5%	39%	35%

There are a few, poorly dated village sites from the Middle Archaic. These sites include the Gold Hill site and the Marthaller site in the Rogue Basin, and the Glide site in the Umpqua Basin. These sites suggest that the shift to a collector regime began along the major waterways perhaps 3,000 years ago, although better chronological information from these or other sites is needed to affirm this suggestion. The collector model did, however, spread throughout the region during the last 2,000 years.

The sites in the study are located where federal projects have taken place. Since these projects have largely occurred at lower elevations near major rivers or streams, most of the sites in the sample are consequently located at moderate elevations, within the Interior Valley vegetation zone, and near major waterways. This general similarity among site locations does not permit analysis of contrasts between the two subsistence models in terms of gross environmental characteristics. However, the fact that there is considerable overlap between the sites from the two periods does indicate that these lower elevation areas were important to both subsistence/ settlement regimes.

The change in the subsistence/settlement systems demonstrated by this study raises questions significant to the field of human ecology, regarding the nature of the adaptations to the environment by those participating in the mobile model and those participating in the collector model. These two contrasting subsistence/settlement patterns represent either different adaptations to different environments, or different adaptations to similar environments, or both possibilities. In the first case, it is possible that the warmer and drier conditions of the early part of the Holocene promoted a mobile subsistence regime, due to the scarcity of stable and predictable resources and the abundance of mobile game, coupled with a milder climate which permitted greater movement throughout the mountains and valleys for longer periods of the year. Conversely, it is possible that the inception of a wetter and cooler climate restricted mobility by limiting access to higher elevations for longer periods during the year. Restricted mobility, in turn, was coupled with the greater availability of stable and predictable resources such as anadromous fish, acorns and camas; taken together, these factors may have promoted the semi-sedentary regime which was dependent upon these more stable resources. It is also possible that the mobile pattern persisted through both climatic intervals, relatively unaffected by the changes which took place.

At present it is not possible to make a direct correlation between the early Holocene environment and the mobile pattern, although the collector pattern certainly evolved within the more mesic period. Additional paleoenvironmental studies, as well as better chronological information for the archaeological data, are needed to determine the relationship between the past environments and these cultural patterns.

Understanding the relationship of the past human groups to the environments in which they existed also requires analysis of the characteristics of specific site locations. There are, for example, many sites located on river terraces along the North Umpqua River, representing components of both the mobile and collector patterns. Late Archaic sites include village sites from the collector pattern; Middle Archaic sites include seasonal camps from the mobile pattern. Do these sites represent differing adaptations to similar environmental conditions at these specific locations? Or were there significant differences in the past environments, such as differences in fish runs or plant foods present, which might account for the cultural differences? Reconstructing the significant features of the environment around a site at the time of its occupation is a major task, difficult to undertake for the large sample of sites used in this study. Analysis of a selection of sites from this database for each cultural pattern could, however, prove informative.

Finally, analysis of past subsistence/settlement patterns must take better account of how prehistoric peoples interacted with their environment to obtain the things they needed. Aboriginal peoples were sophisticated participants in the landscapes in which they lived. Changes in subsistence/settlement patterns may reflect new ways of manipulating the environment. More extensive use of fire, for example, may have meant that certain groups "made an investment" in a particular part of the landscape, to which they became increasingly tied, leading to a more sedentary existence within a comparatively circumscribed territory. At present, a detailed and comprehensive understanding of native land management practices of the people of southwest Oregon is lacking; such information could assist the understanding of the particular cultural adaptations of both the mobile and collector pattern, and help develop hypotheses explaining the transition from one to the other. Research into this area involves not only analysis of existing ethnographic material, but also a good understanding of local plant and animal ecology.

The contrasts between mobile/sedentary hunter-gatherers may also describe differences in social organization related to these different types of societies. Sedentism, intensification of resource use, and production of seasonal surpluses promote population aggregation and growth, and furnish essential pre-requisites for the development of social complexity (e.g., Brown 1985; Dumond 1972; Gould 1985; Price and Brown 1985). Studies of modern hunter-gatherers illustrate the contrasts in social complexity between mobile and sedentary groups, such as the contrast between immediate-return and delayed-return systems defined by Woodburn (1988). More sedentary societies tend to experience more rapid population growth, accumulate greater material wealth, and develop distinctions in wealth, power, and status. More mobile societies, however, have flexible social groups, social relations which include mechanisms for leveling accumulation of wealth, and generally minimize distinctions based on wealth, power, and status.

These contrasts pose hypotheses for further investigation in this region. Is the change in subsistence/settlement systems accompanied by a change in social organization? Do the collector societies, for example, manifest a greater degree of social hierarchy, wealth distinctions, or labor specialization than the mobile groups? If not, does this raise questions regarding the argument that sedentism fosters complexity? Investigation of these questions involves more than an analysis of the subsistence/settlement systems themselves. There has been some work regarding social complexity which is pertinent to the types of archaeological information available for this region. Hughes' (1990) source analysis of obsidian artifacts from the Gold Hill site, for example, delineates the relationship between social elites and the different sources of obsidian used at a site. This study suggests that obsidian for utilitarian tasks came from nearby "cheap" sources, whereas that used for wealth items came from far-away "expensive" sources. Such studies illustrate the potential of obsidian source studies for assisting the analysis of prehistoric social systems.

At present, however, there are no readily applicable models appropriate to the archaeological description of social complexity among the hunter-gatherers of this region. Such models, describing the nature of social complexity as well as the archaeological correlates, need to be developed. Use of the ethnographic record of this area, and of adjacent regions, should provide a starting place for this exercise. Once developed, such models can guide the description of prehistoric social systems in the region, and identify changes possible within them. Such investigations are important not only to the specific prehistory of this region, but to the study of culture change as a whole.

Analyzing Cultural Resource Management Studies

Cultural resource management (CRM) refers to those actions taken by federal agencies to implement the laws protecting cultural properties, including archaeological sites, which exist on federal lands or come under federal purview. In southwest Oregon, almost all of the archaeological work accomplished to date has been done as part of CRM programs. These efforts have resulted in a host of site-specific reports, and a handful of major studies which address basic cultural chronological questions. CRM data provide a rich body of material capable of addressing questions of significance beyond the immediate local concerns of typology and chronology.

The sites in this database were excavated because they occurred in areas where federal projects were taking place. As a consequence, they lack many of the characteristics favored by archaeologists, such as good preservation of material remains and undisturbed contexts. These sites exist mostly in open environments, where preservation is poor, and were frequently disturbed. Furthermore, the amount of excavation accomplished varies widely among sites, depending on project circumstances. As a result of these factors, assemblages are of widely differing sizes and consist primarily of stone artifacts. Integrating these diverse data in a productive fashion posed challenges to this study which were met in the following ways.

First, it was necessary to describe the characteristics of the three types of sites used in this analysis, and their archaeological manifestations. These efforts were based in part on information from ethnographic material, as well as on hunter-gatherer studies more generally. Next, it was necessary to define archaeological correlates of these types that would be workable given the very diverse data available, consisting mainly of artifact catalogs and feature data. In order to compare this data the archaeological correlates of the site types were described in part on the basis of general characteristics of site assemblages: artifact density and diversity. The site types, and the archaeological correlates, are summarized below and in Table 29.

Village: The village was the geographic locus of the social group; it was the place which focused the annual round and where people spent the longest periods of time. Larger winter villages were located along the most productive fish-bearing streams and smaller settlements along less productive streams, but all at comparatively low elevations. These were the most functionally complex of the three site types. Numerous activities were accomplished at villages, by people of every age and both sexes. Annual re-occupation made investment in substantial architecture--such as pithouses--worth the effort. The village's function as the focal point for storage made artifacts and facilities for storage necessary, such as baskets and pits. The variety of tasks at these sites, as well as their stable locations, also called for a variety of tools and implements, many of which were heavy and non-portable, or fragile. Middens and cemeteries are associated with such sites,

TABLE 29. Site Types and Archaeological Correlates

Site Type	Characteristics	Archaeological Correlates
Village	annual reoccupation; permanent storage of food and materials; wide range of tasks accomplished; diversity of inhabitants; long period of occupation; lowland elevation, associated with fish-bearing streams	high density, high diversity assemblages; storage facilities; habitation features (e.g., middens, cemeteries housepits)
Seasonal Camp	temporary sites; semi-specialized; sometimes annually re-occupied; smaller, heterogeneous groups; shorter-term occupation; near significant resource areas	moderately dense and diverse assemblages; some features, such as hearths
Task sites	temporary, short-term sites; specialized; homogeneous groups; diverse locations	low density, low diversity assemblages; features rare

as places of long-term accumulation of refuse and burial of the dead. Village sites produce diverse, unspecialized assemblages, a high density of artifacts, and habitation features.

Seasonal camps were temporary sites, occupied by family groups for a week or month, or perhaps longer. Seasonal camps usually had a particular focus, such as berrying, root gathering, or hunting, and were functionally more specialized than villages. Yet these were also places where families camped and engaged in normal everyday maintenance tasks; tools and materials left from these camps would also reflect this more generalized focus. These camps were therefore occupied by smaller, heterogeneous groups for shorter periods of time than the villages. They were frequently locations for collecting and processing resources for over-winter storage. The assemblages reflect a range of daily activities, but are more specialized than those for village sites; they are consequently less diverse--and more specialized--than assemblages from village sites. Site assemblages are not likely to be as dense as the annually re-occupied, more densely populated, and longer-term village sites.

Task sites result from focused and specialized activities accomplished by limited groups of people. Hunting/butchering sites, fishing stations, quarries, spiritual quests, and short-term encampments when travelling are examples of such sites. Such sites reflect a single purpose, accomplished by a specialized group of people, over a short period of time. Although the basic tool-kit might be represented at a site, the dominant task would generate an assemblage which was more specialized than that found at the other two types of sites. Site assemblages would be the least diverse, and probably the least dense[1], of the three types of sites.

Once types and archaeological correlates were defined, it was necessary to devise the means of analyzing and comparing sites. Sites were assigned to functional types based on an array of different tests, including qualitative descriptions and quantitative measures (see Table 30). These tests were done for Umpqua Basin and Rogue Basin samples separately. The qualitative information was derived from the original site report and

---

[1]It is possible that certain short-term, specialized tasks, such as quarrying, would produce a high density of materials. Such sites would appear as high density, low diversity sites in the archaeological record.

TABLE 30. Methods of Analysis Employed

Method	Data Used*
Qualitative Assessment	Full range of information available for a site, including artifact and feature data, ethnohistorical information, and site location.
Density Measures	
Density Measure 1	Projectile point and chipped stone tool densities, measured as number of items per cubic meter excavated.
Density Measure 2	Debitage and total tool densities, measured as number of items per cubic meter excavated.
Multidimensional Scaling (MDS): comparison of assemblage diversity	Percentage of artifacts in each typological class.
Groundstone Density/ Feature comparison	Density of groundstone per cubic meter compared to presence/absence of features.
Cobble tool Density/ Feature comparison	Density of other cobble tools (including battered cobbles) compared to presence/ absence of features.

*Artifact types from different assemblages were grouped into seven commonly recognized typological categories in order to perform these analyses: projectile point, biface, edge-modified flake, core, battered cobble, groundstone, other cobble tools.

included the original investigator's judgement of the site based on a range of factors, such as materials recovered, site location, and ethnohistoric references. The quantitative tests assessed differences in site function based on the relative density and diversity of site assemblages. Site assemblages for these tests were described in terms of seven broad classes of stone tools (projectile points, bifaces, edge-modified flakes, cores, battered cobbles, groundstone, and other cobble tools), and debitage. Finally, feature data were incorporated into two of the density tests, in order to anchor the density measures to outside criteria, and to provide a check on the results. These methods permitted this analyses to circumvent the problem associated with defining functional types based on the comparative diversity (richness and evenness) of archaeological samples of widely differing sizes. This "sample size" problem is discussed following the description of the methods used.

Density was measured as the number of items per cubic meter of soil excavated. Two different density tests were employed; both involved plotting one type of density against another type of density for each site, resulting in a scatterplot which visually represented the relationship among the sites in terms of the density of their site assemblages. In Density Measure 1, the density of projectile points was plotted against the density of other chipped stone tools for each site. In Density Measure 2, the density of all stone tools was plotted against the density of debitage. Three groups of sites, ranging from the least to the most dense, were distinguished based on apparent breaks in the array of sites in the scatterplot. Sites within these groups were assigned to a particular functional type based on their density relative to other sites in the sample: the most dense were assigned a "village" classification, the moderately dense assigned a "seasonal camp" designation, and the least dense a "task site" designation. There was considerable overlap among the two measures; that is, sites with a high density of projectile points and other chipped stone tools also had a high density of all stone tools and debitage.

The second quantitative technique compared sites based on the diversity of their assemblages. The diversity of an assemblage includes both the richness and evenness of the assemblage. Richness is defined as the number of artifact types present, and evenness is the uniformity with which artifacts are distributed within the various types. In this analysis, site assemblages were compared based on the proportions of artifact types within the artifact classes for each assemblage (i.e., percentage of projectile points, percentage of bifaces, and so forth). A multidimensional scaling (MDS) technique was employed to compare the site assemblages. This method produced a scatterplot in which those site assemblages most like one another clumped together, with sites which were similar to this central clump, but rather different from one another, in a ring about the central unit. Sites which were not similar to either of these groups were dispersed about the plot. Since village sites have the least specialized assemblages, they should resemble one another the most and group together in the center of the plot. Seasonal camps also have diverse assemblages, which are nonetheless more specialized than village sites. These sites should cluster around the village sites. Task sites, with the most specialized assemblages, would not resemble either the village or seasonal camps, and would be dispersed about the central group of sites.

In order to interpret the plot, those sites which were consistently identified as a certain type by the previous tests (qualitative and density measures) were noted on the scatterplot. The distribution of these sites conformed very closely with the pattern predicted. Sites with equivocal designations were assigned to a functional type based on their relationship to other sites in the MDS distribution.

The final quantitative measure combined density data plus feature data. Sites were arranged in order of both groundstone and cobble tool densities, and compared to the presence or absence of archaeological features. It was discovered that those sites with the highest densities of these heavy tools also had the highest incidence of features, especially habitation features such as housepits, middens, and burials. Again, sites were divided into three groups, based on the relative densities of these artifacts and the presence/absence of features.

Once all the various tests were accomplished, sites were assigned to a final functional type in order to complete the analysis of the subsistence/ settlement systems. This final assignment represents a summing up of the results; where there were differences among the various tests, the resulting functional designation took into account information from all available sources for the site. There was an astonishing degree of agreement among all the measures used (Table 31). For example, 50 percent of the sites from the

TABLE 31. Agreement Among Methods Employed

	Rogue Basin		Umpqua Basin		
Sites listed in same category with every measure employed	50%	86%	37%	58%	High Agreement
Sites listed in adjacent categories (task and seas. camp, or seas. camp and village)	36%		21%		
Sites listed in all three categories, or as task and village	14%		42%		

Rogue Basin were placed in the same functional category for every measure employed, as were 37 percent of the sites from the Umpqua Basin. The site classifications represent a sort of continuum of assemblage traits, with task sites more similar to seasonal camps than to villages, and seasonal camps similar to village sites. Hence, task sites and seasonal camps may be considered adjacent groups, as may seasonal camps and village sites. In these analyses, an additional 36 percent of the Rogue Basin sites, and 21 percent of the Umpqua Basin sites were placed in adjacent classes for all the measures used (e.g., a site would one time be designated a task site, and another time a seasonal camp). The remainder of the sites (14% for the Rogue Basin and 42% for the Umpqua) had results which were less consistent. These sites were placed in all three groups, or in the task site and village groups, based on the array of tests employed.

The assemblages used in this study came from different types of investigations, and were consequently of widely varying sizes. Comparison of such diverse assemblages can give rise to a problem known as the "sample size" problem. Larger samples statistically will contain larger numbers of artifact types, since there is a greater chance for rare types to occur. Hence, larger samples are likely to appear more diverse than smaller samples, and comparisons of site type based on artifact diversity will be skewed by sample size differences. In this study, this "sample size" problem was addressed in several ways.

One common measure of assemblage diversity has focused on quantitative measures of richness (the number of different artifact types present). This measure is prone to the sample size problem noted above, and therefore is difficult to use for samples of widely varying sizes. However, this measure may confound artifact density with richness, two characteristics of a site which often operate in the same direction in terms of site function. In this analysis, density was measured separately, as the number of artifacts per unit of material excavated. Site densities were compared separately from site diversity.

In addition to richness, the evenness (uniformity) of a site's assemblage is another common measure of assemblage diversity. This characteristic is often measured separately from assemblage richness, although the two characteristics are necessarily linked. That is, when these measures are expressed as proportions of a total assemblage the evenness of an assemblage is dependent in part on the richness of that assemblage. Hence, they are appropriately considered together. The comparison of assemblage diversity in this analysis was done using multidimensional scaling analysis. This analysis sorted sites in space based on their dissimilarities to one another. These similarities/differences included both richness and evenness, taken together. While this approach allows an investigator to utilize complex data and to compare sites, the interpretation of the resulting scatterplot is not as clear-cut as a numerical measure of richness or evenness. In this study, reference to outside data helped to interpret the scatterplot, then the scatterplot was used to classify sites.

The overall success of the methods employed in this study was due to several factors. First, comparisons of site density and diversity were possible because most of the sites are from similar depositional environments. Most are open-air sites in forested or semi-forested areas, and have been subjected to similar processes affecting both soil build-up and stratigraphic mixing. These similarities permitted the assumption that differences in density among assemblages represented cultural factors rather than depositional conditions. Those sites which were in different environments, such as in rockshelters where soil did not build up, or along river terraces where soils may have built up quickly, were not so easily compared to other sites on the basis of artifact density. Furthermore, strategies for excavation were similar at most sites. That is, excavators chose to concentrate excavation at the most productive part of the site available for investigation and used similar hand-tool methods of excavation. These methods permitted the assumption that the diversity represented in the assemblages was equally represented among the sites.

Second, the use of an array of different methods, including the qualitative as well as the quantitative, permitted the assessment of site function based on the fullest information available. Furthermore, the different tests served as a check upon one another, so that an anomalous result in one test could be compared to results from other tests. The methods used in this study are frankly experimental, but the results indicate that they may prove fruitful in other areas.

In the future, archaeological research in southwest Oregon--as elsewhere--will depend less upon the data available from any one site and increasingly on the relationships inherent among many sites. CRM programs promise to provide archaeologists with data for a long while, and should be a major part of research programs looking at inter-site relationships. In order for CRM work to fulfill its potential, however, future research in this region will require researchers to produce good descriptive site reports as the basis for more analytic, as well as synthetic, studies. Too often in this study sites were excluded from the full analysis because they lacked basic data. At the minimum, a good descriptive report should contain the following: (a) a detailed description of the site's setting; (b) a clear and accurate description of the field methods used, including the types of tools used (e.g., screen sizes), area and volume of soil excavated, and sampling rational; (c) detailed and specific descriptions of materials found, including the definitions used for artifact categories; (d) clearly presented results of any analyses undertaken, including stratigraphic analyses; and (e) the investigator's best judgement regarding the site's relationship to the region's prehistory.

Conclusion

This study demonstrates a change in aboriginal subsistence and settlement patterns during the last 6,000 years. Prior to about 3,000 years ago, all of the inhabitants of the Umpqua and Rogue valleys and the adjacent Western Cascades followed a mobile way of life. During most this time, encompassing most of the Middle Archaic, people lived in highly mobile small groups, moving themselves among various resources as part of the subsistence quest. About 3,000 years ago, along the Rogue River, a different adaptation began to appear. These later people lived in annually re-occupied, permanent villages, where necessary goods were collected and stored for winter use. Although inhabitants departed from these villages at certain times of the year, provisions were processed and returned to these home bases, which served as a geographic and social locus for the group. This collector pattern spread throughout the region during the Late Archaic, replacing the earlier mobile regime.

The cultural change demonstrated in this study leads to questions concerning the relationship of prehistoric groups to the natural environment within which they lived, and leads to questions concerning possible changes in social organization which may have accompanied changes in the subsistence and settlement systems. Future work in both these broad research domains can contribute to studies of human ecology and to studies concerning the evolution of complexity in human societies. Specifically, work in southwest Oregon archaeology will benefit from investigation of the following major areas:

1. Paleoenvironmental studies are needed to determine the nature of the past environments, and especially the timing of the transition from an earlier warm, dry period to the current cooler, moister regime;

2. Reconstruction of specific local environments associated with archaeological sites, with particular reference to significant resources present;

3. Analysis of aboriginal land use practices, including the use of fire in managing the resources available;

4. Development of models describing social structure, with concomitant archaeological correlates, applicable to the societies of this region at the time of historic contact, as well as for those different groups postulated for an earlier period;

5. Chronological studies producing temporal data which is comparable among sites, such as obsidian hydration studies for each of the two drainage basins (Rogue and Umpqua).

This study was based primarily on data gathered during cultural resource management studies in support of federal projects on federal lands. Despite the biases inherent in such a database, this study developed methods for integrating these data in a fruitful fashion. These methods should prove useful to further investigation in this or similar areas, and will benefit from the scrutiny of other investigators.

BIBLIOGRAPHY

Aikens, C. Melvin
1986 Affluent Collectors at the Edges of Eurasia and North America: Some Comparisons and Observations on the Evolution of Society among North-Temperate Coastal Hunter-Gatherers. In, Prehistoric Hunter-Gatherers in Japan, edited by Takeru Akazawa and C. Melvin Aikens, pp. 3-26. University of Tokyo Press, Tokyo.

1993 Archaeology of Oregon. U.S. Department of Interior, Bureau of Land Management, Portland, Oregon.

Aldenderfer, Mark and Roger Blashfield
1984 Cluster Analysis. Sage Publications, Beverly Hills, California.

Ames, Kenneth M.
1985 Hierarchies, Stress, and Logistical Strategies among Hunter-Gatherers in Northwestern North America. In, Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity, edited by T. Douglas Price and James Brown, pp. 155-180. Academic Press, New York.

Baker, Richard G.
1983 Holocene Vegetational History of the Western United States. In, Late Quaternary Environments of the United States, Vol 2, edited by H. E. Wright, Jr., pp. 109-127. University of Minnesota Press, Minneapolis.

Barnard, Alan
1983 Contemporary Hunter-Gatherers: Current Theoretical Issues in Ecology and Social Organization. Annual Review of Anthropology 12:193-214.

Baxter, Paul W.
1987 Archaeological Testing at Limpy Rock Shelter: An Upland Hunting Camp in the North Umpqua Valley. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1988 Archaeological Testing at Coffee Creek Bridge, Douglas County, Oregon. Report prepared for the U.S. Department of Transportation, by Heritage Research Associates, Eugene, Oregon.

Baxter, Paul and Rick Minor
1987 US Sprint Fiber Optic Cable Project, Oroville, California to Eugene, Oregon. Archaeological Testing of Seven Sites in Oregon: 35JA184; 35JA185; 35DO36; 35DO37; 35DO390; 35DO391; 35DO396. Report prepared for US Sprint, under contract to Dames and Moore, Heritage Research Associates Report No. 63, Eugene, OR.

Beckham, Stephen Dow
1971 Requiem for a People. University of Oklahoma, Norman, Oklahoma.

1983a Resource Utilization Study. Exhibit A to Cow Creek Band of Umpqua Tribe Indians: Occupation and Use of Territory in Southwestern Oregon. Docket 53-81L, Cow Creek Band of Umpqua Tribe Indians v. United States, U.S. Claims Court, Washington D.C.

1983b Cow Creek Band of Umpqua Tribe of Indians: Occupation and Use of Territory in Southwestern Oregon. Docket No.53-81L, U.S. Claims Court, Washington, D.C.

1986 Land of the Umpqua: A History of Douglas County, Oregon. Douglas County Commissioners, Douglas County, Oregon.

Beckham, Stephen D. and Rick Minor
1992 Cultural Resources Overview of the Umpqua National Forest, Southwestern Oregon. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Beckham, Stephen D., Rick Minor, and Kathryn Toepel
1981 Cultural Resource Overview of the Eugene BLM District, West-Central Oregon. Report prepared for the Eugene District, Bureau of Land Management, Eugene, Oregon.

Bender, Barbara
1978 Gatherer-Hunter to Farmer: A Social Perspective. World Archaeology 10(2):204-222.

Bettinger, Robert L.
1987 Archaeological Approaches to Hunter-Gatherers. Annual Review of Anthropology 16:121-42.

Bettinger, Robert L. and Martin A. Baumhoff
1982 The Numic Spread: Great Basin Cultures in Competition. American Antiquity 47(1):485-503.

Berryman, Judy
1987a Archaeological Site Evaluation of 35DO265, the Apple Creek Site. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1987b Archaeological Evaluation of the Little Oak Flat Site. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Binford, Lewis
1980 Willow Smoke and Dogs' Tails: Hunter Gatherer Settlement Systems and Archaeological Site Formation. American Antiquity 45(1):4-20.

Boag, Peter
1992 Environment and Experience: Settlement Culture in Nineteenth-Century Oregon. University of California Press, Berkeley, CA.

Borgatti, Stephen
1990 ANTHROPAC Version 3.02. Available from Department of Sociology, University of South Carolina, Columbia, South Carolina 29208.

Brauner, David
1983 The Reevaluation of Cultural Resources within the Applegate Lake Project Area, Jackson County, Oregon. Phase III: Data Recovery at Site 35JA42. Report prepared for the U.S. Army Corps of Engineers, Portland District, Oregon.

Brauner, David and William Honey
1977 Cultural Resource Evaluation of the Steamboat Creek Drainage, Douglas County, Oregon. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Brauner, David and Lynne McDonald
1981 The Reevaluation of Cultural Resources within the Applegate Lake Project Area, Jackson County, Oregon. Phase III: Archaeological Sampling of Sites 35JA47 and 35JA49. Report prepared for the U.S. Army Corps of Engineers, Portland District, Oregon.

Brown, James A.
1985 Long-Term Trends to Sedentism and the Emergence of Complexity in the American Midwest. In, Prehistoric Hunter-Gatherers, edited by T. Douglas Price and James Brown, pp 201-231. Academic Press, New York.

Budy, Elizabeth, and Robert Elston
1986 Data Recovery at Sites 35JA102 and 35JA107, Elk Creek Lake Project, Jackson County, Oregon. Report prepared for the U.S. Army Corps of Engineers, Portland District, Portland, Oregon.

Burtchard, Greg C.
1990 The Posy Archaeological Project: Upland Use of the Central Cascades, Mt. Hood National Forest, Oregon. Report prepared for the Mt. Hood National Forest, Gresham, Oregon.

Burtchard, Greg C. and Robert W. Keeler
1991 Mt. Hood Cultural Resource Reevaluation Project. Report prepared for the Mt. Hood National Forest, Gresham, Oregon.

Carlson, Vance
1986 Some Explanations for Settlement Patterns and Contact Period Evidence in the Western Cascades. Paper prepared for the Association of Oregon Archaeologists Meeting, Eugene, Oregon.

Chatters, James C.
1982 Prehistoric Settlement and Land Use in the Dry Columbia Basin. Northwest Anthropological Research Notes 16(2):125-147.

Chatters, J. C., D. A. Neitzel, M. J. Scott, and S. A. Shankle
1991 Potential Impacts of Global Climate Change on Pacific Northwest Spring Chinook Salmon (Oncorhynchus tshawytscha): An Exploratory Case Study. The Northwest Environmental Journal 7:71-92.

Cheatham, Richard Darrington
1987 Late Archaic Settlement Pattern in the Long Tom Sub-Basin, Upper Willamette Valley, Oregon. Unpublished Ph.D Dissertation, Department of Anthropology, University of Oregon, Eugene.

Churchill, Thomas
1986 Archaeological Investigations of the Reynolds Site (35-DO-372). Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Churchill, Thomas and Paul Christy Jenkins
1985 Testing and Evaluation of the Glide Station Site, 35DO58. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1989 Archaeological Investigations of the Dry Creek Site. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Clark, Linda
1988 A Study of Temporal Variation in the Scrapers from the Marial Site (35CU84). Report prepared for the Bureau of Land Management, Medford District, Medford, Oregon.

Connolly, Thomas
1981 Preliminary Testing of Archaeological Sites Along PP&L's Proposed Eugene-Medford 500 KV Transmission Corridor: 35DO199 and 35DO61. Report prepared by the Department of Anthropology, University of Oregon, Eugene.

1982 Preliminary Testing of Archaeological Sites along PP&L's Proposed Eugene-Medford 500 KV Transmission Corridor: 35DO199 and 35DO61. Oregon State Museum of Anthropology, Eugene, Oregon.

1986 Cultural Stability and Change in the Prehistory of Southwest Oregon and Northern California. Unpublished Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene.

1988 Archaeological Evaluation of Sites Along the Crater Lake Highway, Jackson County: Trail to Casey State Park Section. Oregon State Museum of Anthropology Report 88-4, University of Oregon, Eugene.

1990 Letter Report. On file, Winthrop Associates, Ashland, Oregon.

Cowgill, George
1989 The Concept of Diversity in Archaeological Theory. In, Quantifying Diversity in Archaeology. Edited by R. Leonard and G. Jones. Cambridge University Press: New York.

Cressman, Luther S.
1933a Aboriginal Burials in Southwestern Oregon. American Anthropologist 35:116-130.

1933b Contributions to the Archaeology of Oregon: Final Report on the Gold Hill Burial Site. University of Oregon Publications 1(1):5-24.

Davis, Wilber
1970 Lost Creek Archaeology, 1968: Final Report. Department of Anthropology, Oregon State University, Eugene.

1974 Lost Creek Archaeology, 1972: Final Report. Department of Anthropology, Oregon State University, Eugene.

1983 1973 Lost Creek Archaeology, Jackson County Oregon, Contract CX 8099-2-0016, and 1974 Elk Creek Archaeology, Jackson County Oregon, Contract CS 8099-2-0017; Final Reports. Submitted to the Interagency Archaeological Services Division, Western Region, National Park Service. Department of Anthropology, Oregon State University, Corvallis.

Deich, Lyman P.
1982 A Report on the Excavation and Deposition of Three Aboriginal Burials at the Marthaller Site, 35JO16. Report on file, Bureau of Land Management, Medford, Oregon.

Detling, LeRoy
1961 The Chaparral Formation of Southwestern Oregon, with Considerations of its Postglacial History. Ecology 42(2):348-357.

Dixon, Roland B.
1907 The Shasta. Bulletin of the American Museum of Natural History 17(5):381-498.

Donald, Leland
1984 The Slave Trade on the Northwest Coast of North American. Research in Economic Anthropology 6:121-158.

Doran, J. E. and F. R. Hodson
1975 Mathematics and Computers in Archaeology. Harvard University Press, Cambridge, Massachusetts.

Dorsey, J. Owen
1890 The Gentile System of the Siletz Tribes. Journal of American Folklore 3:227-237.

Drucker, Philip
1937 The Tolowa and Their Southwest Oregon Kin. University of California Publications in American Archaeology and Ethnology 36(4):221-300.

Dumond, Don E.
1972 Population Growth and Political Centralization. In, Population Growth: Anthropological Implications, edited by Brian Spooner, pp. 286-310. Massachusetts Institute of Technology Press, Cambridge.

Dunnell, Robert
1989 Diversity in Archaeology: A Group of Measures in Search of Application? In, Quantifying Diversity in Archaeology, edited by R. Leonard and G. Jones, pp. 142-149. Cambridge University Press, New York.

Feinman, Gary, Linda Nicholas and William Middleton
1992 Archaeology in 1992: A Perspective on the Discipline from the Society for American Archaeology Annual Meeting Program. American Antiquity 57(3):448-458.

FEMAT (Forest Ecosystem Management Assessment Team)
1993 Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. USDA Forest Service, USDI Fish and Wildlife Service, Bureau of Land Management, and Park Service, US Department of Commerce, National Oceanic and Atmoshperic Administration, National Marine Fisheries Service, Environmental Protection Agency. Portland, Oregon.

Fladmark, Knut R., Kenneth M. Ames, and Patricia D. Sutherland
1990 Prehistory of the Northern Coast of British Columbia. In, Handbook of North American Indians, Vol 7, Northwest Coast, edited by Wayne Suttles, pp. 229-239. Smithsonian Institution, Washington D.C.

Flanagan, James G.
1989 Hierarchy in Simple Egalitarian Societies. Annual Reviews of Anthropology 18:245-266.

Franklin, Jerry and C. T. Dyrness
1988 Natural Vegetation of Oregon and Washington. Oregon State University Press, Corvallis.

Franklin, Jerry, Frederick Swanson, Mark Harmon, David Perry, Thomas Spies, Virginia Dale, Arthur McKee, William Ferrell, Joseph Means, Stanley Gregory, John Lattin, Timothy Schowalter, and David Larsen
1991 Effects of Global Climatic Change on Forests in Northwestern North America. The Northwestern Environmental Journal 7:233-254.

Gardner, James V., Linda E. Heusser, Paula L. Quinterno, Sean M. Stone, John A. Barron, and Richard Z. Poore
1988 Clear Lake Record vs. the adjacent marine record; A correlation of their past 20,000 years of paleoclimatic and paleoceanographic responses. In, Late Quaternary Climate, Tectonism, and Sedimentation in Clear Lake, Northern California Coast Ranges, edited by John D. Sims, pp. 171-182. Geological Society of America, Special Paper 214, Boulder, Colorado.

Gould, Richard
1985 "Now Let's Invent Agriculture...": A Critical Review of Concepts of Complexity among Hunter-Gatherers. In, Prehistoric Hunter-Gatherers, edited by T. Douglas Price and James Brown, pp. 427-434. Academic Press, New York.

Gray, Dennis J.
1987 The Takelma and Their Athapascan Neighbors. University of Oregon Anthropological Papers, 37. Department of Anthropology, University of Oregon, Eugene.

Grayson, Donald
1989 Sample Size and Relative Abundance in Archaeological Analysis: Illustrations from Spiral Fractures and Seriation. In, Quantifying Diversity in Archaeology, edited by R. Leonard and G. Jones, pp. 79-84. Cambridge University Press, Cambridge.

Griffin, Dennis
1983 Archaeological Investigation at the Marial Site: Rogue River Ranch; 35CU84. Report on file, Department of Anthropology, Oregon State University, Corvallis, Oregon. Report prepared for the Bureau of Land Management, Medford District, Medford, Oregon.

Hanes, Richard C.
1993 Preface. In, Archaeology of Oregon, by C. Melvin Aikens, pp. iii-iv. U.S. Department of the Interior, Bureau of Land Management, Portland, Oregon.

Hannon, Nan
1992 Hand to Mouth: Plant Food Resources and Prehistoric People in Southwest Oregon's Bear Creek Valley. Unpublished M.A.thesis, Department of Sociology/Anthropology, Southern Oregon State College, Ashland, Oregon.

Heizer, Robert F. and Thomas R. Hester
1970 Shasta Villages and Territory. Contributions of the University of California Archaeological Research Facility 9:119-158. University of California, Berkeley.

Heusser, Calvin
1985 Quaternary Pollen Records from the Pacific Northwest Coast: Aleutians to the Oregon-California Boundary. In, Pollen Records of Late Quaternary North American Sediments, edited by Vaughn M. Bryant, Jr., and Richard Holloway, pp. 141-165. American Association of Statigraphic Palynologists Foundation, Dallas, Texax.

Hewes, Gordon
1947 Aboriginal Use of Fishery Resources in Northwestern North America. Unpublished Ph.D. dissertation, University of California.

1973 Indian Fisheries Productivity in Pre-Contact Times in the Pacific Salmon Area. Northwest Anthropological Research Notes 7(2):133-155.

Hietala, Harold J.
1984 Intrasite Spatial Analysis: A Brief Overview. In, Intrasite Spatial Analysis in Archaeology. Edited by Harold Hietala, pp. 1-3. Cambridge University Press, Cambridge.

Hodder, Ian and Clive Orton
1976 Spatial Analysis in Archaeology. University of Cambridge Press, Cambridge.

Holt, Catharine
1946 Shasta Ethnography. University of California Anthropological Records 3(4):299-349.

Hughes, Richard
1990 The Gold Hill Site: Evidence of a Prehistoric Socio-Ceremonial System in Southwestern Oregon. In, Living With the Land: The Indians of Southwest Oregon, edited by Nan Hannon and Richard Olmo, pp. 48-55. Southern Oregon Historical Society, Medford, Oregon.

Hunn, Eugene S.
1982 Mobility as a Factor Limiting Resource Use in the Columbia Plateau of North America. In, Resource Managers: North American and Australian Hunter-Gatherers, edited by Nancy M. Williams and Eugene S. Hunn, pp. 17-43. Westview Press, Boulder, Colorado.

1990 Nch'i-Wana, "The Big River", Mid-Columbian Indians and Their Land. University of Washington Press, Seattle.

Jenkins, Paul Christy
1988 Archaeological Investigations of the Snuff Out Site 35DO379. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Jenkins, Paul Christy and Ron King
1988 Archaeological Testing of the Snowbird Site. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Johnson, Dale
1993 Personal communication; fisheries biologist, Medford District Bureau of Land Management.

Jones, George T.
1984 Prehistoric Land Use in the Steens Mountain Area, Southeastern Oregon. Ph.D. Dissertation, University of Washington. University Microfilms International, Ann Arbor.

Jones, George T., Charlotte Beck and Donald Grayson
1989 Measures of Diversity and Expedient Lithic Technologies. In, Quantifying Diversity in Archaeology, edited by R. Leonard and G. Jones, pp. 69-78. Cambridge University Press, New York.

Jones, George T. and R. Leonard
1989 Quantifying Diversity in Archaeology. Cambridge University Press, New York.

Kachigan, Sam Kash
1986 Statistical Analysis: An Interdisciplinary Introduction to Univariate and Multivariate Methods. Radius Press, New York.

Kaczynski, V. W. and J. F. Palmisano
1993 Oregon's Wild Salmon and Steelhead Trout: A Review of the Impact of Management and Environmental Factors. Report prepared for Oregon Forest Industries Council, Salem, Oregon.

Katzer, Keith
1986 Geomorphic History of Elk Creek. In, Data Recovery at Sites 35JA102 and 35JA107, Elk Creek Lake Project, Jackson County, Oregon, edited by Elizabeth Budy and Robert Elston. Report prepared for the Army Corps of Engineers, Portland, Oregon.

Kelly, Robert L.
1992 Mobility/Sedentism: Concepts, Archaeological Measures, and Effects. Annual Review of Anthropology 21:43-66.

Kendall, Daythal L.
1990 Takelma. Handbook of North American Indians, Vol 7, Northwest Coast, pp. 589-592. Smithsonian Institution, Washington D.C.

Keyser, James and Vance Carlson
1987 Archaeological Testing at Hughes I Rockshelter. In, Archaeology of the South Umpqua Falls Rockshelters, Douglas County Oregon, by Rick Minor. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

King, Thomas F.
1978 Don't That Beat the Band? Nonegalitarian Political Organization in Prehistoric Central California. In, Social Archeology: Beyond Subsistence and Dating, edited by Charles. L. Redman. Academic Press, New York.

LaLande, Jeffrey
1983 An Inventory and Evaluation Report on Site 35JA133 (RR-443), Jackson County, Oregon. Report on file, Rogue River National Forest, Medford, Oregon.

1987 Archaeological Inventory and Evaluation Report: Site 35JA191. Report prepared by the Rogue River National Forest, Medford, Oregon.

1989 The Indians of Southwestern Oregon: An Ethnohistorical Review. Paper prepared for the Symposium: "Living with the Land: The Indians of Southwest Oregon", Southern Oregon State College, sponsored by Southern Oregon Historical Society, Medford, Oregon.

1990 The Indians of Southwestern Oregon: An Ethnohistorical Review. In, Living with the Land, edited by Nan Hannon and Rich Olmo, pp. 95-119. Southern Oregon Historical Society, Medford, Oregon.

Lebow, Clayton G., Richard M. Pettigrew, Jon M. Silvermoon, David H. Chance, Robert Boyd, Yvonne Hajda, and Henry Zenk
1990 A Cultural Resource Overview for the 1990's, BLM Prineville District, Oregon. U.S. Department of the Interior, Bureau of Land Management, Portland, Oregon.

Lee, Richard B.
1968 What Hunters Do for a Living, or, How to Make Out on Scarce Resources. In, Man the Hunter, edited by R. B. Lee and I. DeVore, pp. 30-48. Aldine, Chicago.

1992 Art, Science, or Politics: The Crisis in Hunter-Gatherer Studies. American Anthropologist 94(1)31-54.

Leonard, Robert and George T. Jones, editors
1989 Quantifying Diversity in Archaeology. Cambridge University Press, New York.

Lewis, Henry
1990 Reconstructing Patterns of Indian Burning in Southwestern Oregon. In Living With the Land, edited by Nan Hannon and Richard Olmo, pp. 80-84. Southern Oregon Historical Society, Medford, Oregon.

Loomis, Dave
1993 Personal communication; fisheries biologist, Oregon Department of Fish and Wildlife.

Lyman, Lee, ed.
1985 Archaeological and Geoarchaeological Investigations at the Sylmon Valley School Site (35DO275), Southwestern Oregon. Department of Anthropology, Oregon State University. Prepared for Roseburg Sanitary Authority, Roseburg, Oregon.

Lyman, Lee
1991 Prehistory of the Oregon Coast: The Effects of Excavation Strategies and Assemblage Size on Archaeological Inquiry. Academic Press, New York.

Mace, Robert and Harold Smith
1970 Oregon's Big Game Resources. Wildlife Bulletin No. 2., Oregon State Game Commission, Portland.

Mack, Joanne
1989 Siskiyou Utility Ware: A Possible Horizon Marker of the Late Prehistoric of the Southern Cascades of California and Oregon. Paper presented at the Northwest Anthropological Conference.

Mackey, Harold
1972 New Light on the Molalla Indians. Oregon Historical Quarterly 73:63-75.

Mairs, John
1989 Site Geomorphology. In, Bogus Creek Data Recovery Project (35DO278), by Kathryn Winthrop. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1993 Environment. In, Cultural Resource Overview of Crater Lake National Park, DRAFT, by Robert and Kathryn Winthrop. Report prepared for the National Park Service, Seattle, Washington.

Martinez, Dennis
1993 Managing a Precarious Balance. Winds of Change, Summer, pp. 23-28.

Mierendorf, Robert
1986 People of the North Cascades. Report prepared for the National Park Service, Pacific Northwest Region, Seattle, Washington.

Miller, Jay and William R. Seaburg
1990 Athapaskans of Southwestern Oregon. In, Handbook of North American Indians, Vol 7, Northwest Coast, edited by Wayne Suttles, pp. 580-588. Smithsonian Institution, Washington D.C.

Minor, Rick

1976 Archaeological Evaluation of Sites 35DO11 and 35DO12, in the Proposed Lower Rhody Timber Sale Area, Umpqua National Forest, Oregon, with an Appendix on Lichenometric Dating at Site 35DO11, by Larry Pike. Report prepared for Umpqua National Forest, Roseburg, Oregon.

1987 Archaeology of the South Umpqua Falls Rockshelters, Douglas County, Oregon. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Minor, Rick and Thomas Connolly

1987 Archaeological Testing at Times Square Rockshelter, Douglas County, Oregon. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Musil, Robert

1992 Testing and Evaluation of the Susan Creek Campground Site, Douglas County, Oregon. Report prepared for the Bureau of Land Management, Roseburg, Oregon.

Musil, Robert and Rick Minor

1989 Archaeological Data Recovery Investigations at Coffee Creek Bridge, Douglas County. Report prepared for OBEC Consulting Engineers, Eugene, OR, by Heritage Research Associates, Report #86, Eugene, Oregon.

Neitzel, D. A. and M. J. Scott, S. A. Shankle, and J. C. Chatters

1991 The Effect of Climate Change on Stream Environments: The Salmonid Resource of the Columbia River Basin. The Northwest Environmental Journal 7:271-293.

Netboy, Anthony

1973 The Salmon: Their Fight for Survival. Houghton Mifflin, Boston.

Nilsson, Elena and Michael Kelly

1991 Prehistory of the Upper Rogue River Region: Archaeological Inventory and Evaluation within the Elk Creek Lake and Lost Creek Lake Project Areas, Jackson County, Southwest Oregon. Report prepared for the U.S. Army Corps of Engineers, Portland District.

O'Neill, Brian

1988a Archaeological Evaluation of the Shivigny East Site (35-DO-397): A Ridge Crest Hunting Camp in the Upper Umpqua Basin, Douglas County, Oregon. Report prepared for the Bureau of Land Management, Roseburg District, Oregon.

1988b Archaeological Evaluation of the Narrows Site (35DO153): A Middle and Late Archaic Fishery in the Middle Umpqua Basin, Douglas County, Oregon. Report on file, Bureau of Land Management, Roseburg District, Roseburg, Oregon.

1988c Archaeological Evaluation of the Powerline Site (35DO398): A Chipping Station in the Upper Umpqua Basin Douglas County, Oregon. Bureau of Land Management, Roseburg District, Roseburg, Oregon.

1989a Archaeological Investigations at the Winchester Bridge Site (35DO67) Douglas County, Oregon. Oregon State Museum of Anthropology Report 89-5, University of Oregon, Eugene.

1989b A Cultural Chronology of the Umpqua Basin, Southwest Oregon. Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene, Oregon.

1989c Archaeological Investigations at the Narrows and Martin Creek Sites, Douglas County, Oregon. Cultural Resource Series No. 4. USDI, Bureau of Land Management, Portland, Oregon.

1990 Archaeological Evaluation of the Swiftwater Site (35DO359), Douglas County, Oregon. Report prepared for the Bureau of Land Management, Roseburg, Oregon.

1991a Evaluation of Six Archaeological Sites Along the North Umpqua Highway, Douglas County: Steamboat Creek to Boulder Flat Section. Report prepared by Oregon State Museum of Anthropology, University of Oregon, Eugene.

1991b Data Recovery Excavations at the Section Creek Site (35DO219), Douglas County, Oregon. Report prepared by the Oregon State Museum of Anthropology, Eugene, Oregon.

1992 Pre-Mazama Occupation of the Dry Creek Site (35DO401) Southwest Oregon. Paper on file at the Oregon State Museum of Anthropology, University of Oregon, Eugene, Oregon.

Ottis, Nancy and Terry West
1984 Archaeologic Testing of the Gatchel Site (35DO252). Rogue Valley Archaeological Society, Grants Pass, Oregon.

Pettigrew, Richard and Clayton G. Lebow
1987 Data Recovery at Sites 35JA27, 35JA59, and 35JA100, Elk Creek Lake Project, Jackson County, Oregon. Report by Infotec Research Incorporated, Eugene, Oregon, prepared for the Army Corps of Engineers, Portland District, Portland, Oregon.

1989 Cultural Chronology in Southwestern Oregon. Paper presented at the annual State of Jefferson Conference, Grants Pass, Oregon.

Plog, Stephen and Michelle Hegmon
1993 The Sample Size-Richness Relation: The Relevance of Research Questions, Sampling Strategies, and Behavioral Variation. American Antiquity 58(3):489-496.

Price, T. Douglas and James A. Brown
1985 Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity. Academic Press, New York.

Prouty, Guy
1988 Ancient Earth Ovens at the Saltsgaver Site, Southwestern Oregon. MS on file at the Oregon State Museum of Anthropology, Eugene, Oregon.

Rappaport, Roy
1979 Ecology, Adaptation, and the Ills of Functionalism. In, Ecology, Meaning, and Religion, by Roy Rappaport, pp. 43-95. North Atlantic Books, Richmond, California.

Rigsby, Bruce
n.d. The Molala Draft entry, Handbook of North American Indians, Vol. 12, Plateau, in press. MS on file, Winthrop Associates, Ashland, Oregon.

1966 On Cayuse-Molala Relatability. International Journal of American Linguistics 32:369-378.

1969 The Waiilatpuan Problem: More on Cayuse-Molala Relatability. Northwest Anthropological Research Notes 3:68-146.

Sapir, Edward
1907 Notes on the Takelma Indians of Southwestern Oregon. American Anthropologist 9:251-75.

1909 Takelma Texts. Anthropological Publications of the University Museum 2(1)3-197. University of Pennsylvania, Philadelphia.

1910 Takelma. Bulletin 30. Bureau of American Ethnology, Washington D.C.

Satler, Timothy
n.d. A preliminary report on excavations at 35JA77 (Salt Creek Site). Report prepared for the Bureau of Land Management, Medford District, Medford, Oregon.

Schreindorfer, Crystal
1985 Marial: 1984 Archaeological Investigations at 35CU84. Oregon State University, Corvallis, Oregon. Report prepared for the Bureau of Land Management, Medford District, Medford, Oregon.

Sea, Debra
n.d. Holocene Vegetation History of Gold Lake Bog and Indian Prairie Fen, Western Cascades. Abstract, Department of Geography, University of Oregon, Eugene.

Silver, Shirley
1978 Shastan Peoples. In, Handbook of the North American Indians, Vol 8, California, edited by Robert F. Heizer, pp. 211-224. Smithsonian Institution, Washington D.C.

Simmons, Alexy, and Michael Gallagher
1985 Archaeological Evaluation of the Orchard Site 35DO274 and the Sylmon Valley School Site 35DO275. Report Prepared for CH2M Hill; on file at the Umpqua National Forest, Roseburg, Oregon.

Smith, Bruce and Eric A. Winterhalder
1981 Hunter-Gatherer Foraging Strategies, Ethnographic and Archeological Analyses. University of Chicago Press, Chicago.

Snyder, Sandra
1978 Archaeological Testing and Evaluation of Tiller #6. Report prepared by the Department of Anthropology, Oregon State University, Corvallis, Oregon, for the Umpqua National Forest, Roseburg, Oregon.

1979 An Archaeological Investigation of Tiller Northside #1, Douglas County, Oregon. Report prepared by the Department of Anthropology, Oregon State University, Corvallis, Oregon, for the Umpqua National Forest, Roseburg, Oregon.

1981a Muddy Timber Sale. Report Prepared for the Umpqua National Forest, Roseburg, Oregon.

1981b Medicine Creek. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1981c Medicine Creek: Pre- and Post-Mazama Occupation in the Cascades. Tebiwa 23.

1987 Prehistoric Land Use Patterns in the Central Oregon Cascade Range. Ph.D. Dissertation, Department of Anthropology, University of Oregon, Eugene, Oregon.

Snyder, Sandra and William Honey
1979 Cultural Resource Evaluation of Three Recreational Area Sites. Report prepared for the Bureau of Land Management, Roseburg, Oregon.

Spencer, Lee
1991 Pacific Salmon and Environmental Change in the Rogue Basin. Report prepared for the Swedenburg Cultural Resource Center, Ashland, Oregon.

Spier, Leslie
1927 Tribal Distribution in Southwestern Oregon. Oregon Historical Quarterly 28:358-365.

Steele, Harvey
1984 The Marthaller Site. Oregon Archaeological Society Report No. 9. Report on file at the Bureau of Land Management, Medford, Oregon.

Steward, Julian H.
1938 Basin-Plateau Aboriginal Sociopolitical Groups. Bulletin 120, Smithsonian Institution, Bureau of American Ethnology, Washington D.C.

Sullivan, Alan P. III
1992 Investigation and the Archaeological Consequences of Short-Duration Occupations. American Antiquity 57(1)99-115.

Suttles, Wayne
1990 Introduction. In, Handbook of North American Indians, Vol 7, Northwest Coast, edited by Wayne Suttles, pp. 1-15. Smithsonian Institution, Washington D.C.

Thomas, David Hurst
1989 Diversity in Hunter-Gatherer Cultural Geography. In, Quantifying Diversity in Archaeology, edited by R. Leonard and G. Jones, pp. 85-92. Cambridge University Press, New York.

Thompson, Robert S., Cathy Whitlock, Patrick J. Bartlein, Sandy P. Harrison, and W. Geoffrey Spaulding
1993 Climatic Changes in the Western United States since 18,000 yr B.P. In, Global Climates since the Last Glacial Maximum, edited by H. E. Wright, Jr., J. E. Kutzbach, T. Webb III, W. F. Ruddiman, F. A. Street-Perrott and P. J. Bartlein, pp 473-517. University of Minnesota Press, Minneapolis.

Todt, Don
1990 Clues to Past Environments: Relict and Disjunct Plant Distributions Along the California-Oregon Border. In, Living With the Land, edited by Nan Hannon and Richard Olmo, pp. 71-79. Southern Oregon Historical Society, Medford, Oregon.

Trigger, Bruce G.
1968 The Determinants of Settlement Patterns. In Settlement Archaeology, edited by K. C. Chang, pp. 53-78. National Press Books, Palo Alto, California.

Voght, Evon and Richard M. Leventhal
1983 Introduction. In, Prehistoric Settlement Patterns: Essays in Honor of Gordon R. Willey. Edited by Evon Voght and Richard Leventhal. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Massachusetts.

Watanabe, Hitoshi
1992 The Northern Pacific Maritime Culture Zone: A Viewpoint on Hunter-Gatherer Mobility and Sedentism. In, Pacific Northeast Asia in Prehistory: Hunter-Fisher-Gatherers, Farmers, and Sociopolitical Elites, edited by C. Melvin Aikens and Song Nai Rhee, pp. 105-109. Washington State University Press, Pullman, Washington.

Whitlock, Cathy
1992 Vegetational and Climatic History of the Pacific Northwest during the Last 20,000 Years: Implications for Understanding Present-day Biodiversity. The Northwest Environmental Journal 8:5-28.

Willey, Gordon R.
1974 The Viru Valley Settlement Pattern Study. In Archaeological Researches in Retrospect. Edited by Gordon R. Willey, Winthrop Publishers, Cambridge, Mass.

Wilmsen, Edwin N. and James R. Denbow
1990 Paradigmatic History of San-speaking Peoples and Current Attempts at Revision. Current Anthropology 31(5)489-524.

Wilson, Bart McLean
1979 Salvage Archaeology of the Ritsch Site, 35JO4: A Late Prehistoric Village Site on the Central Rogue River, Oregon. Master's Thesis, Oregon State University, Corvallis, Oregon

Winthrop, Kathryn
1986 Bogus Creek Site: 35-DO-278: Testing and Evaluation Report. Report Prepared for the Umpqua National Forest, Roseburg, Oregon.

1989 Bogus Creek Data Recovery Project (35-DO-278). Report prepared for the Umpqua National Forest, Roseburg, Oregon.

Winthrop, Kathryn and Dennis Gray

1987 Testing and Evaluation of Two Sites on Oak Flats: 35-DO-187 and 35-DO-227. Report prepared for the Umpqua National Forest, Roseburg, Oregon.

1991 Data Recovery Excavations at Site 35JA197, Butte Falls Ranger District, Rogue River National Forest. Report prepared for the Rogue River National Forest, Medford, Oregon.

Winthrop, Robert

1989 Models and Ethnography. In, Multidisciplinary Assessment: Site 35KL680, by Kathryn and Robert Winthrop. Draft report prepared for the Winema National Forest, Klamath Falls, Oregon

1991 Dictionary of Concepts in Cultural Anthropology. Greenwood Press, New York.

1992 Ethnology of the Southern Oregon Cascades. In, Cultural Resource Overview, Crater Lake National Park, by Kathryn and Robert Winthrop. Draft. Report prepared for the National Park Service, Seattle, Washington.

1993 Ethnographic Assessment of the Crispen Ranch Site. Report prepared for the Oregon State Museum of Anthropology, Eugene, Oregon.

Winthrop, Robert and Kathryn Winthrop

1989 Multidisciplinary Approaches to a Lithic Scatter: Site 35KL680. Draft report prepared for the Winema National Forest, Klamath Falls, Oregon.

1992 Crater Lake Park Ethnographic and Prehistoric Overview, Draft. Prepared for the Crater Lake National Park, National Park Service, Seattle, Washington.

Woodburn, James

1988 African hunter-gatherer social organization: is it best understood as a product of encapsulation? In, Hunters and Gatherers 1. History, evolution and social change, edited by Tim Ingold, David Riches, and James Woodburn, Berg, New York.

Worona, Marc
1993 A 42,000 Year Record of Vegetation from Little Lake, Central Coast Range, Oregon. Abstract, paper presented to the GSA Cordilleran/Rocky Mountain Section Meeting, Reno, Nevada, May 19-21.