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ABORIGINAL SETTLEMENT AND SUBSISTENCE AT THE MOUTH OF THE COLUMBIA RIVER

University of Oregon PH.D. 1983

ABORIGINAL SETTLEMENT AND SUBSISTENCE AT THE MOUTH OF THE COLUMBIA RIVER

by

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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

June 1983

APPROVED: C. Melvin Aikens

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An Abstract of the Dissertation of

Rick Minor for the degree of Doctor of Philosophy

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Title: ABORIGINAL SETTLEMENT AND SUBSISTENCE AT THE MOUTH OF THE COLUMBIA RIVER

Approved: C. Melvin Aikens

It has been suggested that differences in the levels of cultural complexity observed ethnographically along the Northwest Coast may be related to differences in the environment of the region. The present study seeks to contribute toward a better understanding of the relationship between culture and environment along the Northwest Coast by reconstructing the settlement-subsistence system of the Chinookan peoples at the mouth of the Columbia River.

Ethnographic/ethnohistoric information about the location of settlements and the annual subsistence cycle of the Chinookan peoples in this area has been combined with archaeological site distribution data to identify three basic settlement types and four broad environmental-use zones. These were then used to develop two models of settlement-subsistence for the study area: one for the Lower Chinook and one for the Middle Chinookan peoples.

In order to obtain specific artifactual and ecological data not available in the ethnographic/ethnohistoric record, excavations were conducted at a sample of six archaeological sites representing all four environmental zones. Functional analysis of the recovered cultural materials and identification of the faunal materials obtained from these sites provided the basis for defining the nature and range of activities performed at each location. The recovered cultural and faunal assemblages from these six sites provide an impression of cultural continuity within this area over the last 3000 years.

The above lines of evidence point to the Columbia River estuary as having a special significance in the development of Chinookan culture. The Chinookan peoples at the mouth of the Columbia River practiced two contrasting settlement-subsistence systems, one emphasizing coastal and estuarine resources and the other adapted to the riverine environment upstream. Environmental differences are reflected not only in the existence of distinct cultural adaptations but also in the development of the language boundary which existed between the Lower and Middle Chinookan groups at the time of historic contact.

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Dave Dodson	Lisa Saichek	Ron Towner
James Earl	Jon Silvermoon	Bob Wenger
Julie Marsalek	Lois Stanford	Grace Zilverberg
	Terry Strong	

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The responsibility of identifying the faunal remains recovered during this study was initially assumed by A. William Zukosky. When the quantity of these remains exceeded expectations, however, others stepped in to assist in the analysis. The faunal material from the coastal Fishing Rocks site was identified by Christopher L. Brown of Washington State University. The faunal collections from the estuarine Eddy Point and Ivy Station sites were studied by several individuals, with A. William Zukosky handling the mammals, Ruth Greenspan identifying the fish, and Becky Saleeby analyzing the avifaunal remains. The efforts of all of these individuals in contributing their expertise to this study are greatly appreciated.

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CHAPTER ONE

INTRODUCTION

The way of life practiced by the Chinookan peoples who lived around the mouth of the Columbia River at the beginning of the historic era is usually thought of as a local variant of the Northwest Coast cultural pattern. Geographically, this distinctive cultural pattern was found along the Pacific seaboard from Yakutat Bay in southeastern Alaska in the north to Cape Mendocino in northern California on the south (Kroeber 1939:28-31). The Chinookan peoples at the mouth of the Columbia River were thus situated in the south-central portion of the Northwest Coast Culture Area (Figure 1-1).

Northwest Coast Culture occupied a distinctive position in native North America. The various aboriginal groups which participated in this cultural pattern seem to have attained the highest known level of population density and cultural complexity ever achieved on a hunting-gathering-fishing economic base (Suttles 1968a:56). The essentially sedentary lifeways, social stratification, and high levels of achievement in art, architecture, and ceremonial life found in this region serve to distinguish the aboriginal peoples of the Northwest Coast from virtually all other food-gathering societies.

Cultural complexity and elaboration within the Northwest Coast Culture Area were highest among the northern groups, such as the Nootka, Kwakiutl, Haida, and Tlingit who occupied the islands and coastal areas

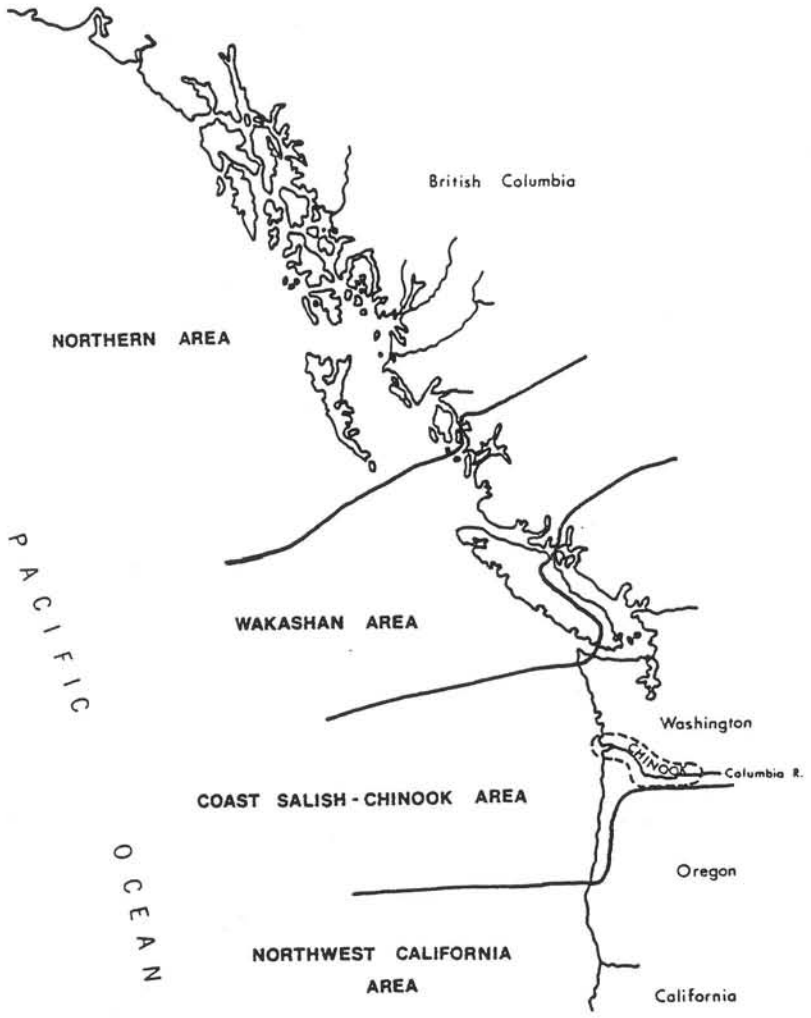

Figure 1-1. Location of Chinook territory in the south-central portion of the Northwest Coast Culture Area.

of British Columbia and southeastern Alaska. In general, cultural complexity decreased with more southerly location (Kroeber 1939:30). South of the Strait of Juan de Fuca, many of the characteristic features of Northwest Coast Culture were absent or occurred only in attenuated form.

The variation which existed in the nature and complexity of the aboriginal societies along the Northwest Coast has led to the division of this region into a number of different subareas or provinces (Kroeber 1939; Drucker 1955). Kroeber (1939:156) was among the first to link the differences observed in cultural complexity along the Northwest Coast with variation in the natural environment and the way in which it was exploited by the aboriginal inhabitants:

> The northern groups were essentially maritime, mostly lived fronting the beach, and made little use of the land which they owned. The southern groups lived on river and tributary as well as on the shore, perhaps more largely so, in fact, and often made genuine use of their land holdings. Their habitat utilization and culture remained more generalized and simpler; those of the northern groups were more specialized and extreme.

Subsequent research by Suttles (1951, 1960) among the Coast Salish indicated a close connection between the nature of their economy and the structure of their society. Expanding on this theme, Suttles (1968a, 1968b) demonstrated that the distribution of plant and animal resources along the Northwest Coast were highly variable (both spatially and seasonally), and furthermore that their availability and abundance were not precisely the same from one area to the next. It was suggested by Suttles (1968b:140) that differences in the level of cultural complexity along the Northwest Coast may be related in part to differences in the environment. More recent studies have sought to follow up on this idea

and to expose the highly complex and systematic relations to the environment that lie behind the development of Northwest Coast Culture (e.g., Fladmark 1975; Schalk 1977).

Within this frame of reference, the present study is directed at an examination of the relationship between environment and culture among the aboriginal peoples who lived around the mouth of the Columbia River. At its most basic level, this relationship is reflected in the settlement patterns and subsistence remains left behind by the former native inhabitants, and it is these data which are used to reconstruct the nature of aboriginal occupation in this area. Located approximately 250 km south of the Strait of Juan de Fuca, the mouth of the Columbia River is well removed from the areas in which the most elaborate expressions of Northwest Coast Culture developed. The lifeways of the Chinookan peoples were representative of what Kroeber (1939:156) termed the "more generalized and simpler" cultures found in the southern portion of the region. In this respect, the present study is intended as a contribution toward a better understanding of the range of environmental situations and associated cultural adaptations which characterized the Northwest Coast Culture Area as a whole.

The Study Area and Its Aboriginal Inhabitants

The area examined during the present study is bounded on the west by the Pacific Ocean at the mouth of the Columbia River and on the east by the first major bend in the river some 72 km upstream. The study area includes both the Oregon and Washington sides of the Columbia River as well as short sections of the adjacent Pacific Coast (Figure 1-2).

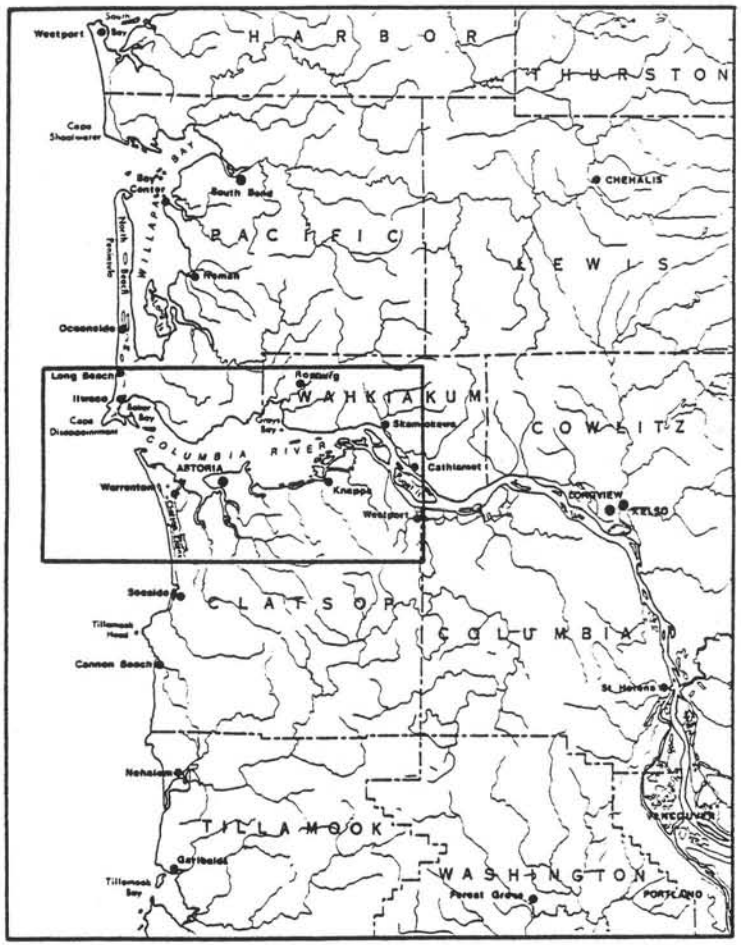

Figure 1-2. Location of the study area at the mouth of the Columbia River.

The study area articulates on the north with the Willapa Bay area in Washington and on the south with the Seaside area in Oregon, both of which are currently under investigation by other archaeologists. The boundaries of the study area were designed to encompass the primary areas of settlement and subsistence used by the aboriginal peoples who inhabited the area around the mouth of the Columbia River at the beginning of the historic era.

At the time of historic contact the area around the mouth of the Columbia River was occupied by aboriginal peoples who have come to be known as the Chinook. These people occupied the Pacific Coast from Tillamook Head on the south to Willapa Bay on the north, and extended up the Columbia River as far as The Dalles. To the north along the Washington coast lived various groups comprising the Coast Salish, while to the south along the Oregon coast were the Tillamook, the southernmost speakers of a Salish language. This section of the North Pacific Coast is thus referred to as the Coast Salish-Chinook Province of the Northwest Coast Culture Area (Drucker 1955).

Ethnographically, the Coast Salish-Chinook Province is considered an area in which the basic Northwest Coast cultural pattern became modified by the adoption of certain cultural traits derived from the interior, specifically from the Columbia Plateau. These traits include the construction of mat lodges as temporary dwellings, coiled basketry, truncated conical basketry caps for women, the small steam sweat lodge, and use of long nets for fishing and hunting (Drucker 1955:68). Indeed, the culture of the Lower Chinook at the mouth of the Columbia River apparently included so many interior traits that it has been suggested

that these people "occupied a distinctly intermediate position between the typical Northwest Coast cultures and those of the Plateau" (Ray 1937:371-372).

The intermediate cultural position of the Chinookan peoples was undoubtedly derived in large measure from their location astride the Lower Columbia River. The Columbia is the largest river on the Pacific coast of North America, and it provides a continuous navigable waterway by canoe between the coast and interior Columbia Plateau. Ethnohistoric accounts suggest that the Columbia River was an important avenue for contact between aboriginal peoples in the coastal and interior regions. In early historic times their position along the Lower Columbia River enabled the Chinook to regulate the flow of commerce between Euro-Americans and native peoples in the interior, a situation which resulted in their gaining the reputation as shrewd traders (Ruby and Brown 1976).

Early Contact History

The early contact history of the Chinookan peoples at the mouth of the Columbia River has recently been reviewed by Ruby and Brown (1976). The first recorded contact occurred in May of 1792 when Captain Robert Gray brought his ship, the *Columbia Rediviva*, into the mouth of the Columbia River (Boit 1921). In October of that same year, Lieutenant William Robert Broughton explored the Lower Columbia as far upstream as the mouth of the Willamette River (Barry 1926). For the next two decades, contact was largely confined to trade between aboriginal peoples and Euro-American seamen involved in the maritime fur trade (see Ruby and Brown 1976:40-90).

In the autumn of 1805, Lewis and Clark descended the Lower Columbia and wintered at Fort Clatsop near its mouth before journeying back up-river in the spring of 1806 on their return trip. The entries in their journals during this six-month period contain the first detailed descriptions of the lifeways and material culture of the Chinookan peoples of the Lower Columbia Valley. Although the members of the Lewis and Clark party had their closest contact with the Clatsop, and secondarily with the Chinook proper, these explorers also recorded the most informative descriptions available of the Wahkiakum and Kathlamet peoples upriver (Thwaites 1905:3, 4).

In 1811 Fort Astoria (later called Fort George) was established at modern Astoria and for the next two decades contact was maintained between the Chinookan peoples of the Lower Columbia and fur traders of the Pacific Fur Company, the Northwest Company, and Hudson's Bay Company. A number of these early fur traders subsequently published narratives of their adventures in the region which include descriptions of its aboriginal inhabitants (e.g., Cox 1832; Ross 1849; Franchere 1969; Coues 1897). These accounts generally confirm the information on aboriginal group and place names collected by Euro-Americans previously in the area.

In contrast, the explorers, missionaries, and settlers who were in the area after circa 1830 recorded accounts of the native peoples which generally reflect the decimation of their population and the disintegration of their culture resulting from the introduction of epidemic diseases (e.g., Parker 1838; Lee and Frost 1844; Thwaites 1906; Powell 1932). Among these afflictions were venereal disease, measles, and

smallpox, but the most virulent was the sickness variously known as "intermittent fever," "fever and ague," or the "cold sick," which is thought to have been either malaria or virus influenza (Cook 1955; Taylor and Hoaglin 1962; Boyd 1975). It is generally accepted that these diseases resulted in the death of ninety percent or more of the aboriginal population of the Lower Columbia Valley.

By the late 1830s Euro-American settlement of the Lower Columbia was underway, and this development brought representatives of the federal government into the region who, among other responsibilities, were assigned the task of obtaining information on the numbers, condition, and languages of the native peoples. Among the accounts from this period are those of the U.S. Exploring Expedition (Wilkes 1845; Hale 1845), John Slacum (1912), and George Gibbs (1854, 1877). The earliest valuable account of the Chinook proper residing around Willapa Bay also dates from this period of increased Euro-American settlement (Swan 1857).

In August, 1851, representatives of the various aboriginal groups in the region were called to Tansy Point near the mouth of the Columbia River for the purpose of negotiating treaties with the federal government. At this time the remaining aboriginal peoples ceded huge tracts of land in exchange for small reservations and annuities to be paid over a ten-year period. These treaties were never ratified by the federal government, however. Eventually, some of the Clatsop and other peoples who had signed the unratified Tansy Point treaties ended up on the Siletz and Grand Ronde reservations in northwestern Oregon. There they

intermarried with Tillamook peoples and adopted their language (Boas 1894:5-6).

Some of the remaining Chinookan peoples settled around the fish canneries which were built during the latter part of the nineteenth century at the sites of the old native villages of Chinook, Altoona, Pillar Rock, and Skamokawa along the north side of the Columbia River (U.S. Bureau of the Census 1872, 1883, 1902, 1916). Others were drawn northward to Willapa Bay, where they found employment in the developing fishing and oyster industries. Over the years the Chinookan peoples living around Willapa Bay intermarried with the Salish-speaking Lower Chehalis and adopted their language (Boas 1894:5-6).

By the time ethnographers began working in this region only a few aged Chinookan informants with knowledge of aboriginal lifeways remained. In the early 1890s, Franz Boas discovered a valuable Chinookan informant, Charles Cultee, living in Bay Center on Willapa Bay. Cultee had lived for many years at Cathlamet on the north bank of the Columbia River, and he spoke both the Lower Chinook and Kathlamet languages. Myths and tales narrated by Cultee were subsequently published by Boas in *Chinook Texts* (1894) and *Kathlamet Texts* (1901). Subsequent research just after the turn-of-the-century by Edward S. Curtis was carried out mainly among Chinookan peoples living upriver, although some information on village names and locations in the area around the mouth of the Columbia River was also obtained (Curtis 1911).

Almost three decades later during the 1930s, additional ethnographic fieldwork was carried out by Verne F. Ray with native informants living at Bay Center. By this time, however, the Chinookan population

had largely merged with the Salish-speaking Lower Chehalis peoples. Ray's principal informant, Emma Millet Luscier who was born around 1871, was of Cowlitz ancestry on her mother's side and her father was of Wahkiakum descent (Ray 1938:64). In fact, her father and mother had served as Curtis' informants for Shoalwater and Lower Cowlitz Salishan groups, respectively (Curtis 1913:172-173). Ray's secondary informant, Isabelle Aubichon Bertrand who was born around 1843, was the daughter of French-Canadian Alexis Aubichon and his Chinook wife Elimermach (or Mary Anne).

Ray's subsequent publication, *Lower Chinook Ethnographic Notes* (1938), is generally considered the principal source of information on the Chinookan peoples who occupied the area around the mouth of the Columbia River. Considering the mixed backgrounds of his informants, however, ethnographic data obtained by Ray clearly must be used with some caution. Other information, obtained both before and after Ray's fieldwork, must be used in conjunction with his "ethnographic notes" to assure an accurate reconstruction of Lower Chinookan lifeways (Silverstein n.d.).

Previous Archaeological Research

Before the initiation of this study in 1977, very little systematic archaeological research had been carried out around the mouth of the Columbia River. The earliest fieldwork was in 1947 by Richard Daugherty, then a student at the University of Washington, who in conducting a survey along the Washington coast recorded one site at Cape Disappointment at the mouth of the river and others to the north along

Willapa Bay (Daughtery 1948). The following year Robert Hudziack and Clarence Smith, who were affiliated with the Smithsonian Institution River Basin Surveys program, used ethnographic and ethnohistorical sources in recording the locations of 16 aboriginal settlements on the Washington side near the mouth of the Columbia River. Several additional sites were recorded in the 1950s and 1960s along the north shore of the Columbia River and nearby Willapa Bay, mostly in connection with the University of Washington's Fort Columbia Archaeological Project, which was under the overall direction of R. E. Greengo (Kidd 1960:11-12; Kidd 1967:14). The earliest archaeological research on the Oregon side near the mouth of the Columbia River was undertaken in 1951 by Lloyd Collins of the University of Oregon, who began an extensive survey along the Oregon coast by recording 15 sites in the Astoria and Clatsop Plains areas (Collins 1953).

Prior to the present study, only a small number of the archaeological sites recorded around the mouth of the Columbia River had been previously excavated by professional archaeologists. In 1957 James Alexander, then a student at the University of Washington, tested two prehistoric sites on Willapa Bay: 45PC9, a shell midden containing burials on Long Island, and 45PC7, the Martin site, an extensive shell midden on the North Beach Peninsula (Alexander 1958). Excavations continued at the Martin site in 1959 by archaeologists from the University of Washington under the direction of Robert S. Kidd (1960, 1967). Fieldwork was subsequently carried out at the Martin site by archaeologists from Washington State University in 1974 and 1976 under the direction of Robert S. Shaw (1977) and Christopher L. Brown (1977).

The Martin site has yielded a considerable amount of information about aboriginal use of the Willapa Bay area in prehistoric times. Evidence of structures, possibly aboriginal housepits, and a number of concentrations of sea and land mammal bones were found during the excavations. The artifact assemblage consists predominantly of stone tools, which include projectile points, knives, scrapers, drills, used flakes, hammerstones, cores, and net weights. The most common type of projectile point is stemless and triangular in form. Bone-antler artifacts are also represented and include unilaterally barbed points, unbarbed points, awls and wedges. A variety of faunal remains was recovered. In addition to shellfish, fish, sea mammals, birds and large land mammals are all represented. Radiocarbon dates of A.D. 90 and A.D. 510 have been reported from the Martin site (Shaw 1977).

For several years beginning in the late 1960s, excavations were carried out by amateur archaeologists at two extensive shell middens south of the mouth of the Columbia River on the northern Oregon coast near Seaside. The results of this fieldwork have not yet been fully reported, but some information about these sites is available in preliminary reports (Phebus and Drucker 1973, 1977). Excavations at the Palmrose site (35CLT47), situated on an old beach terrace at some distance from the present coastline, uncovered a rectangular housepit with a hearth in the center which yielded a radiocarbon date of 615 B.C. Additional radiocarbon dates from the Palmrose site indicate occupation over a relatively long time span, beginning as early as 600-700 B.C. and continuing until the site was abandoned around A.D. 200. The Par-tee site (35CLT20), located nearby on the bank of the Necanicum River, is

situated somewhat closer to the modern coastline and was apparently occupied slightly later in time. Radiocarbon dates bracket the major period of occupation at the Par-tee site between A.D. 245 and A.D. 915.

The Palmrose and Par-tee sites both produced rich artifact collections which contain a preponderance of bone-antler tools, including atlatls, composite harpoon parts, digging stick handles, wedges and awls. Stone tools found at these sites include projectile points of various styles, lanceolate blades, and atlatl weights. Sandstone abraders, mussel shell adz blades, Olivella shell beads, and pendants made from elk and shark teeth were also recovered. Faunal remains recovered from these two sites reflect an emphasis on coastal resources, as molluscs were abundant and sea lions, fish, and whales were represented. Elk, otter, and bird remains were also found.

A third shell midden in the Seaside area, the Avenue Q site (35CLT13), has also been tested (Phebus and Drucker 1973, 1977). The small artifact assemblage recovered from this site includes two atlatl fragments. A series of radiocarbon dates ranging from A.D. 275 to A.D. 620 has been obtained from the Avenue Q site.

Just north of Seaside on the Clatsop Plains, another shell midden (35CLT27) was excavated during the 1970s by an archaeology class from Clatsop Community College. The results of this work have never been reported, but it is known that radiocarbon dates of A.D. 1090 and A.D. 1220 were obtained from this site (Sheppard and Chatters 1976:145).

During the early 1970s small-scale excavations were carried out by Keith Gehr (1975) at Bay View (45WK50), located approximately 50 km upstream from the mouth of the Columbia River on the north shore just

below the town of Skamokawa, Washington. This was the site of an important Chinookan village upon which a fish cannery was later constructed. The cultural deposits at this locality apparently contained a wealth of Euro-American trade materials intermixed with the aboriginal artifact assemblage, but the site has now been virtually obliterated as a result of the depredations of relic collectors. The report on the fieldwork at Bay View is concerned entirely with the historic artifacts recovered; items of aboriginal manufacture are not described (Gehr 1975).

More recently, excavations were conducted in 1977 and 1979 at the Skamokawa site (45WK5) in the town of Skamokawa, Washington (Minor 1978, 1980). This site contained extensive deposits more than a meter deep from which a broad range of stone tools was recovered. Faunal preservation was poor, and no evidence of an extensive bone-antler industry comparable to that found in coastal sites was encountered. The extent and depth of the cultural deposits, the broad range of tool types represented in the artifact assemblage, and the location of the site at the mouth of an important salmon spawning stream all combine to suggest that the Skamokawa site was a prehistoric winter village. A series of eight radiocarbon dates indicates that occupation of this locality spanned the period from around 350 B.C. to A.D. 600 (and possibly later). An absence of Euro-American trade items in the artifact assemblage suggests that the site was abandoned sometime before the beginning of the historic era.

The results of recent archaeological research some 150 km upstream from the mouth of the Columbia River in the Portland Basin are also of relevance to the present study. Excavation and analysis of six sites in

the Sauvie Island area by Pettigrew (1977, 1981) resulted in the definition of a local cultural sequence encompassing the last 2600 years. Of particular importance was the development of a projectile point typology which reflects the stylistic changes which occurred in these artifacts over time. This typology appears to be applicable to the area around the mouth of the Columbia River and is used in the present study.

More recently, Saleeby (1983) has analyzed faunal remains from these same six sites and used this information in conjunction with biogeographic data to develop a new model for aboriginal settlement in the Portland Basin. It is suggested that villages in the Sauvie Island area were occupied more or less year-round, being temporarily abandoned only when threatened by high river levels. The proposed model has important implications, as a greater degree of sedentism is suggested in this area than has been previously acknowledged. This study is also significant from another perspective, in that it suggests that settlement and subsistence practices may not have been uniform among all of the aboriginal peoples of the Lower Columbia Valley.

In summary, at the time this study began in 1977, relatively little archaeological research had yet been carried out around the mouth of the Columbia River. Earlier surveys had been concentrated for the most part along the coastal margins, and as a result most of the previously recorded sites were located along the northern Oregon and southern Washington coasts on either side of the Columbia River, and around Willapa Bay to the north. In general, little was known about the distribution and nature of archaeological sites along the river itself. Likewise, previous archaeological excavations had been carried out

(though reported in varying detail) mainly in two coastal areas on either side of the Columbia River: at Seaside in Oregon and on Willapa Bay in Washington. With the exception of the Skamokawa site some 50 km upstream, no archaeological investigations had yet been conducted on sites along the river near its mouth. Collectively, the radiocarbon dates obtained from the previously excavated sites indicated a time depth of approximately 2500 years for the archaeological record along the coast in this general area, but little had yet been documented about the specific nature of aboriginal occupation at the mouth of the Columbia River.

Project Focus

As described in the preceding section, previous archaeological research around the mouth of the Columbia River has been very limited. In undertaking archaeological studies in a little known area, an initial research objective must involve steps toward understanding the manner in which the cultural systems of the aboriginal inhabitants were articulated with the natural environment. The most direct relationship between a culture and its environment is expressed in its technological and economic adaptations, which in turn are most clearly reflected in a culture's subsistence-settlement system. It is these aspects of extinct cultures which are among the most accessible for study by archaeological methods.

The term "subsistence-settlement system" refers to "the functional relationships among a contemporaneous group of sites of a single culture" (Winters 1969:111). As this term implies, reconstruction of

subsistence-settlement systems requires the acquisition of information about both the settlement and subsistence practices of an aboriginal group. Following Chang (1968:3), a settlement can be defined as "the physical locale . . . where the members of a community lived, ensured their subsistence, and pursued their social functions in a delineable time period." Variation in the function, size, and composition of settlements occupied by a community reflects the use of different settlement types. The spatial distribution of different settlement types across the landscape comprises the community's settlement pattern.

The key to interpreting a community's settlement pattern is an understanding of the nature of the subsistence activities carried out at each settlement type occupied during the year, as each settlement should fall within the "ordinary, expected and predictable round of activities of the society in question" (Campbell 1968:15). The annual subsistence cycle as practiced by a given group depends upon the interplay of a number of factors, including available resources, seasonality, exploitative technology, geography and weather. Together, the annual subsistence cycle and the resultant settlement pattern combine to form the subsistence-settlement system that characterizes a society's adaptation.

The most comprehensive statements regarding the goals and methods of reconstructing subsistence-settlement systems have been made by Struever (1968a, 1968b, 1971). As described by Struever, the basic task is as follows:

> To identify, through a program of survey and excavations, the variability in functional types of artifacts, features and food remains and thereby define one or more settlement types

> which together comprise the total settlement system (Struever 1971:11).

This research objective necessarily involves a shift in focus away from individual site investigations toward an examination of the relationships between sites within a region. At the same time, new data requirements are introduced which put a premium on determining the function, seasonality, and chronology of occupation of sites within the system.

In most of the previous studies of this nature, attempts at reconstructing prehistoric subsistence-settlement systems have been carried out largely on the basis of archaeological evidence alone. In general, little use has been made of historical and ethnographic data in the development of models which could be used to interpret the archaeological record (Parsons 1972:146). This situation is unfortunate in view of the fact that the nature of human settlement systems is a topic of general interest to both archaeologists and ethnologists, and the importance of close cooperation between the two sub-disciplines in studies of this type has long been stressed (Willey 1956:1; Vogt 1956:173). In this regard, the present study of aboriginal occupation around the mouth of the Columbia River begins with an analysis of ethnographic information on subsistence and settlement which is then used in the development of an archaeological research program.

Research Design

The research design employed in the present study of aboriginal occupation around the mouth of the Columbia River consisted of three

interrelated phases of investigation. The procedures implemented during each phase involved the acquisition of information from different sources, all of which were relevant to the task of reconstructing the aboriginal subsistence-settlement system within the study area.

Phase I: Documentary Study

The initial phase of research involved documenting the nature of the environment within the study area and the cultural adaptations of the aboriginal peoples around the mouth of the Columbia River. In general, the subsistence and settlement practices of aboriginal peoples were influenced to varying degrees by certain aspects of the natural environment, such as topography, vegetation, hydrology, and animal life. The emphasis during this phase of research was on the identification of patterns in the natural environment which may have affected human use of the area (Chapter 2). Given that certain aspects of the natural environment are determining factors in the location of aboriginal settlements, correlations noted between the distribution of certain resources and archaeological sites should provide important clues for understanding the aboriginal subsistence-settlement system.

The cultural adaptations of the Chinookan peoples who occupied the area around the mouth of the Columbia River were documented through a review and analysis of the ethnographic and ethnohistorical information available for the area. Certain problems and limitations in the use of the ethnographic data were identified, but when supplemented by ethnohistorical accounts sufficient information was available to suggest the occurrence of two separate subsistence-settlement systems within the

study area (Chapter 3). The information extracted from the documentary sources provided a framework within which to structure archaeological survey data and was used to design a program of excavations at selected sites in the area (Chapter 4).

Phase II: Field Survey and Excavation

Archaeological fieldwork in the area around the mouth of the Columbia River was undertaken in two stages. First, an intensive survey was carried out in order to obtain information on the location and nature of archaeological sites within the study area. A substantial number of aboriginal settlements occupied in early historic times had been noted in the ethnographic and ethnohistorical accounts. The results of the archaeological survey supplemented this data by providing information about other sites in the study area, particularly those which had been occupied prior to historic contact. Together, the information on settlements contained in documentary sources and the sites recorded during the archaeological survey combined to provide a good indication of the aboriginal settlement pattern around the mouth of the Columbia River.

The survey information assembled was then used in the design of a program of small-scale excavations at certain sites within the study area. An attempt was made to select sites for investigation which were located in different environmental settings and which were presumed at the time to represent a range of aboriginal settlement types.

The purpose of the excavation stage was to obtain artifactual and ecological data on the nature and range of activities performed by

aboriginal peoples at each location (Chapters 5-8). Particular attention was given to the collection of datable charcoal samples, so that some assurance could be gained that the sites under investigation had been occupied more or less contemporaneously. The information recovered during these excavations was then used to interpret the excavated archaeological sites in terms of the ethnographic subsistence-settlement systems which had been previously defined for the study area.

Phase III: Analysis and Interpretation

The third phase of the research design was interpretive in nature and rested on the combined results of the previous phases. This phase began with an analysis of the cultural materials recovered from the six excavated sites. Since the emphasis of this study is on aboriginal subsistence, a typology was developed for classifying these artifacts which stresses their technological and functional characteristics (see Appendix). Faunal remains recovered during the excavations were also identified. The results of these various analyses have contributed more detailed information on the aboriginal use of particular resources which is not available in documentary sources.

The artifact assemblages from the six sites investigated were then compared in terms of chronology and function (Chapter 9). Collectively, these sites were occupied over a span of approximately 3100 years. Changes in artifact styles, considered together with the results of radiocarbon dating, were used in the formulation of a cultural chronology for the area. Functional analysis of the artifact assemblages indicates

a general correlation between certain tool types, as represented in activity sets/subsets, and sites in different environmental-use zones. The differences observed in the content of artifact assemblages are interpreted to reflect the existence of different settlement types, such as camps and villages.

This study concludes (Chapter 10) with comments concerning the utility of using an ethnographic approach in examining aboriginal subsistence and settlement around the mouth of the Columbia River. In addition, the Columbia River estuary is seen to have played an important role in fostering the divergence of the Lower Chinookan and Middle Chinookan peoples, leading to the development of the separate cultural and linguistic groups which were occupying this area at the time of historic contact.

CHAPTER TWO

NATURAL SETTING

The Columbia River is the largest river on the Pacific Coast of North America, with a length of 1950 km and a combined drainage area with its tributaries of about 671,000 km^2 (Trefethen 1972:77). Most of this drainage basin is situated within the interior Columbia Plateau, which is bounded on the east and north by the Rocky Mountains, on the south by the Great Basin, and on the west by the Cascade Range. From the Columbia Plateau, the river flows westward toward the Cascade Range, north and westerly through the Coast Range, and into the Pacific Ocean near Astoria, Oregon.

Geography

As it approaches the Pacific Ocean, the Columbia River emerges from a canyon cut through the mountains of the Coast Range of western Oregon and Washington. For most of its course through the Coast Range, the river has a relatively narrow channel less than a kilometer wide. As it approaches the ocean, the width and depth of the Columbia change significantly, however, increasing to about 14 km wide about 32 km from the ocean. The river then narrows again to about 3 km at the entrance.

The Columbia River discharges into the sea between Cape Disappointment, a high rocky headland on the north, and Clatsop Spit, a low sand point on the south. Cape Disappointment is the only headland on the low

sand beach that extends northward from Tillamook Head in Oregon to Point Grenville in Washington, a distance of 150 km. The cape is the southern end of a coast range spur and on its seaward faces are precipitous cliffs rising about 60 meters above sea level. Clatsop Spit is an extension of Point Adams and was formed after construction of the south jetty. Before construction of the jetty, the Oregon shore line marking the south boundary of the entrance extended only to Point Adams, about 10 km southerly from Cape Disappointment and 4 km inland from the present shore line along Clatsop Spit.

The mouth of the Columbia River is separated by rocky headlands into four large bays. On the north shore, Baker Bay lies just inside the river mouth between Cape Disappointment and Ellice Point. Several kilometers upstream on the north shore is Grays Bay, located between Grays Point and Harrington Point. On the south shore, Youngs Bay is situated just inside the river's mouth between Point Adams and Smith Point, while Cathlamet Bay is located farther upstream between Tongue Point and Aldrich Point (Figure 1-2).

Numerous tributary creeks and rivers of various sizes drain into the Columbia River near its mouth. On the north shore, the Wallacut and Chinook rivers flow into Baker Bay, and the Deep and Grays rivers drain into Grays Bay. Farther upstream, Skamokawa Creek and the Elochoman River empty directly into the main channel of the Columbia River. On the south shore, the Lewis and Clark and Youngs rivers flow into Youngs Bay, while the John Day River, Big Creek and Gnat Creek empty into Cathlamet Bay.

The terrain around the mouth of the Columbia River is dominated by the rugged hills forming the western edge of the Coast Range. Along the north shore of the river, the land rises steeply from the water's edge to elevations of several thousand meters. The hills on the Oregon side of the river are somewhat lower in elevation and less rugged, with more gentle slopes and fewer ravines. On both sides of the river there are only occasional narrow strips of flat land along the shore.

Tide lands, mud flats, and dunes occupy the remainder of the area. Tide lands and mud flats are especially prevalent in Baker and Youngs bays which, being located at the entrance of the river, are most subject to tidal fluctuations. Dunes are found along the coast, especially south of the Columbia River along Clatsop Plains (Cooper 1958). Numerous freshwater lakes occur within the dune systems found along the shores of the Pacific Ocean both north and south of the Columbia River.

Geology

The geology of the area around the mouth of the Columbia River is reasonably well understood but, with the exception of a study of the Cape Disappointment area by Williams (1952), has not been studied in as great a detail as have other sections of the Northwest Coast (Snavely and Wagner 1963). Geological formations of both volcanic and sedimentary origin are found in this area.

The oldest geological formation in the area around the mouth of the Columbia River consists of a series of basalt flows of Eocene age. These flows erupted from numerous fissures and volcanic vents and poured out onto a relatively flat surface which for the most part was slightly

below sea level. These basalts outcrop at various locations along the Washington and Oregon coasts and are exposed at Cape Disappointment on the north shore of the Columbia River, where they are assigned to the geological series known as the Metchosin Volcanics (Weaver 1937:26-40; Williams 1952:10-20).

Overlying the Eocene volcanic rocks in the area around the mouth of the Columbia River are marine sedimentary strata composed of shale, sandstone, and siltstone. The earliest of these strata are found on the north shore where they have been correlated with both the Lincoln Formation of Oligocene age (Weaver 1937:110-11) and the McIntosh Formation of Eocene age (Williams 1952:20-25). Similar strata on the south shore have been assigned to the Astoria Formation which is of Miocene age (Baldwin 1981:18).

Contemporaneously with the deposition of the later of these sedimentary strata, flood basalt flowed down the valley of the Columbia River from the interior Columbia Plateau. These flows, which comprise the westernmost extension of the widespread Columbia River Basalt, interfinger with the upper sandstone member of the Astoria Formation (Baldwin 1981:18-19). Outcrops of this basalt are exposed at Tongue Point and other locations along the south shore near the mouth of the Columbia River.

Subsequent Pliocene and Pleistocene strata in the area around the mouth of the Columbia River were also deposited during periods of higher sea level and are composed of fine sand, silt and clay, and fine gravels. Pliocene deposits in this area, which are characterized by quartzite pebbles and cobbles, are correlated by Williams (1952:27-31)

with the Troutdale Formation of the Portland Basin (Lowry and Baldwin 1952:17-18).

The remaining geological deposits found in the area around the mouth of the Columbia River are composed of alluvium which has filled the lowlands along the Columbia River and its major tributaries in post-Pleistocene times. The shoals at the river mouth, which made entry and egress hazardous until the jetties were built, are the product of this mass movement of sand down the Columbia River. Alluvium carried downstream has also been distributed by longshore currents both north and south along the Pacific Coast. The greater part of this alluvium apparently flowed northward where, augmented by material moving out from Willapa Bay and Grays Harbor, it has formed the North Beach Peninsula. On the south side of the Columbia River this alluvium has formed the extensive series of sand dunes comprising Clatsop Plains, which extend from the river mouth southward 30 km to Tillamook Head (Cooper 1958).

Hydrography

With the retreat of continental glaciers, sea levels along the Northwest Coast rose in post-Pleistocene times. As a result, the mouth of the Columbia River and other rivers in this coastal region were drowned. With this encroachment by the sea, a sand spit built largely of alluvium carried down the Columbia River formed on the shallow ocean floor at its entrance.

Early maps and charts indicate that instability has always been characteristic of the mouth of the Columbia River, especially before the construction of jetties (Lockett 1963). At the entrance to the river

there is only one entrance, but once inside the mouth two distinct channels develop which parallel the two shores. The greater flood currents are on the north side and the greater ebb currents are on the south side of the river. This horizontal variance in currents is probably due to the more or less direct path that the north channel takes from the river's mouth (Neal 1972:25). Between the two main channels there are several small connecting channels of variable depth separated by islands, bars and shoals. The two main channels eventually merge, and above Harrington Point (Columbia River Mile 23) there is only one major channel.

Before construction of dams on the river, the flow of water at the mouth of the Columbia River was subject to large seasonal variations. The lowest flows of water occurred during August and September and were about 70,000 cubic feet per second. The highest flows occurred in May through July, due to melting snows in the river's headwaters, and were about 660,000 cubic feet per second. There were occasional winter freshets in December and January, resulting from winter rains mainly in the Willamette Basin, which approached the average summer freshets in magnitude (U.S. Army Corps of Engineers 1938:5).

Tides at the mouth of the Columbia River are the mixed diurnal type characteristic of the Pacific Coast, which produce two high waters and two low waters during a 24.8-hour period. At the river mouth the mean tidal range is 1.7 m (5.6 feet), and the diurnal range is 2.3 m (7.5 feet) (U.S. Coast and Geodetic Survey 1969:172-73). Extreme tides at the entrance vary from -0.8 m (2.6 feet) to +3.5 m (22.6 feet). Tidal reversal of river flow, surface and bottom, has been observed as far

upstream as Oak Point (CRM 54). During periods of low and moderate runoff, tides influence the flow in the Columbia River as far upstream as Bonneville Dam (CRM 145).

The combination of moderate tide ranges and a large freshwater discharge produces a dynamic estuarine environment at the mouth of the Columbia River. Following Pritchards' (1967:3) definition, the estuary is that part of the river that may be subjected to salinity intrusion. The distribution and concentration of seawater within the estuary varies with both the tidal stage and river stage. At its minimum, the boundary of the Columbia River estuary is placed between Astoria and Cliff Point (CRM 15), while at its maximum the estuary boundary is extended upstream to around Harrington Point (CRM 23) (Neal 1972:23; Hughes and Rattray 1980:480). The Columbia River estuary is classified in the general category of a coastal plain estuary that exhibits characteristics most of the time in a Type B (partly mixed) estuary (Pritchard 1955).

Land-Sea Relationships

In post-Pleistocene times a general rise in sea level accompanied the retreat of continental glaciers. This rise in sea level did not occur uniformly everywhere, but varied depending on local geological conditions. A recent review of the data on sea level fluctuations along the Northwest Coast led to the conclusion that sea levels had stabilized throughout this coastal region by around 5000 years ago (Fladmark 1975:143-171).

Little specific information is available concerning sea level changes in the area around the mouth of the Columbia River. It has been

previously suggested that sea levels along the Oregon coast have remained constant for the last 6000 years (Dicken et al. 1961:16). The presence of partially submerged archaeological sites has been noted at two localities on the northern Oregon coast south of the study area, however. Since these sites were occupied in relatively recent times, it seems unlikely that sea levels stabilized so early in this area. For example, the earliest radiocarbon date of A.D. 1400 from 35TI1 on Netarts Bay was obtained from cultural deposits which are presently inundated at high tide (Newman 1959). Similarly, a site on Cronin Point on Nehalem Bay contains water-logged cultural deposits from which a radiocarbon date of A.D. 1560 has been reported (Woodward 1981).

Partially submerged archaeological sites also occur on the Lower Columbia River. A site on Eddy Point at the upper end of the Columbia River estuary which was investigated during this study contained cultural deposits which are inundated at high tide (see Chapter Six). Other sites with water-logged components have been reported as far upstream as the Portland Basin (Strong 1973).

The occurrence of these partially submerged archaeological sites along the Lower Columbia River and on the adjacent northern Oregon coast indicates either that sea levels have continued to rise or that the land in this area is submerging, and that this process has persisted into relatively recent times. This situation represents an important limiting factor in attempts to reconstruct aboriginal settlement patterns in this area. Any evidence of aboriginal occupation more than a few thousand years old, and in some cases more than a few hundred years

old, is likely to have been eroded away by the rising sea, or buried beneath alluvial deposits on the submerged continental shelf.

Climate

The area around the mouth of the Columbia River has a temperate, humid marine climate characterized by relatively wet, mild winters and dry, moderately cool summers. The principal factors affecting the area's climate are its proximity to the Pacific Ocean and its geographic location near the center of the middle latitude westerly winds (Sternes 1974).

In winter, cyclonic storm systems from the northern Pacific Ocean dominate the weather pattern, producing widespread frontal rain storms broken by short, infrequent periods of clear weather. Winter storms generally consist of steady rains which may continue without interruption for several days. These storms may be carried into the area either by onshore winds from the south or by winds flowing from the east through the Columbia Gorge.

In summer the central Pacific high pressure system moves in, forcing the storm track north into British Columbia and producing relatively dry weather. Summer precipitation, which usually is carried into the area by onshore winds from the north, is generally limited to occasional rainstorms, relatively rare thunderstorms, and coastal fog.

Average annual precipitation at Astoria is more than 178 cm (70 inches), with the highest precipitation usually occurring in December and January, and relatively low rainfall during July and August. Annual snowfall at Astoria is approximately 13 cm (5 inches) (Oregon State

Water Resources Board 1961:96). Temperatures in Astoria during the summer months are generally in the high 50°-low 60° F. range, while winter temperatures are generally in the 40°-50° F. range. Freezing temperatures are infrequent. The mean annual temperature in Astoria is approximately 51° F. (Oregon State Water Resources Board 1961:96).

Flora

The area around the mouth of the Columbia River is situated within the Sitka spruce (*Picea sitchensis*) forest zone, which characteristically occurs along much of the north Pacific coast. In addition to Sitka spruce, constituent tree species include lodgepole pine (*Pinus contorta*), western hemlock (*Tsuga heterophylla*) and, less commonly, western redcedar (*Thuja plicata*) and Douglas fir (*Pseudotsuga menziesii*).

The Sitka spruce forest is characterized by lush understory vegetation with dense growths of shrubs, herbs and ferns. Major shrub species include salal (*Gaultheria shallon*), ovalleaf huckleberry (*Vaccinium ovalifolium*), red huckleberry (*V. parvifolium*), rustyleaf (*Menziesia ferruginea*), and salmonberry (*Rubus spectabilis*). Deerfern (*Blechnum spicant*), swordfern (*Polystichum munitum*), Oregon oxalis (*Oxalis oregana*), and ladyfern (*Athyrium filix-femina*) are the principal species of herbs and ferns present (Franklin and Dyrness 1973:58-63).

Since it exists on the edge of the Pacific Ocean, the Sitka spruce zone contains a number of specialized habitats, including sand dunes and tidelands. Dune and strand vegetation along the coast consists mainly

of grasses backed by shrub communities comprised principally of salal. Other shrubs include evergreen huckleberry (*Vaccinium ovatum*), Pacific rhododendron (*Rhododendron macrophyllum*), kinnickinnick (*Arctostaphylos uva-ursi*), salmonberry, and hairy manzanita (*Arctostaphyllos columbiana*) (Franklin and Dyrness 1973:291-93).

There are a number of islands in the Lower Columbia River which are subject to major tidal influences, but the composition of their plant communities is little known. The islands closer to the mouth of the river are mainly marshlands, while those farther upriver are characterized by dense, tall shrub communities with scattered Sitka spruce and, less often, other trees such as red alder (*Alnus rubra*), cottonwood (*Populus trichocarpa*), and willow (*Salix*) (Franklin and Dyrness 1973:295).

The coastal climatic influence, as indicated by the presence of Sitka spruce, disappears east of Cathlamet, Washington (CRM 37). Above that point, river island and shoreline communities are the more typical riparian forests of cottonwood, willow and Oregon ash (*Fraxinius latifolia*). Away from the river Sitka spruce is replaced by western hemlock, western redcedar, and Douglas fir on the forest slopes of the Coast Range (Franklin & Dyrness 1973:295).

Some idea of the time depth of the vegetation pattern found in the area around the mouth of the Columbia River can be obtained from pollen profiles analyzed by Heusser (1960). One pollen core was collected near Seaview north of the Columbia River, and another from near Warrenton on the south side of the river. In both profiles, Sitka spruce, western hemlock, lodgepole pine (especially at Seaview), as well as alder, sedge

(Cyperaceae), and fern (Polypodiaceae) predominate (Heusser 1960, Figure 42). Both profiles are thought to encompass roughly the same period of time, the Late Postglacial. A radiocarbon date of 2950 ± 150 years B.P. indicates that the present vegetation pattern has existed in the area for at least the last 3000 years.

Fauna

Owing to exceptionally favorable environmental conditions, the area around the mouth of the Columbia River was, and still is, an exceptionally prolific producer of fish and wildlife. The following review of the faunal resources of the area highlights those species known or thought to have played a role in aboriginal subsistence (also see Table 2-1).

Fish

The Columbia River and adjacent ocean waters contain an abundance of fishery resources. These resources can be categorized as (1) marine species, such as halibut, shark and shrimp which are available only in the ocean; (2) anadromous fish, such as salmon, which migrate as adults from the ocean into the Columbia River and may be obtained in either river or ocean waters; and (3) freshwater species, which are resident in the Columbia River and tributary streams and lakes throughout their lives.

A very large number of marine fish species occur in ocean waters adjacent to the Columbia River. Pelagic fishes (those found near the ocean surface) comprise principally albacore, Pacific sardine or

Table 2-1. Selected Fish and Wildlife Species Around the Mouth of the Columbia River

Common Name	Scientific Name	Environments: Marine	Estuarine	Freshwater	Terrestrial
FISH:					
Albacore	*Thunnis alalunga*	X			
Pacific sardine (pilchard)	*Sardinops sagax*	X			
Northern anchovy	*Engraulis mordax*	X			
Pacific herring	*Clupea harengus pallasi*	X			
Pacific halibut	*Hippoglossus stenolepsis*	X			
Flounders (soles)	Pleuronectidae/Bothidae	X			
Rockfishes	Scorpaenidae	X			
Cods	Gadidae/Hexagrammidae/Anoplopomatidae	X			
Grayfish	*Squalus acanthias*	X			
Soupfin shark	*Galeorhinus zyopterus*	X			
Pink salmon	*Oncorhynchus gorbuscha*	X			
Sockeye (blueback) salmon	*O. nerka*	X	X	X	
Coho (silver) salmon	*O. kisutch*	X	X	X	
Chum (dog) salmon	*O. keta*	X	X	X	
Chinook salmon	*O. tshawytscha*	X	X	X	
Steelhead trout	*Salmo gairdneri*	X	X	X	
Eulachon (smelt)	*Thaleichthys pacificus*	X	X	X	
White sturgeon	*Acipenser transmontanus*	X	X	X	
Green sturgeon	*A. medirostris*	X	X	X	
Pacific lamprey	*Lampetra tridentata*	X	X	X	
Cutthroat trout	*Salmo clarki*			X	
Peamouth	*Mylocheilus caurinus*			X	
Mountain whitefish	*Prosopium williamsoni*			X	
Sand roller	*Columbia transmontanus*			X	
Chiselmouth	*Acrocheilus alutaceus*			X	
Northern squawfish	*Ptychocheilus oregonensis*			X	
Largescale sucker	*Catostomus macrocheilus*			X	
SHELLFISH:					
Razor clam	*Siliqua patula*	X			
Pacific gaper clam	*Tresus nuttalli*	X	X		
Cockle	*Clinocardium nuttalli*	X	X		
Butter clam	*Saxidomus giganteus*	X	X		
Softshell clam	*Mya truncata*	X	X		
Bent-nose clam	*Macoma nasuta*	X	X		
Littleneck clam	*Protothaca staminea*	X	X		
Dungeness crab	*Cancer magister*	X	X		
Crawfish	*Pacifastacus trowbridgii*			X	
SEA MAMMALS:					
Sea otter	*Enhydra lutris*	X			
California sea lion	*Zalophus californianus*	X			
Northern fur seal	*Callorhinus alascensis*	X			
Steller sea lion	*Eumetopias jubata*	X	X		
Harbor seal	*Phoca vitulina*	X	X	X	
Harbor porpoise	*Phocoena phocoena*	X	X		
Whale	Cetacea	X			

Table 2-1 (continued)

Common Name	Scientific Name	Environments: Marine	Estuarine	Freshwater	Terrestrial
WILDLIFE:					
Roosevelt elk	*Cervus canadensis*				X
Black-tailed deer	*Odocoileus columbianus*				X
White-tailed deer	*O. virginianus*				X
Black bear	*Euarctos americanus*				X
Red fox	*Vulpes vulpes*				X
Bobcat	*Lynx rufus*				X
Beaver	*Castor canadensis*				X
Mountain beaver	*Aplodontia rufa*			X	X
Porcupine	*Erethizon dorsatum*				X
Muskrat	*Ondatra zibethicus*			X	X
Mink	*Mustela vison*			X	X
Otter	*Lutra canadensis*			X	X
Raccoon	*Procyon lotor*				X
Weasel	*Mustela erminea/M. frenata*				X
Skunk	*Mephitis mephitis*				X
Snowshoe hare	*Lepus americanus*				X
Brush rabbit	*Sylvilagus bachmani*				X
GAME BIRDS:					
Band-tailed pigeon	*Columba fasciata*			X	X
Mourning dove	*Zenaidura macroura*			X	X
Quail	*Oreortyx picta*			X	X
Grouse	*Centrocercus urophasianus*			X	X
SEA BIRDS:					
Cormorant	*Phalacrocorax* spp.	X	X		
Western sandpiper	*Ereunetes mauri*	X	X		
Sanderling	*Crocethia alba*	X	X		
Gull	*Larus* spp.	X	X		
Murre	*Uria aalge*	X	X		
Loon	*Gavia* spp.	X	X		
Grebe	*Colymbus/Aechmophorus* spp.	X	X		
Scoter	*Melanitta* spp.	X	X		
Fulmar	*Fulmaris glacialis*	X	X		
WATERFOWL:					
Black brant	*Branta bernicla*		X	X	
Canada goose	*B. canadensis*		X	X	
Mallard	*Anas platyrhynchos*		X	X	
Pintail	*A. acuta*		X	X	
American widgeon	*Mareca americana*		X	X	
Shoveler	*Spatula clypeata*		X	X	
Canvasback	*Aythya valisineria*		X	X	
Merganser	*Mergus merganser*		X	X	
Coot	*Fulica americana*		X	X	
Common snipe	*Capella gallinago*		X	X	
Wood duck	*Aix sponsa*		X	X	

Sources: Pruter 1966; Marriage 1958; Bailey 1936; Maser et al. 1981; Jewett et al. 1953

pilchard, northern anchovy, and Pacific herring. The principal demersal fishes (those found at lower depths) are Pacific halibut, a number of flounders or "soles," rockfishes, and "cods." In addition to these bony (true) fishes, elasmobranch fishes (those with cartilaginous skeletons) found in the area include principally the soupfin shark and the grayfish or spiny dogfish (Pruter 1966:37-53).

To the aboriginal inhabitants of the area, the most important fish were undoubtedly the various anadromous species which ascend from the ocean into rivers and streams to spawn. The Columbia River is one of the world's most famous watersheds for propagation of anadromous fish; anadromous species found in this river include Pacific salmon, steelhead trout, eulachon, sturgeon, and Pacific lamprey.

All five species of salmon found in waters along the Pacific coast occur in the Columbia River: the chinook, sockeye or blueback, coho or silver, chum or dog, and pink salmon. All of these species are anadromous and all die after spawning. The Columbia River is the most productive river on the Pacific Northwest Coast for the propagation of chinook salmon, apparently providing the particular conditions for the complete physical and numerical expression of this species. The chinook is the largest of the salmons, averaging around 44 kg (20 pounds). Coho and sockeye salmon, which weigh an average of 17 kg (8 pounds) and 13 kg (6 pounds), respectively, are a distant second and third in frequency in the Columbia River system. The chum salmon, with an average weight of 20 kg (9 pounds), is less common, with its occurrence confined to the Lower Columbia River. Pink salmon, with an average weight of 11 kg (5 pounds), is only occasionally found in the Columbia River.

The Columbia River is also the principal steelhead trout stream on the Pacific Northwest coast. The steelhead is a sea-run rainbow trout which inhabits a stream system offering an outlet to the ocean. Unlike salmon, however, steelhead return to the ocean after spawning in fresh water. Steelhead have an average weight of 22 kg (10 pounds) and were undoubtedly of greater importance to aboriginal peoples at the mouth of the Columbia River than certain of the less common salmon species. Since steelhead are captured and utilized at the same time and in the same manner as the salmon, they are considered along with the salmon as contributors to the salmon fisheries.

Eulachon, locally known as Columbia River smelt, are small fish, 12 to 20 mm long at maturity. They enter the Columbia River in dense schools from December through March and ascend various lower river tributaries, mainly the Cowlitz, Lewis, Grays and Sandy rivers, where they remain on into April. Eulachon are apparently like the Pacific salmon in not surviving after spawning. They have a delicious flavor and are exceedingly rich in fat. Prior to the manufacture of candles, these fish were dried, fitted with wicks, and used as a source of light. This application explains why eulachon are still sometimes referred to as candlefish (Craig and Hacker 1940:208).

Sturgeon were once extremely abundant in the Lower Columbia River where two species are present, the white sturgeon and the green sturgeon. The white sturgeon is larger than the green, having a maximum weight of over 2200 kg (1000 pounds), while the green sturgeon seldom weighs over 770 kg (350 pounds). As a food fish, the white sturgeon is considered superior to the green sturgeon. Both species are anadromous,

depositing their eggs in freshwater and spending portions of their life in the sea. Sturgeon do not adhere to the clear-cut distinction between fresh- and saltwater residence that is so marked in salmon. The green sturgeon prefers the salt or brackish waters of the estuary, while the white sturgeon often remains in freshwater throughout the year (Craig and Hacker 1940:208).

The Pacific lamprey is an eel-like vertebrate with a long slender body and a jawless mouth surrounded by a horny, sucking disk containing plate-like teeth. They are found in both the main channel of the Columbia River as well as smaller tributary streams (Pruter 1966:34-37).

Many marine fish, including anadromous species, spend time in the Columbia River estuary. Several of these, including herring, need estuaries for successful spawning. Estuaries are also important to the survival of young salmon and steelhead by providing them an opportunity to adjust to full seawater conditions. Likewise, estuaries play an important part in the adjustment of adults to freshwater. Most bottom fishes are dependent on estuaries during some part of their lives (Lauman, Smith and Thompson 1972:12).

Estuaries are especially important for the production of food organisms. The estuarine food chain includes microscopic phytoplankton and other algae, zooplankton, small crustaceans, mollusks, annelids, as well as fish. Tideflats as well as deep water channels and rocky areas provide a variety of rearing habitats. Fish and shellfish typically found associated with tideflats include flounder, perch, rockfish, salmon, crabs, shrimp, and clams. In addition to those species found on tideflats, shad, sturgeon, herring, anchovy, and smelt reside in the estuary

channels. Rocky areas in the Columbia River estuary are the preferred feeding and rearing areas of perch, rockfish, greenling, and cabezon (Gaumer, Demory and Osis 1973).

In addition to the marine fish species, resident cutthroat and rainbow trout inhabit nearly all freshwater streams which maintain perennial flows, as well as most lakes and ponds. More than a dozen species of "rough" fish are also found in the waters of the Columbia River and its tributaries (Thompson and Fortune 1968:8). Freshwater crawfish are also indigenous to the Columbia River and tributary streams (Pruter 1966:21).

Shellfish

Dungeness crabs are extremely common in the ocean waters off the mouth of the Columbia River and also occur inside the estuary. They favor sandy bottoms but are found on most other bottoms as well (Pruter 1966:56-57).

Common intertidal shellfish found at the mouth of the Columbia River include bay clams and razor clams. Bay clams include gaper clam, bentnose clam, cockle, butter clam, softshell clam and littleneck clam. Razor clams are found almost exclusively on beaches along the open coast. These clams are abundant on the sandy ocean beaches on either side of the mouth of the Columbia River (Edmondson 1920; Marriage 1958).

Finally, the Western or Olympia oyster, which formerly flourished in Willapa Bay to the north, was probably also available through trade or travel to the aboriginal peoples at the mouth of the Columbia River (Pruter 1966:61).

Sea Mammals

Sea mammals occurring in the ocean waters off the mouth of the Columbia River include the sea otter, Steller sea lion, California sea lion, northern fur seal, harbor seal, and harbor porpoise. Seals and sea lions often rest on the rocky coast at Cape Disappointment. The Steller sea lion and harbor porpoise also occasionally enter the lower reaches of the Columbia River, while harbor seals have been observed as far upstream as The Dalles. In addition to the sea mammals listed above, a number of different species of whales and porpoises are found in the waters of the Pacific Ocean off the Oregon and Washington coasts (see Bailey 1936:336-49; Maser et al. 1981:372-457).

Terrestrial Wildlife

Big game species inhabiting the forests around the mouth of the Columbia River include black-tailed deer and Roosevelt elk, both of which are plentiful. Black bears are also found in the area, and white-tailed deer occur in the bottom lands along the Lower Columbia River (Thompson and Fortune 1968:36-37).

The principal furbearers in the area are beaver, muskrat, mink, and otter. Less common are raccoon, bobcat, fox, weasel, hare, rabbit, and skunk (Bailey 1936). All of these furbearers rely extensively on water for their existence (Thompson and Fortune 1968:40-41).

Five species of upland game birds are found in the area. Two species, the band-tailed pigeon and mourning dove, are migratory. Resident game birds include blue grouse, ruffed grouse, and mountain quail. All

of the above game birds primarily utilize forest habitat (Thompson and Fortune 1968:38).

Avifauna

The avifauna which frequent the area around the mouth of the Columbia River include both sea birds and waterfowl. Sea birds are associated with the open bays and offshore oceanic habitats, as well as the estuarine mud flats and marshes of the estuary. A seabird rookery exists on the headland cliffs of Cape Disappointment. The mouth of the Columbia River is situated along the Pacific Flyway. Migratory waterfowl concentrations occur during the fall and winter in the open estuary, estuarine marsh, and inland riverine habitats. Nineteen species of waterfowl spend all or part of each year in the area (Thompson and Fortune 1968:38-40).

Variation in Resource Availability

As pointed out by Suttles (1968b), the abundance and availability of subsistence resources vary locally and seasonally along the Northwest Coast. This is especially the case with the resource of greatest importance to aboriginal subsistence in this region: anadromous fish. The spawning migrations of anadromous fish have a distinct "structure" which includes both a spatial and a temporal component (Schalk 1977).

The structure of anadromous fish runs at the mouth of the Columbia River is outlined in Table 2-2. In general, earlier salmon and steelhead runs are composed of fish migrating greater distances inland. Late summer and autumn runs tend to spawn in lower river tributaries, and

Table 2-2. Anadromous Fish Runs at the Mouth of the Columbia River

Species	Runs	Spawning Grounds
Spring Chinook	(a) February-May	Lower river (primarily Willamette River; also Cowlitz, Kalama and Lewis rivers)
	(b) March-May	Upriver (Upper and Middle Columbia River tributaries)
Summer Chinook	May-July	Upriver (Upper Columbia and Snake River systems)
Fall Chinook	(a) August-September	Upriver (Upper and Middle Columbia and Snake river systems)
	(b) August-October	Lower river (Willamette, Lewis, Kalama rivers; Skamokawa and Big creeks)
Sockeye	June-July	Upriver (lakes tributary to the Middle and Upper Columbia and Snake river systems)
Coho	August-December	Lower river
Chum	October-December	Lower river
Summer Steelhead	(a) April-May	Lower river
	(b) June-August	Upriver (Middle and Upper Columbia and Snake river systems)
	(c) August-October	Clearwater River, Idaho
Winter Steelhead	November-April	Lower river (Cowlitz, Lewis, Kalama, Washougal, Grays, Elochoman, Willamette and Sandy rivers)
Eulachon	November-February	Lower river (Cowlitz, Lewis, Grays and Sandy rivers)

Sources: Lavier 1976:H2-H5; Fulton 1970; Pruter 1972

fall runs are principally composed of fish returning to rivers rising in the coastal mountains. For aboriginal peoples at the mouth of the Columbia River, then, anadromous fish would have been available for most of the year in the main river channel. Not until fall would spawning begin in the tributary streams near the mouth of the Columbia River. The species spawning in these streams were the Fall chinook, coho, and chum salmon and winter steelhead trout.

Besides anadromous fish, there is a seasonal aspect to the abundance and availability of other subsistence resources as well. For example, waterfowl are most common at the mouth of the Columbia River during the fall, winter, and spring. Vegetal foods such as shoots, roots, and berries are available from spring through fall. Most sea mammals and certain species of sea birds are only present in the area during the summer. The availability of subsistence resources also may have fluctuated in abundance from year to year, due to the regular cycles of animal populations as well as in response to less predictable changes, as in weather (Suttles 1968b:133-135).

The seasonal and annual variation in the availability and abundance of anadromous fish and other subsistence resources on the Northwest Coast was offset by the development of a storage technology. Salmon were dried and packed in great quantities for consumption during the winter, a season otherwise characterized by reduced availability of subsistence resources. This storage capacity, together with the development of specialized technological devices such as toggling harpoons, composite fish-hooks, and fish weirs, raised the carrying capacity of the environment and provided the basis for the high population density and residential stability which characterized the ethnographic Northwest Coast (Fladmark 1975:90-95; Schalk 1977:231-238).

Summary

From the foregoing description of the natural environment at the mouth of the Columbia River, it can be seen that this area provided an

especially favorable setting for aboriginal occupation, even by Northwest Coast standards. Within the study area occurs a variety of habitats--marine, estuarine, riverine, and terrestrial--which together make this area one of the most biotically productive environments along the Northwest Coast.

The richness of the environment at the mouth of the Columbia River is perhaps best reflected in the magnitude and duration of the anadromous fish runs. Not only is there considerable species diversity, but runs of one species or another occur more or less throughout the year. In this respect, the Columbia contrasts with smaller rivers along the Northwest Coast in which peak runs of anadromous fish tend to occur only in late summer and fall. In a region where seasonal and annual fluctuations in climate and wildlife may be extensive, the area around the mouth of the Columbia River offered a range of varied food resources with flexible schedules of availability.

CHAPTER THREE

AN ETHNOGRAPHIC PERSPECTIVE ON SETTLEMENT AND SUBSISTENCE

At the time of historic contact, the area around the mouth of the Columbia River was occupied by four separate Chinookan groups. The people on the north shore at the mouth of the river, whose territory extended northward along the Washington coast to Willapa (formerly Shoalwater) Bay, were known as the Chinook proper, Shoalwater Chinook, or Lower Band of Chinook (per 1851 treaty). Opposite these people on the south shore at the mouth of the river and along the northern Oregon coast were the Clatsop. Above these two groups along the Columbia River were the Wahkiakum on the north bank and the Kathlamet on the south bank. These latter two groups later merged in historic times and are often treated as a single people under the name Kathlamet (e.g., Spier 1936:21-23; Ray 1938:37-38).

All four Chinookan groups at the mouth of the Columbia River shared many aspects of their lifeways in common, and for this reason were considered together as the "Lower Chinook" in the principal account of these peoples by Ray (1938; also see Ray 1976). Subsequent studies have followed Ray's lead and have also treated the four Chinookan groups at the mouth of the Columbia River as a single cultural unit (e.g., Taylor, 1974; Suphan 1974; Ruby and Brown 1976; Saleeby 1983; Saleeby and Pettigrew 1983).

Linguistic and Cultural Relations

The Chinookan linguistic family, which is classified as an independent branch of the Penutian phylum, is commonly considered to consist of two languages, Lower and Upper Chinook (Boas 1894:5-6; 1901:6). The two Chinookan groups at the mouth of the Columbia River--the Chinook proper and the Clatsop--spoke two dialects which were practically identical and which together comprise the Lower Chinook language. These dialects were distinct from the related, but mutually unintelligible, languages of the remaining Chinookan peoples upriver.

The two Chinookan groups immediately upstream--the Wahkiakum and the Kathlamet--spoke a separate language known as Kathlamet. The Kathlamet language is similar to the dialects spoken by other Chinookan peoples living farther upriver, and all of these dialects are commonly grouped together as the Upper Chinook language. It has recently been suggested, however, that Kathlamet has sufficiently different pronunciation, grammar, and lexical items for it to be considered a third language, standing between Lower and Upper Chinook, and the name Middle Chinook has been proposed (Hymes 1981:16).

Although they spoke distinct languages, Ray (1938) considered the Chinook proper and Clatsop, along with the Wahkiakum and Kathlamet, as "a single ethnic unit." In his own words, "it should be emphasized that the considerable dialect [sic] difference between the Kathlamet and others was not by any means reflected to a comparable degree in the culture as a whole." In Ray's opinion, the treatment of these four groups as a single entity was justified because cultural differences between

them were very slight due to the "constant intercourse and intermarriage" which occurred within this area (Ray 1938:37-38).

Considering his research in historical perspective, however, it now seems likely that Ray may have inadvertently over-emphasized the extent to which culture contact and intermarriage occurred ethnographically among the native groups along the Lower Columbia River. Ray's ideas on these matters were derived largely from the fact that his informants and the other remaining Chinookans at Bay Center in the 1930s had mixed cultural backgrounds, and he uncritically assumed that intermarriage and other forms of inter-cultural contact occurred at a similarly high rate among the native peoples of this region in aboriginal times.

This view of aboriginal lifeways, however, ignores the drastic population decline and the extreme disruption of the native cultures which occurred in the years following the first contact with Euro-Americans. The subsequent resettlement and intermarriage of the remaining native peoples in this region undoubtedly had a "leveling effect" in which any differences which formerly existed between the various groups became merged within a single surviving Indian "culture." It is this hybrid form of aboriginal culture which was conveyed to Ray by his informants. AS a result, Ray's portrayal of the four Chinookan groups as the "Lower Chinook" may not represent an accurate picture of aboriginal lifeways at the mouth of the Columbia River as they existed prior to historic contact.

For this reason, the four Chinookan groups at the mouth of the Columbia River will be divided here into two units along linguistic lines. The term Lower Chinook will be confined to the two groups at the

mouth of the river who spoke the Lower Chinook language--the Chinook proper and the Clatsop. Likewise, the term Middle Chinook will be applied to the other two groups in the study area--the Wahkiakum and the Kathlamet. It should be noted that the name Middle Chinook is not original in this study, having been previously used long ago by Gatschet (1877), as well as more recently by Wuerch (1979) and Hymes (1981:16), to refer to the Chinookan groups occupying the central portion of the Lower Columbia Valley.

Lower Chinook Settlement and Subsistence

The two groups who spoke the Lower Chinook language--the Chinook proper and the Clatsop--occupied the coastal areas on either side of the mouth of the Columbia River. These groups were the first Chinookan peoples encountered by maritime explorers and fur traders and their location at the mouth of the river meant that they were exposed to contact with Euro-Americans to a greater extent than were most of the other aboriginal peoples in the region. As a result, there is a considerable amount of information about the Chinook proper and the Clatsop in historical sources.

In this section, a brief summary of the ethnographic and ethnohistoric information on the settlement and subsistence practices of the two Lower Chinookan groups is presented. Since the Chinook proper and Clatsop occupied separate territories on either side of the Columbia River, the information available for each group is considered separately. This section concludes with a discussion of how the settlements

of these peoples were articulated in an annual cycle of subsistence activities to form the Lower Chinook subsistence-settlement system.

Chinook Settlements

The Chinook proper occupied the north bank of the Columbia River from Cape Disappointment at the mouth upstream at least as far as Megler (Curtis 1911:182) and possibly as far upstream as the mouth of Grays Bay (Farrand 1907a:272). One of their principal settlements was the village *ɔ'inúk* (Chehalis term) on Baker Bay, from which both the name of this group and the name of the linguistically related peoples along the Columbia River were derived (Boas 1911:563). The territory of the Chinook proper extended north along the Washington coast to Willapa (formerly Shoalwater) Bay. The people on Willapa Bay are sometimes considered a separate group under the name Shoalwater Chinook (Spier 1936:31). Both the Chinook proper and the Shoalwater Chinook spoke the same dialect, however, and it is unclear to what extent they should be considered separately (Silverstein n.d.).

Ray (1938:37, Figure 1) includes Grays Bay within the territory of the Chinook proper, but Curtis (1911:182) assigns villages around Grays Bay to the Wahkiakum. The idea that Grays Bay was properly within Wahkiakum territory is supported by the testimony of Mallet (1902) and that interpretation is followed here.

To the north and east of the Chinook proper were the Salish-speaking Chehalis, and to the east up the Willapa River were the Athapaskan-speaking Kwalhiokwa (Farrand 1970a:272). It is generally agreed that the Chinook proper occupied at least the southern portion of

Willapa Bay as far north as Nemah and Nahcotta (Curtis 1911:182). The north shore of Willapa Bay was claimed by both the Chinook proper and the Lower Chehalis, however, and at this point in time it is probably not possible to determine who were the original inhabitants (cf. Spier 1936:29; Ray 1938:36).

At the time of historic contact, the principal channel of the Columbia River ran along the north shore, and ships entering the river generally sailed into Baker Bay where the Chinook proper had numerous settlements. This situation brought about considerable contact with Euro-Americans, and as a result the names and locations of more than 30 settlements occupied by the Chinook proper in historic times have been recorded (Table 3-1). Many of these sites are shown on early maps of the area (e.g., Broughton 1792; Arrowsmith 1798; Slacum 1836; de Mofras 1844; Belcher 1844). Most of these settlements were described as summer or winter villages, but a few were described as temporary camps. The majority of these settlements were located along Willapa Bay, but approximately one-third were situated along the north shore at the mouth of the Columbia River (Figure 3-1).

There are numerous references in the historical literature which indicate that occupation of the villages of the Chinook proper at the mouth of the Columbia River was of a seasonal nature, beginning in the late spring and continuing through the summer into early fall, during which time the major runs of Chinook salmon took place (e.g., Coues 1897:880; Swan 1857:103; Scouler 1905:277; Ross 1849:102; Franchere 1969:89, 96). This corresponds with Ray's (1938:39) ethnographic notes

Table 3-1. Chinook Proper Settlements

Map Reference Number *	Name	Location	Season of Use**	References
CP1	*Qatiltsiuk*	1½ miles below Megler (upstream side of Point Ellice)	(S)	Curtis 1911:182
CP2	*Kekaiuqilhun*	2 miles below Megler (downstream side of Ellice near MacGowan)	(S)	Curtis 1911:182 cf. Thwaites 1905:3: 223, 225
CP3	*Utxumuiekhan*	At Fort Columbia	(S)	Curtis 1911:182
CP4	*Ilakhahl*	At Chinook	(S)	Curtis 1911:182 cf. Swan 1857:109-10 cf. Mallet 1902:97 Pickernell 1902:168-69 George 1902:174-75, 190-91
CP5	*Waphlutsin*	2 miles below Chinook (near mouth of Chinook River)	(S)	Curtis 1911:182 cf. Thwaites 1905:3:230
CP6	*Qwxtsa'mts*	At mouth of Chinook River	(S)	Ray 1938:39 cf. Thwaites 1905:230, 232, 237-38 George 1902:175 Pickernell 1902:168-69
CP7	*ɬwx'ɬqat* *Walhut*	At mouth of Wallicut River	(S)	Ray 1938:39 cf. Curtis 1911:182 cf. Thwaites 1905:3:232
CP8	*Ho'equalahuk* *Utsihutk*	At Ilwaco	(S)	Ray 1938:39 Curtis 1911:182 George 1902:175, 191
CP9	*Hoxsxa'itmɬe*	At Fort Canby	(S)	Ray 1938:39 Curtis 1911:182
CP10	*Hu'patstak*	At Nahcotta	(W)	Ray 1938:40 Curtis 1911:183 George 1902:176
CP11	*Hu'hushl* (S)+	At mouth of Bear River	(W)	Curtis 1911:183 George 1902:195
CP12	*ɬqɣi'l'so'* on *nuqa'lamil'* island	On arm of bay below mouth of Naselle River (Long Island?)	W	Ray 1938:40 cf. Mallet 1902:105
CP13	*ni'sal* *Notsalappohl* (S)	At head of Naselle River estuary	S/W	Ray 1938:40 Curtis 1911:183 George 1902:193-94
	Tse'yuq	At Oysterville	W	Ray 1938:40
	Kalaxt'aus	At Oysterville Point	(S)	Ray 1938:40
	Ma'x^{u} *Mahu* (S) *Hemah* *Mar'hoo*	At the mouth of Nemah River	(W)	Ray 1938:40 Curtis 1911:182 Hodge 1910:54 Swan 1857:211 George 1902:194
	Ta'kam'noq	At Sandy Point	W	Ray 1938:40

Table 3-1 (continued)

Map Reference Number *	Name	Location	Season of Use**	References
	Quer'quelin *Hayakolole* (S) *Kaulaxul* (S)	At the mouth of the Querquellin River (south fork of Palix River?)	(W)	Ray 1938:40 Swan 1857:211 cf. Hodge 1910:47-48 cf. Spier 1936:30
	Toq'pi'luks *Qaulilak* (S)	At mouth of Palix River	(W)	Ray 1938:40 Curtis 1913:173
	Tutsuɬɬso'q *Tushautsuk* (S)	On the bay west of Bay Center	(W)	Ray 1938:40 Curtis 1913:173 George 1902:177, 195
	namla'laks	At Goose Point	(W)	Ray 1938:40
	xa'xots *Kaxots* (S) *Kaxhots* (S) *Khar'hoots*	3 miles north of the mouth of the Palix River at the former town of Bruceport	(W)	Ray 1938:40 Hodge 1910:938 Curtis 1913:173 Swan 1857:211
	Que-lap'ton-lilt	On the south side of the Willapa River near its mouth	(W)	Ray 1938:40 Swan 1857:211 Hodge 1910:338, 955
	Qilaptihl (S)	On Stewart's Point, halfway between Bay Center and South Bend	(W)	Curtis 1913:173 cf. Spier 1936:30
	Tsxa'lsos *Tsha'lso* (S)	On the Willapa River between South Bend and Raymond	(W)	Ray 1938:41 Curtis 1913:173
	Tatyasap (S)	On the Willapa River opposite Raymond	(W)	Curtis 1913:173
	Hlahuon (S)	On the Willapa River near the town of Willapa	(W)	Curtis 1913:173
	xa'kɬlc *Kplelah* (S)	At the mouth of Smith Creek	W	Ray 1938:41 Curtis 1913:173
	Toxxnd'na *Kxapka?* (S)	On the west side of North River at its mouth	(W)	Ray 1938:41 cf. Curtis 1913:173
	Hu'kanɬ (S) *Sumothanhl*	At Tokeland	W	Ray 1938:41 Curtis 1913:173
	Ha'mstcats (S)	Between Tokeland and North Cove at the present site of Georgetown	(W)	Ray 1938:41 Curtis 1913:173
	Hlimmi (S)	On a little bay near North Cove	(W)	Curtis 1913:173
	Huai'lus	At Grayland on the coast	?	Ray 1938:41

* Settlements without a map reference number are not included on Figure 3-1.

** W = Winter months; S = Summer months; ( ) = Inferred seasonality; ? = Unknown

\+ (S) = Salish term

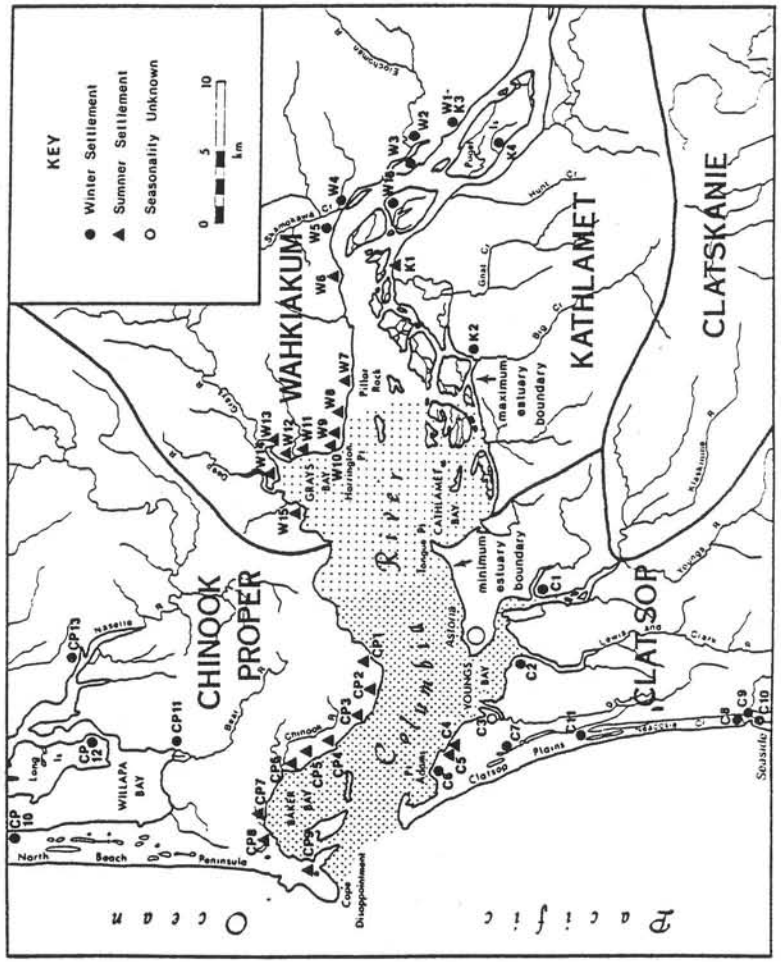

Figure 3-1. Location of known ethnographic settlements.

that fishing was highly productive at the villages of *ɬwa'l̓xat* and *noxswa'itmɬs* on Baker Bay.

The settlements of the Chinook proper on Willapa Bay, on the other hand, were generally considered winter villages (Gibbs 1877:166). The occupation of these settlements began at the end of August and coincided with the run of dog (chum) salmon which spawn in the rivers and streams draining into the bay (Swan 1857:140; Rollins 1935:8). At the conclusion of this second fishing season, the Chinook proper remained in winter villages around Willapa Bay throughout the winter. The famous chief Comcomly, for example, is known to have spent the winter at a settlement on the Naselle River which was well protected from winter storms, while in the spring he returned with the start of the new fishing season to his village on Baker Bay (Cox 1832:266). According to Curtis (1911:182), "those who wintered on the bay returned to the Columbia about the first of May for the salmon fishing."

The settlements of the Chinook proper on Baker Bay and those to the north along Willapa Bay were connected by a portage route which facilitated travel between these two areas. From the vicinity of present-day Ilwaco on Baker Bay, the route ran north across an extensive cranberry bog to Tarlatt Slough which then feeds into Willapa Bay (Swan 1857:246-47).

In addition to summer and winter villages, the Chinook proper also made use of temporary camps. The most common type of temporary camp used by these people was associated with the gathering of shellfish, which were especially plentiful around Willapa Bay (Swan 1857:26). Ray (1938:40) mentions that *kaɬawa'uus* near the tip of the North Beach

Penisula "was an important clam-digging site" where "camps were maintained for both digging and drying of clams." These shellfish gathering camps were most commonly occupied during the summer (Swan 1857:59, 249).

Clatsop Settlements

The Clatsop occupied the south bank of the Columbia River from Point Adams at its mouth to at least as far upstream as Tongue Point, and south along the Oregon coast to Tillamook Head (Farrand 1907b:305; Berreman 1937:15). Their name derives from *t-iá-ḱ'ilak*, the Lower Chinook term for "those who have pounded salmon," while one of their main villages on Point Adams is called *t-iá-ḱilak-i(x)* meaning "where there is pounded salmon" (Silverstein n.d.). To the south of the Clatsop along the coast were the Salish-speaking Nehalem Tillamook, while to the eastward above Tongue Point were the Kathlamet.

Considerably less information is available concerning Clatsop settlements than is the case for the Chinook proper. Although Fort Astoria was within their territory, the remainder of the area occupied by the Clatsop remained somewhat off the beaten track for several decades after the time of historic contact. The names and locations of known Clatsop settlements are listed in Table 3-2 and shown in Figure 3-1.

The majority of Clatsop villages were clustered along Point Adams and at the entrance to Youngs Bay. The villages on Point Adams are shown on a number of early maps of the area (e.g., Broughton 1892; Slacum 1836; de Mofras 1844). At these settlements, the Clatsop were admirably situated for fishing the spring and summer runs of salmon

Table 3-2. Clatsop Settlements

Map Reference Number	Name	Location	Season of Use*	References
C1	*Nu'sma'spu*	South of Astoria on Youngs Bay, probably at the mouth of Walluski River	(W)	Curtis 1911:183
C2	*Ni'tl*	At the mouth of the Lewis and Clark River	W	Curtis 1911:183 Coues 1897:772
C3	*Skepinaon*	About 4 miles below *Ni'tl*, at the mouth of Skipanon Creek	?	Curtis 1911:183 Lyman 1900:321
C4	*Naiyaaksta* *Neahkstowt* *Nayaqatacwe*	About 1¼ miles above Fort Stevens near Hammond	S	Curtis 1911:183 Farrand 1907b:305 Hodge 1910:48 Boas 1894:233 Lyman 1900:321
C5	*Kunupi* *Konope*	About a mile above Fort Stevens	S	Curtis 1911:183 Boas 1894:274 Lyman 1900:321
C6	*Klatsap* *Neahkeluk* *Tiakelake* *Klakhelnk?* "Katata's village"	At Fort Stevens	W	Curtis 1911:183 Farrand 1907b:305 Hodge 1910:48 Boas 1894:277 Lyman 1900:321 Thwaites 1905:8 Pipes 1934:158
C7	*Liamenalucta*	On one of the several lakes just below Point Adams	(W)	Boas 1901:236
C8	*Neacoxy* *Niazaqce*	At the mouth of Neacoxie Creek (at about Gearhart)	W	Lee and Frost 1844:283, 295 Thwaites 1905:3:320 Boas 1894:92 Lyman 1900:321
C9	*Niakswankih* *Niakiswanqui*	At mouth of Newanna Creek; "the middle village"	W	Farrand 1907b:305 Boas 1901:236 Thwaites 1905:3:320
C10	*Necotat* *Necanicum?*	At Seaside on south side of mouth of Necanicum River	W	Farrand 1907b:305 Thwaites 1905:3:320 Lyman 1900:321
C11	*La'tcap* "Cuscalah's village"	At Camp Clatsop	W	Ray 1938:39 Farrand 1907b:305 Thwaites 1905:3:272-74

* W = Winter months ( ) = Inferred seasonality
S = Summer months ? = Unknown

which proceed up the main channel of the Columbia River during their migration to spawning grounds in the Columbia's headwaters. According to Suphan (1974:207), the Clatsop also journeyed upriver above Tongue Point where they fished along the lower course of the John Day River.

A second cluster of Clatsop settlements occurred down the coast around the inlet formed by the confluence of the Necanicum River and Neacoxie and Neawanna creeks at modern Seaside (Clarke 1905:420). According to Lewis and Clark (Thwaites 1905:3:320), these latter villages were shared with the Tillamook. The Clatsop settlements along the Columbia River and those to the south around the mouth of the Necanicum River were connected by a well-traveled portage route. From the Columbia River, this route ran up the Skipanon River to the head of navigation, then west over the Clatsop Plains to Neacoxie Creek which has its outlet at the mouth of the Necanicum River. An alternative was to travel west from the Skipanon River to the ocean and then south down the beach to the mouth of the Necanicum River (Pipes 1934:61-62).

As was the case with the Chinook proper, the Clatsop villages along the Columbia River received their heaviest occupation during the summer fishing season. At this time, Clatsop from the villages near Seaside, and apparently sometimes Tillamooks as well, came up to fish along the Columbia River (Wilkes 1845:5:116). In the fall the process was reversed, with Clatsop from the northern villages visiting those at Seaside:

> This stream is called by the natives Neacoxy, the water in which they take the fall salmon. Here we found the Clatsop Indians waiting for the commencement of their second salmon season, the season on the Columbia having closed in August (Lee and Frost 1844:275).

The area between the Columbia River and Seaside villages--Clatsop Plains--was a favorable location for the gathering of roots, fruits, and berries, as were the marshes and streams along Youngs Bay (Lee and Frost 1844:313; Boas 1901:231, 233). The site of modern Astoria is also mentioned as an area where many people came together to pick berries (Gairdner 1841:255). The lowlands along Youngs Bay were noted by Lewis and Clark as containing a plentiful supply of deer and elk (Thwaites 1905:3:256). The Clatsop also apparently gathered roots and hunted game on the slopes of Saddle Mountain at the head of the Lewis and Clark River (Boas 1901:221), and may have hunted as far inland as the Nehalem Valley as well (Suphan 1974:39-41). Much of the hunting, gathering and fishing by the Clatsop was probably carried out directly from their villages, but seasonal camps were probably also used on occasion.

In summary, Clatsop villages were concentrated in two areas. The first area included a number of villages along the south shore of the Columbia River from Point Adams to Youngs Bay. The second area was south along the Pacific coast at the confluence of the Necanicum River and Neacoxie and Neawanna creeks. The principal area exploited by the Clatsops was directly behind and between these settlements, including Clatsop Plains and the upper Youngs Bay area. Only irregular use was made of the forested uplands around this nuclear area (Suphan 1974:212).

Lower Chinook Subsistence-Settlement System

Settlement and subsistence among the Lower Chinook at the mouth of the Columbia River was strongly biseasonal in nature. Subsistence, which focused primarily on fishing, concentrated the bulk of the

population in two different areas during the year. In turn, these concentrations correlated with the two principal types of settlements, a summer village and a winter village. Occupation of these different types of settlements was regulated closely to coincide with the schedule of anadromous fish runs in this area.

Spring and Summer

In the spring and summer, both the Chinook proper and the Clatsop occupied settlements along the main channel of the Columbia River where fishing was the principal economic activity. The spring runs of Chinook salmon and summer steelhead begin entering the mouth of the river as early as February-March, but peak during the summer runs from May through July. The Chinook salmon and summer steelhead runs are supplemented from mid-summer through October-November by runs of sockeye and coho salmon. All of these anadromous fish species are on their way to spawning areas in tributaries of the Columbia River system far upstream, and thus are only available in the main channel of the Columbia River.

During the spring and summer the Lower Chinook occupied summer villages situated along both shores at the mouth of the Columbia River. The settlements of the Chinook proper were concentrated along the margins of Baker Bay from just inside Cape Disappointment upstream to Point Ellice, while Clatsop settlements were concentrated along Point Adams and the entrance to Youngs Bay. Fishing was particularly productive in these areas because, at the time of historic contact, there were two main channels at the entrance to the Columbia and both ran close along the shores on either side of the river. Fish entering the river were

thus available close to the shores and, in addition, once inside the mouth of the river tended to concentrate in the shallow waters of Baker and Youngs bays where they were highly accessible to aboriginal fishermen. Many of the salmon and other fish caught during the summer were pounded and dried and stored for winter use.

Fall and Winter

During the fall and winter, the focus of Lower Chinook settlement and subsistence shifted away from the main channel of the Columbia River for the "second fishing season" in areas where fall runs of anadromous fish were available. Although some Fall Chinook and silver salmon spawn in the area, the principal anadromous fish species available at this time were chum salmon and winter steelhead trout. In contrast to the earlier spring and summer fish runs, the fall and winter runs spawn in lower tributaries of the Columbia close to the river's mouth, as well as in nearby coastal streams.

For the Chinook proper, the second fishing season took place on Willapa Bay. The summer villages along the mouth of the Columbia River began to be abandoned beginning in August, and by October virtually the entire population had reoccupied villages along the bay. The settlements along Baker Bay remained unoccupied until spring, due to the fact that they were highly exposed to winter storms which approach this area from the south. For this reason, the Chinook proper preferred to reside throughout the winter at villages situated in more sheltered areas along Willapa Bay.

The second fishing season for the Clatsop also took them to areas away from the main channel of the Columbia River. With the beginning of the fall runs, some Clatsop moved south along the coast to the area of present-day Seaside to fish the fall runs of salmon and steelhead which spawn in the Necanicum River. Most of these people probably remained throughout the winter at the Clatsop villages in this area. Although not well documented ethnographically, other Clatsop probably took up temporary residence along the upper stretches of the Youngs River and Lewis and Clark River, which both support sizable fall runs of anadromous fish. The principal Clatsop winter villages appear to have been at sheltered locations off the main channel of the Columbia River, principally near present-day Seaside (Clark 1905:420).

Although the Lower Chinook subsistence-settlement system was closely geared to the availability of anadromous fish, hunting and gathering were also important aspects of their adaptive strategy. Because of the richness of the natural environment, hunting and gathering of some animals or plants were probably carried out virtually throughout the year. A large part of the territory occupied by the Chinook proper and Clatsop was accessible by canoe, and it is likely that most hunting and gathering could be carried out directly from the main villages. Temporary camps do appear to have been occupied for the purpose of gathering shellfish, however, and use of such sites on hunting excursions in interior areas is also suggested.

Middle Chinook Settlement and Subsistence

The two Middle Chinookan groups within the study area--the Wahkiakum and Kathlamet--occupied areas on either side of the Columbia River above the Lower Chinook. Due to their location upstream from the main center of Euro-American activity near the mouth of the river, not as much has been recorded about these peoples as is the case with the Lower Chinook. The limited ethnographic and ethnohistoric information on the settlement and subsistence practices of the Wahkiakum and Kathlamet is summarized below. As in the preceding section on the Lower Chinook, the information available for each group is considered separately. A description of the Middle Chinook subsistence-settlement system is presented at the conclusion of this section.

Wahkiakum Settlements

Immediately above the Chinook proper were the Wahkiakum, who occupied the north shore of the Columbia River from Grays Bay upstream to the vicinity of Oak Point (Farrand 1910:890; cf. Berreman 1937:15). The names of 16 Wahkiakum settlements have been recorded, but unfortunately their precise locations are not always known (Table 3-3). The most prominent Wahkiakum villages are sometimes shown on historic maps of the area (Broughton 1792; Arrowsmith 1798; Thwaites 1905:8; Slacum 1836; de Mofras 1844). The locations of the remaining named settlements have been reconstructed as best as possible from the often conflicting data in ethnographic and ethnohistoric accounts (Figure 3-1).

Table 3-3. Wahkiakum Settlements

Map Reference Number	Name	Location	Season of Use*	References
W1	*Kla'scalxix* *Kahliaishaulhih*	At Cathlamet	W	Boas 1901:6 Curtis 1911:182
W2	*Wahkiakum* *Wa'qaiya·qam*	On Elochoman Slough (?)	W	Thwaites 1905:3:206-8 Ray 1938:38 cf. Strong 1906:61
W3	*Clo'mmn* *Qahliashkumimahih*	Opposite Puget Island near mouth of Elochoman Slough	W	Ray 1938:38 Curtis 1911:182
W4	*Chahulklilham*	At Skamokawa	W	Curtis 1911:182
W5	*Tlashgenemaki* *La'agEnEmaxix·*	At Bay View (?)	W	Thwaites 1905:3:207, 209 Boas 1901:6 Ray 1938:41 Hodge 1910:763
W6	*Wakatama*	Three Tree Point	(S)	Curtis 1911:182
W7	*Qiteakamai*	Near Pillar Rock	(S)	Curtis 1911:182
W8	*Tlalegak* *La'legak* *Elalkak*	Near Dahlia	(S)	Ray 1938:41 Boas in Hodge 1910:762 Curtis 1911:182
W9	*Chakxayalham* *Chaqayalhum* *Toakxayalxam*	At Altoona	(S)	Hodge 1907:232 Curtis 1911:182 Thwaites 1905:3:210-11
W10	*Wakathlqi*	At Harrington Point	(S)	Curtis 1911:182 Thwaites 1905:3:210-11
W11	*Wiqilahhl*	At mouth of Crooked Creek	(S)	Curtis 1911:182
W12	*Tiyakcami*	Just above Grays River	(S)	Curtis 1911:182
W13	*Se'oqwal*	At the mouth of Grays River	(S)	George 1902:194-95 cf. Ray 1938:39
W14	*Ho'qwal*	At the mouth of Deep River	(S)	Ray 1938:39 cf. Mallet 1902:116-17 cf. Thwaites 1905:3: 210-11
W15	*Kilaviuks*	Just below Grays River	(S)	Curtis 1911:182
W16	*Ta'nasilui'*	Tenasilahee Island	W (S)	Ray 1938:39 cf. Thwaites 1905:3: 209
	TlDna'itDno	An island near the entrance to Grays Bay	(W) (S)	Spier 1936:23

* W = Winter months
S = Summer months
( ) = Inferred seasonality

The first mention of the Wahkriakum was by Lewis and Clark, who stopped at one of their villages on their way down the Columbia River on November 7, 1805:

> Two cano(e)s of Indians met and returned with us to their village which is Situated on the Stard Side behind a cluster of Marshey Islands, on a narrow chanl of the river through which we passed to the village of 4 Houses, they gave us to eate Some fish, and Sold us, fish, Wap pa to roots three dogs and 2 otter skins for which we gave fish hooks principally of which they were verry fond.
>
> Those people call themselves War-ci-a-cum (War-ki-a-cum) and Speake a language different from the nativs above with whome they trade for the Wapato roots of which they make great use of as food (Thwaites 1905:3:208).

According to the map prepared by Lewis and Clark (Thwaites 1905:8) this village appears to be located near the south end of the Elochoman Slough area, and thus probably corresponds with the village of *Waqaiya·qam* mentioned by Ray (1938:38).

Proceeding down the right side of the Columbia River, Lewis and Clark on the same day also stopped at another Wahkiakum village:

> We landed at a village of the same nation. This village is at the foot of the high hills on the Stard Side back of 2 small Islands it contains 7 indifferent houses built in the same form of those above, here we purchased a Dog some fish, wap pa to, roots and I purchased 2 beaver Skins for the purpose of makeing me a roab, as the robe I have is rotten and good for nothing (Thwaites 1905:3:209).

According to the map prepared during the expedition (Thwaites 1905:8), the location of this village was in the present Skamokawa-Bayview area, and thus may correspond to *Chahulklilham* (Curtis 1911:182) or *Tlashgenemaki* (Boas 1901:6; Hodge 1910:763; cf. Ray 1838:41). The location of the principal Wahkiakum settlements in the area of the

villages observed by Lewis and Clark is supported by Gairdner's (1841:255) early description of "Wakiakum" territory:

> On the right bank of the Columbia; on a small stream, called Cadet River, a good way below Oak Point, between it and Katlamak.

Additional Wahkiakum villages were situated on the north shore of the Columbia River downstream between Pillar Rock and Harrington Point. In August, 1841, Charles Wilkes wrote:

> We ran up the river a few miles, and anchored just below Pillar Rock, and opposite to Waikaikum. Waikaikum belongs to a chief named Skamakewea, and is a large lodge, picketed around with planks (Wilkes 1845:120).

Other references to Wahkiakum settlements between Pillar Rock and Harrington Point were made by Robert Stuart in June, 1812 (Rollins 1935:28) and John Frost in July, 1840 (Lee and Frost 1844:235).

A third concentration of Wahkiakum villages was found around the margins of Grays Bay. It is sometimes difficult to assign named villages to specific locations in this area, but at least the general locations of these settlements are known. According to Mallet (1902:96, 125-26), additional Wahkiakum settlements were located up Grays River in the interior.

In addition to villages, the Wahkiakum also made use of seasonal camps. One of these was on Tenasillahee Island, which Ray (1938:39) says "was famous as a fishing site, particularly for line fishing for sturgeon and smelt fishing with rake or dip net." On their way downstream on November 7, 1805, Lewis and Clark mention a "temporary residence" on Tenasillahee Island, and note that there were "great numbers of water fowls about those Marshey Islands" (Thwaites 1905:3:209).

As first pointed out by Martin (1980:41), the Wahkiakum made use of settlements in different areas during the course of the year. In general, summer settlements were located along the main channel of the Columbia River and Grays Bay, while winter settlements were situated in more sheltered areas away from the river. This pattern is indicated, for example, by the names of two of their principal settlements. The village of *Chahulkilhum* at Skamokawa was called "Winter Town," while the village of *Chaqayalhum* at Altoona was called "Summer Town" (Curtis 1911:182).

A seasonal pattern of movement by the Wahkiakum is also reflected in the periodicity of observations made by Euro-American explorers in this area. For example, Lewis and Clark encountered the Wahkiakum living at two villages in the Elochoman Slough and Bay View-Skamokawa areas in November, 1805. From there, these explorers continued along the north shore past the Pillar Rock-Altoona area and into Grays Bay without encountering any more inhabited settlements, only "old villages" (Thwaites 1905:3:206-12). In contrast, observations of the Wahkiakum in residence along the main channel of the Columbia River between the Grays Bay and Altoona-Pillar Rock areas occur only during the summer. For example, John Frost in July, 1840, mentions seeing "old Skumaquea and his wife . . . head man of a small band of Indians a few miles above" at the "salmon fishery" at Pillar Rock (Lee and Frost 1844:235). Likewise, it was in August, 1841, that Charles Wilkes reported the Wahkiakum "Chief named Skamakewea" in residence at a village at Pillar Rock (Wilkes 1845:120).

Although not as well documented, a similar seasonal pattern of residence seems indicated for the Wahkiakum settlements in the Grays Bay area. The villages around the margins of the bay were unoccupied when Lewis and Clark were there on November 8, 1805 (Thwaites 1905:3:210-12). According to the testimony of Catherine George (1902:194-95), the village of *Selawish* at the mouth of Grays River was occupied in spring and summer "until the salal berry would become ripe and then they would move over to the Nemah" River which drains into Willapa Bay. Similarly, Samuel Mallet (1902:96, 125-26), who lived at the village of *Mo'qwal* on Grays Bay, states that they went into the interior around the forks of the Grays River where they hunted and had settlements with cedar houses occupied during the fall and winter.

Kathlamet Settlements

Adjoining the Clatsop immediately upstream were the Kathlamet, who occupied settlements along the south shore of the Columbia River from the vicinity of Tongue Point upstream to the neighborhood of Puget Island (Farrand 1907c:216; Berreman 1937:15). Kathlamet territory is said by some to extend farther upriver to Oak Point and beyond, but it is unclear if these writers are referring to the local group named the Kathlamet or to the distribution of the Kathlamet linguistic dialect (Boas 1901:6; Curtis 1911:181-82; Ray 1938:38). The occupation of an important village at Oak Point has been generally attributed to the Skilloot, who also spoke the Kathlamet dialect but were a separate Chinookan group (Franchere 1969:78; see Tate 1981:34-53).

Table 3-4. Kathlamet Settlements

Map Reference Number	Name	Location	Season of Use*	References
K1	*Kahlaamat* *Kala'amat*	On Cathlamet Head (Aldrich Point)	(S)	Thwaites 1905:4:199 Farrand 1907c:216 Curtis 1911:8:182 Gairdner 1841:255 Ray 1938:39
K2	*Hlilusqahih*	About 8 miles above John Day River at Knappa	W	Curtis 1911:8:182 Thwaites 1905:3:252 Thwaites 1905:4:198 Rollins 1935:28
K3	*Kahliaishahlhih*	At Cathlamet, Washington	?	Ray 1938:38 Curtis 1911:182 Boas 1901:6
K4	fishing camp	On Puget Island about 1 mile from its lower tip	W	Thwaites 1905:4:200-2
	fishing camp	At mouth of small creek (probably the Clatskanie River)	W	Thwaites 1905:4:201-2

* W = Winter months ( ) = Inferred seasonality
S = Summer months ? = Unknown

In comparison with the other Chinookan groups around the mouth of the Columbia River, the Kathlamet are only rarely mentioned in early historical accounts. Due to the fact that the main channel of the Columbia River runs along the north shore, most observations by Euro-Americans in this area pertained to the Wahkiakum; relatively few people traveled along the south shore in Kathlamet territory.

Although Farrand (1907c:216) writes that the Kathlamet "seemed to have had but one village, also known as Cathlamet," there are actually references in the historical literature to three Kathlamet villages (Table 3-4). The first, *Kahlaamat* (Curtis 1911:182) or *Kala'amat* (Ray 1938:39), was located on Aldrich Point (formerly called Cathlamet Head) and is the village from which the name of the people and their linguistic

dialect was derived. It was unoccupied when Lewis and Clark camped there on March 24, 1806, as they described it as "an old village of 9 houses opposite to the lower Wackkiacum village" (Thwaites 1905:4:199). A large number of canoe burials associated with this village were observed on a nearby island (Thwaites 1905:4:200). A later account pertaining to the period around the mid-nineteenth century describes this village as consisting of "seven houses under chief Wakahohlk" (Curtis 1911:182).

A second Kathlamet village was *Hlilusqahih* which was located at the present town of Knappa, Oregon (Curtis 1911:182). The most detailed first-hand accounts of the Kathlamet are based on the residents of this village and are contained in the journals of Lewis and Clark, who stopped at this settlement on both their initial journey downstream in November, 1805, and again on their return upstream in March, 1806. In the earlier account the settlement is described as "the Calt-har-mar village of nine large wood houses" and burial canoes were again observed on scaffolds on an island across the channel (Thwaites 1905:3:252). In a later account pertaining to the period around the mid-nineteenth century, this village was described as "four large houses under chief Stulah" (Curtis 1911:182).

The third Kathlamet village was called *Kahliashahlhih* (Curtis 1911: 182), while Boas (1901:6) referred to the people who lived there as *Kla'ecalxix*. This settlement was located at present-day Cathlamet, Washington, and was founded after the time of historic contact by Kathlamet who moved over from the Oregon shore to consolidate with the Wahkiakum (Strong 1906:60-61). An informant of Curtis (1911:182), whose knowledge pertained to the period around the mid-nineteenth century,

describes this settlement as already abandoned by that time, but mentions that "the very large burial-ground indicated a populous village."

It is likely that the Kathlamet village of *Kahlaamat* on Aldrich Point was occupied on a seasonal basis, as suggested by the fact that it was unoccupied when Lewis and Clark camped there in March, 1806. The absence of the aboriginal inhabitants at that time may have been due to the fact that Aldrich Point is highly exposed to winter storms which flow down the valley from the Columbia River Gorge. In summer, however, a settlement on Aldrich Point would have been favorably situated for fishing as the fish must pass through a narrow channel at this location on their migration upstream.

The village of *Hlilusqahih* at present-day Knappa, on the other hand, appears to have been a winter settlement, as Lewis and Clark noted the Kathlamet living there in both November and March. This village was situated on a narrow channel which today is noted as a favorable location for spring fishing. Later in the summer, however, it might have been preferable to fish elsewhere, and it seems reasonable to suggest that the residents of *Hlilusquahih* may have moved to *Kahlaamat* at Aldrich Point for the summer fishing season. *Hlilusqahih* was situated in a more sheltered location, and of the two settlements would have been much preferable as a winter village.

In addition to villages, the Kathlamet also made use of seasonal camps. Proceeding up the river from *Hlilusqahih*, Lewis and Clark encountered two fishing camps on March 25, 1806, which were occupied by the Kathlamet. The first, which was located on Puget Island, was

described as:

> A Cathlahmah fishing camp of one Lodge; here we found 3 man two woman and a couple of boys who must have been there for some time for the purpose of taking sturgeon which they do by trolling. they had 10 or 12 very fine sturgeon which had not been long taken; we wished to purchase some of their fish but they asked such extravegent prices that we declined purchaseing. one of our Party purchased a sea otter skin at the Lodge, for which he gave a dressed Elk skin & a Handkerchief (Thwaites 1905:4:202).

The second Kathlamet fishing camp was encountered nearby at the mouth of a small creek and was described as follows:

> Here we found another party of Cathlahmahs about 10 in number, who had established a temporary residence for the purpose of fishing and takeing seal. they had taken about 12 sturgeon and some seal. they gave us some of the flesh of the seal which I found a great improvement to the poor Elk (Thwaites 1905:4:202).

In addition to fishing, hunting was also carried out on the islands, as noted by an earlier settler:

> Opposite Cathlamet in the Columbia River is Puget Island . . . and here the Indians hunted the deer in the low, marshy lands along the sloughs (Strong 1906:25).

In summary, Kathlamet territory extended along the south shore of the Columbia River from the vicinity of Tongue Point upstream to the vicinity of Puget Island. In ethnographic times, there were apparently two main villages, one at Knappa and the other at Aldrich Point. A third village on the Washington shore at Cathlamet was apparently established in historic times and represented a consolidation of the surviving Kathlamet and Wahkiakum peoples. Occupation of the village at Aldrich Point was probably on a seasonal basis during the summer fishing season. The village at Knappa, on the other hand, is known to have been a winter settlement.

It has been suggested by Suphan (1974:220-21) that the primary area exploited by the Kathlamet was upstream from Knappa, including the river islands, and that the area downstream from Knappa to Tongue Point was little used because of steep bluffs and heavy forest. It should be pointed out, however, that the narrow channel between the south shore and the islands along this section of the river is a favorable area for spring fishing. As Suphan notes elsewhere, the Clatsop evidently sometimes fished along this section of the river around the mouth of the John Day River (Suphan 1974:207). It thus seems likely that this area between Tongue Point and Knappa may have been used on a seasonal basis by both groups.

Middle Chinook Subsistence-Settlement System

The two groups comprising the Middle Chinook--the Wahkiakum and the Kathlamet--each exploited areas along the Lower Columbia immediately upstream from the estuary and both appear to have followed a similar annual round. Like the Chinook proper and the Clatsop at the mouth of the river, settlement and subsistence among these groups was biseasonal in nature, with the location of settlements geared to the exploitation of anadromous fish.

Spring and Summer

With the onset of the summer Chinook salmon run in May and June, most of the Middle Chinook population moved to summer villages where fishing was the principal economic activity. These settlements were generally located along the main channel of the Columbia River at local-

ities where fishing was most advantageous. On the north shore, these settlements were primarily located along the section from Pillar Rock west to Harrington Point and around the margins of Grays Bay. On the south shore, the primary summer fishing village was probably at Aldrich Point.

Fall and Winter

Movement to winter villages in September and October coincided with the beginning of chum salmon runs up tributaries such as Skamokawa Creek and the Elochoman and Grays rivers. It would also coincide in a general way with the deterioration of weather conditions with the oncoming of winter. Winter villages were generally situated along sloughs which were separated from the main river channel by islands or, in some cases (e.g., Grays Bay area), up tributary streams. Location of winter villages in these settings provided shelter from winter storms.

In addition to the basic summer and winter village pattern, the Middle Chinookan peoples also made use of temporary camps. These camps were primarily located on the islands along this section of the river, but some use of temporary camps in interior areas is also suggested. The principal activities carried out at temporary camps appears to have been sturgeon fishing and the hunting of seals and deer.

A Comparison of Lower and Middle Chinook Subsistence-Settlement Systems

The subsistence-settlement systems of the Lower Chinook at the mouth of the Columbia River and the Middle Chinook upstream were similar

in certain respects. All of these Chinookan peoples appear to have practiced a biseasonal settlement pattern involving a summer village and a winter village as the principal types of settlements. Both types of villages were generally situated so as to take maximum advantage of anadromous fish runs. A setting in a sheltered area was also an important consideration in the location of winter villages.

At the same time, however, it is important to stress the basic difference in the nature of the environment to which the Lower and Middle Chinookan groups were adapted. The Lower Chinookan peoples were principally adapted to the estuarine environment occurring at the mouth of the Columbia River, in Willapa Bay, and to a much lesser extent, at the mouth of the Necanicum River. It is in these areas that the Chinook proper and Clatsop carried out most of their fishing and, correspondingly, situated their summer and winter villages. The estuaries, especially Willapa Bay, also provided another important subsistence staple, shellfish, which were also available on the sandy beaches along the coast itself.

In contrast to the estuarine and coastal orientation of the Lower Chinook, the Middle Chinookan groups were closely adapted to the riverine environment immediately upstream. Unlike the Chinook proper and Clatsop who were able to practice their principal economic activity--fishing--on both the Columbia River and in coastal areas like Willapa Bay, the Wahkiakum and Kathlamet were confined in their fishing to their stretch of the Columbia River and its tributary streams. Marine shellfish were unavailable to the Middle Chinook. In view of their geographic situation, it seems likely that the Wahkiakum and

Kathlamet may have depended more on the hunting of large game animals and the gathering of plant foods than the Lower Chinook. An interesting bit of folklore in this regard was related by Mary Kelly, who testified at the 1902 hearings on Chinook Indian claims that she could tell the difference between Lower Chinook, Willapas, and Wahkiakums because the latter "lived so much more by meat than salmon" (Kelly 1902:85).

The recognition of a fundamental dichotomy between the estuarine-oriented adaptation of the Lower Chinook and the riverine-oriented adaptation of the Middle Chinook is further reflected in the boundaries of the territories occupied by these different peoples. As shown in Figure 3-1, the territories of the Chinook proper and Clatsop were well within the maximum upstream boundary of the Columbia River estuary. An even closer correlation is found in the distribution of the known settlements of these peoples, as all of the named villages of the Chinook proper and Clatsop were situated around the lower estuary.

In contrast, the territories of the Wahkiakum and Kathlamet were well above the lower estuary and only overlapped slightly with the maximum upstream boundary of the estuary. The Kathlamet are generally considered to have occupied the margin of the upper estuary above Tongue Point but, significantly, the Clatsop are also reported to have fished in this area (Suphan 1974:207). On the north side of the river, some Wahkiakum settlements were situated around the margin of Grays Bay. This is an area of shallow water peripheral to the main channel of the river, and whether it should properly be included within the estuary is uncertain. As was the case with the Lower Chinook, the closest correlation is seen in the location of major settlements. With the exception

of the Wahkiakum villages around Grays Bay, all of the other known villages of the Wahkiakum and Kathlamet were located above the maximum upstream boundary of the estuary in a riverine environment.

The geographic distribution of the Lower and Middle Chinookan groups thus corresponds closely with the change in the nature of the hydrologic environment at the mouth of the Columbia River. The Lower Chinook were adapted to the estuarine-coastal environment, while the adaptation of the Middle Chinook was riverine-oriented. These basic differences in the cultural adaptations of the Chinookan groups at the mouth of the Columbia River had apparently existed for some time, and it seems reasonable to suggest that over time they contributed to the development of the language boundary which existed between the Lower Chinookan and Middle Chinookan peoples at the beginning of the historic era.

CHAPTER FOUR

SITE TYPES AND USE ZONES: AN ARCHAEOLOGICAL MODEL

Previous attempts at characterizing the nature of aboriginal settlement within the Northwest Coast Culture Area have been carried out primarily from a pan-regional perspective. In the 1955 SAA Seminar on the "Functional and Evolutionary Implications of Community Patterning," the aboriginal cultures of the Northwest Coast were classified as having a "semi-permanent sedentary" settlement pattern, in which a village is occupied continuously for a period of years and then re-established in a new location (Beardsley et al. 1955:140). More recently, Fladmark (1975:7-9) has characterized aboriginal settlement on the Northwest Coast as seasonally sedentary, involving a permanent winter village and several temporary camps occupied in other seasons while various subsistence activities were pursued. Although apparently applicable to other areas of the Northwest Coast, neither of these characterizations seems appropriate for describing the winter village-summer village settlement pattern of the Chinookan peoples at the mouth of the Columbia River.

A more appropriate conceptual framework for describing Chinookan settlement practices may be found in Chang's (1962:30) notion of a "seasonal settlement complex" which is composed of

> A network of seasonal settlements occupied by a group of people in turn in different seasons of the year and being distributed within the confines of an annual subsistence region.

The winter village-summer village settlement pattern of the Chinookan peoples around the mouth of the Columbia River conforms to the particular variation of the seasonal settlement complex integrating two sedentary settlements, which served as permanent bases and remained unchanged in location from year to year, with temporary hunting and fishing camps occupied at various times of the year. According to Chang (1962:30), this particular settlement pattern was characteristic of many coastal hunting-fishing peoples.

Development of an Archaeological Model

In order to relate the archaeological record to the documentary information available for the mouth of the Columbia River, the ethnographic subsistence-settlement patterns were operationalized through the definition of settlement types and environmental use zones. These site types and use zones, as well as their relationships to the ethnographic annual round, are discussed below.

Site Types

On the basis of the ethnographic and ethnohistorical record, the particular form of the seasonal settlement complex practiced by the Chinookan peoples at the mouth of the Columbia River can be said to consist of four basic settlement types, including two types of villages and two types of temporary camps (as summarized in Table 4-1).

Table 4-1. Summary of Settlement Types

Settlement Type	Setting	Expected Archaeological Features
Winter Village	sheltered area away from main river channel	house pits; extensive midden; broad range of tools; fall/winter faunal indicators (e.g., mature elk or deer, shellfish, waterfowl)
Summer Village	along main channel of Columbia River accessible to summer fish runs	house pits; extensive midden; broad range of tools; spring/summer faunal indicators (e.g., juvenile animals, fish remains, sea mammals)
Shellfish-gathering Camp	along coast or estuary	temporary camp featuring shell midden and limited artifact assemblage
Hunting and Fishing Camp	variety of settings on river islands, along tributaries or in island areas	temporary camp featuring smaller or shallower midden, limited artifact and faunal assemblage

Winter Villages

Members of a local group occupied plank, semi-subterranean houses at these settlements during the fall and winter months. These sites were typically located in sheltered areas away from the main channel of the Columbia River. The archaeological remains of winter villages would be expected to feature house pits, a substantial midden (both horizontally and vertically) a wide range of tools representing a variety of activities associated with sedentary living, and faunal remains indicative of winter seasonality. Mature game animals and a greater

proportion of shellfish remains are expected to be among the indicators of winter use (Fladmark 1975:8-9).

Summer Villages

Local populations moved to summer villages with the beginning of the spring fish runs. Families occupied plank houses at these sites which were located along the main channel of the Columbia River at locations suitable for fishing. It would appear that the site setting is the key to distinguishing summer from winter villages, although it is also conceivable that a few village sites might be ideally located to have served as year-round villages. Like winter villages, summer villages would contain house pits, a wide range of cultural remains, and an extensive midden. Specific indicators of summer use would be found in the remains of juvenile animals, a greater proportion of fish remains and evidence of sea mammal hunting (faunal remains or harpoon parts).

Shellfish-gathering Camps

These temporary camps were occupied by small task-specific groups for the primary purpose of collecting shellfish. These sites were situated along the ocean coast and Columbia River estuary where shellfish were available. Ethnographic sources indicate that these camps were occupied primarily during the summer for gathering and drying shellfish for winter storage. Archaeological indicators would include a relatively restricted midden comprised primarily of shell containing a limited range of cultural remains.

Hunting and Fishing Camps

Small groups occupied these camps for the specific purpose of hunting and/or fishing. These small sites were typically located on the river islands, along inland tributaries or in other inland areas. Settlements of this type may have been used during any time of the year. Like shellfish-gathering camps, these sites would probably feature a relatively small or shallow midden with a limited cultural assemblage. Small hearth features, hunting and fishing tools, and the remains of game or fish would be expected at these camps.

In addition to the four site types listed above, ethnographic sources also mention the gathering of roots and berries within the study area. Gathering activities appear to have been ubiquitous, and as such would not necessarily be expected to be recognizable as a distinct archaeological site type. Evidence of vegetal gathering (in the form of digging sticks, mortars and pestles, and floral remains) should be in evidence at the previously-mentioned site types.

Environmental use Zones

As discussed in Chapter 3, ethnographic and ethnohistorical sources suggest that the Chinook proper and Clatsop were closely adapted to the estuary at the mouth of the Columbia River, while the Kathlamet and Wahkiakum were more closely adapted to the riverine environment immediately upstream. In addition to this basic dichotomy in the nature of the hydrological systems, a further distinction can be easily recognized between coastal and inland portions of the study area based upon the

different nature of these environments and the way in which they were used by aboriginal peoples. Although additional, more specific, habitats could be delineated, it is sufficient for the purposes of the present study to recognize four general environmental zones within the study area, each of which offered a particular set of resources for aboriginal subsistence.

Coastal Zone

Aboriginal use of the coastal zone within the study area seems to have been focused primarily on the gathering of shellfish. Butchering of beached whales was carried out whenever possible and, although rarely mentioned in ethnographic or ethnohistorical accounts, fishing for marine species and hunting of sea mammals may also have been carried out in the coastal zone.

Estuarine Zone

The Lower Chinookan groups at the mouth of the Columbia River were closely adapted to the resources available in the estuaries of the Columbia River, Willapa Bay, and the Necanicum River. The most important of these resources were anadromous fish, but certain species of marine fish and shellfish also occur there. In addition, some species of sea mammals, waterfowl, and terrestrial game and wildlife could also be hunted either in the estuary or around its margin.

Riverine Zone

The Middle Chinookan groups were closely adapted to the riverine environment above the Columbia River estuary. The most important resources in this zone were anadromous fish, but freshwater fish species were also available, and waterfowl, harbor seals and terrestrial game and wildlife could also be hunted there.

Inland Zone

Inland areas away from the coast and the Columbia were less productive in terms of exploitable resources than the other three zones. Waterfowl, terrestrial game and wildlife were available in this zone, as were freshwater fish and, during certain times of the year, runs of anadromous fish. Because of the rugged terrain and the dense forest cover, aboriginal use of the inland zone was probably carried out mostly along tributary streams which were accessible by canoe travel.

Interrelationship of Site types and Use Zones

The relationships between settlement types and environmental use zones are summarized in Table 4-2. This table, which also includes major subsistence resources for each zone, is based primarily on ethnographic/ethnohistoric information. The existence of a few resources and site types within each zone have been inferred from the background environmental research, however. For example, shellfish gathering is mentioned for the estuarine zone at Willapa Bay (Ray 1938:40) but is not specifically noted for the Chinook on the coast; because shellfish is a

Table 4-2.

Distribution of Site Types
According to Ethnographic/Ethnohistoric Sources

Environmental-Use Zone	Settlement Type	Resources	Season of Use
Coastal	(shellfish-gathering camp) (hunting and fishing camp)	(shellfish) marine fish beached whales sea mammals terrestrial game and wildlife	Lower Chinook: primarily summer
Estuarine	summer village winter village shellfish-gathering camp (hunting and fishing camp)	anadromous fish certain species of marine fish shellfish sea mammals waterfowl terrestrial game and wildlife	Lower Chinook: year-round
Riverine	summer village winter village hunting and fishing camp	anadromous fish freshwater fish seals waterfowl terrestrial game and wildlife	Middle Chinook: year-round
Inland	hunting and fishing camp winter village	terrestrial game and wildlife (waterfowl) (freshwater and anadromous fish)	Lower and Middle Chinook: primarily fall and winter

*Sites and resources in parentheses are known to be within the use zone, but not noted specifically in ethnographic or ethnohistoric sources.

major ocean resource, it is quite likely that the Lower Chinook also gathered shellfish in the coastal zone. Likewise, it is also plausible that hunting and fishing camps occurred in all four use zones, although they are only specifically mentioned for the inland and riverine zones.

An examination of available resources by environmental use zone, as shown in Figure 4-1, indicates that many of the subsistence resources are found in two or more use zones. This situation probably reduced the necessity for aboriginal peoples to move frequently from one zone to another, contributing to a stable bi-village settlement pattern.

The Lower Chinook, who made use of the estuarine, coastal and inland zones, had access to virtually all of the major resources. Of these resources, only two--beached whales and freshwater fish, neither of which were a major portion of the Lower Chinookan diet--were not available in the estuarine zone. This availability of resources supports the impression that the Lower Chinook were estuarine-oriented peoples rather than coastal-oriented.

The Middle Chinook, on the other hand, had access primarily to the riverine and inland zones. With the exception of sea mammals which followed the anadromous fish runs up into the riverine zone, marine resources (whales, sea birds, marine fish, shellfish) were excluded from the habitual use areas of the Middle Chinook, accounting for their riverine orientation in contrast to the Lower Chinook.

On the basis of resource availability indicated in Figure 4-1, the occurrence of archaeological site types by use zone is predicted schematically in Figure 4-2. All four site types would be expected within

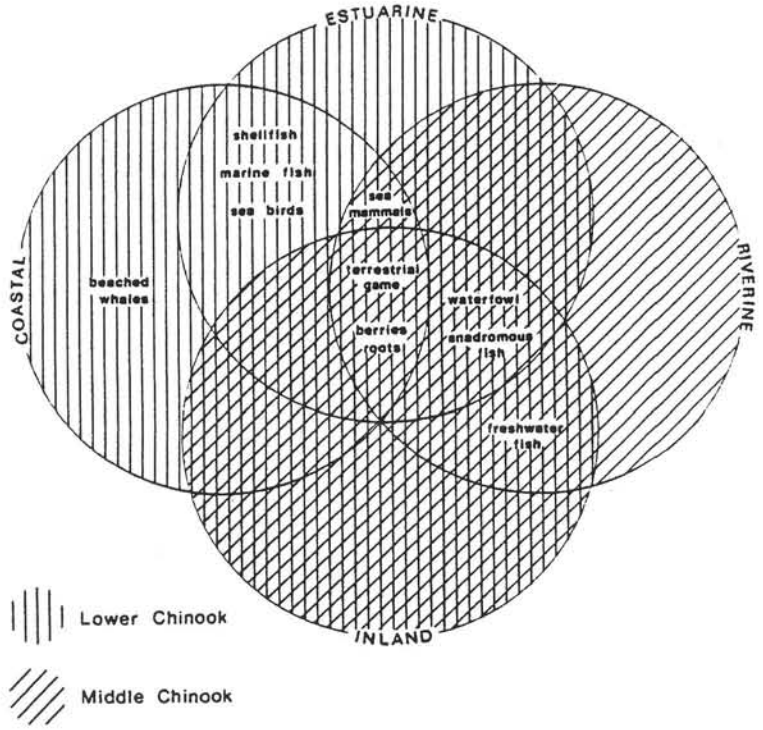

Figure 4-1. Summary of available subsistence resources by environmental-use zone.

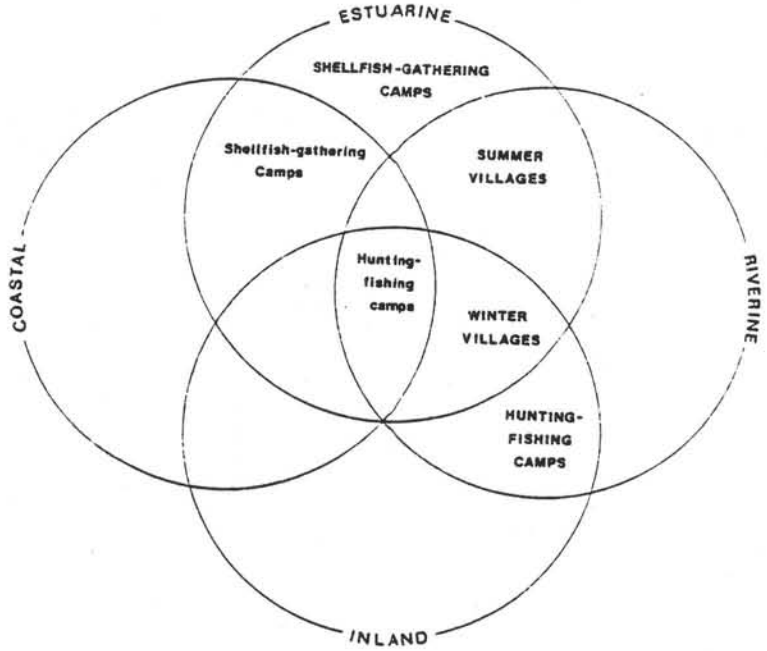

Figure 4-2. Summary of site types by environmental-use zone (site types in upper case lettering are ethnographically documented, while site types in lower case lettering are inferred on the basis of resource availability).

the Lower Chinookan use zones. Only one site type--shellfish-gathering camps--would not occur within Middle Chinookan territory.

Archaeological Site Distribution

The information concerning ethnographic settlement types and environmental use zones can be profitably used to structure the data available on the distribution of archaeological sites within the study area (Minor 1983). Prior to 1977, information was available concerning 38 previously recorded archaeological sites within the study area. Eighteen of these sites are in Clatsop County, Oregon, while the remaining 20 are in Pacific and Wahkiakum counties, Washington. Additional survey work carried out in connection with the present study recorded another 40 sites, with all but eight located in Clatsop County where the survey efforts were concentrated (Table 4-3).

It should be pointed out that the nature of the site survey data places considerable limitations on attempts to reconstruct the nature of aboriginal settlement in this area. Although an attempt was made to revisit all the previously recorded sites, many of these localities no longer exist or have been severely disturbed as a result of such activities as river bank erosion, construction of jetties, highways, railroads, and houses, and the vandalism of relic collectors (Minor 1979a). Thus, much of the data required for a truly rigorous examination of aboriginal settlement patterns is simply no longer available for this area.

The locations of the 78 recorded archaeological sites within the study area are shown in Figure 4-3. Each site has been classified into

Table 4-3. Inventory of Archaeological Sites Recorded at the Mouth of the Columbia River

Zone	Settlement Type*	Site Number	Cadastral Location T	R	S	Date Recorded
COASTAL	SGC	35CLT1	7N	10W	4	1951
	SGC	35CLT4	8N	10W	33	1951
	SGC	35CLT8	7N	10W	27	1951
	SGC	35CLT9	7N	10W	21	1951
	SGC	35CLT11	7N	10W	10	1951
	SGC	35CLT15	6N	10W	10	1951
	SGC	35CLT16	7N	10W	3	1951
	SGC	35CLT17	7N	10W	34	1951
	SGC	35CLT18	7N	10W	27	1951
	SGC	35CLT27	7N	10W	27	1974
	SGC	35CLT49	7N	10W	27	1977
	SGC	35CLT59	7N	10W	27	1981
	SGC	35CLT60	7N	10W	15	1981
	SGC	35CLT61	7N	10W	34	1981
	SGC	45PC35	10N	11W	32	1961
	HFC	35CLT10	7N	10W	15	1951
ESTUARINE	SV	35CLT2	8N	10W	9	1951
	SV	35CLT22	8N	9W	18	1977
	WV	35CLT33	8N	7W	7	1977
	WV	35CLT34	8N	8W	13	1977
	WV	35CLT48	8N	8W	16	1978
	SV?	35CLT51	8N	10W	21	1978
	SV?	35CLT54	8N	9W	11	1977
	SV	45PC1	10N	11W	33	1948
	SV	45PC2	10N	11W	35/36	1948
	SV	45PC3	9N	10W	6	1948
	SV	45PC4	9N	10W	23	1948
	SV	45PC20	9N	11W	9	1947
	SV	45PC21	9N	11W	9	1948
	SV?	45PC44	9N	10W	16/17	1977
	SV?	45PC45	10N	11W	36	1977
	SV?	45WK1	10N	8W	30	1948
	SV	45WK2	10N	8W	9	1948
	SV	45WK8	10N	8W	32	1948
	SV	45WK9	9N	8W	4	1948
	WV	35CLT13	6N	10W	22	1951
	WV	35CLT14	6N	10W	11	1951
	WV	35CLT20	6N	10W	28	1951
	WV	35CLT47	6N	10W	28	1973

Table 4-3 (continued)

Zone	Settlement Type*	Site Number	Cadastral Location T	R	S	Date Recorded
RIVERINE	SV	35CLT32	8N	6W	5	1978
	SV	35CLT35	9N	7W	26	1977
	SV	45WK3	9N	8W	15	1948
	SV	45WK4	9N	7W	18	1948
	SV?	45WK7	8N	6W	12	1948
	WV	35CLT37	8N	7W	8	1977
	WV	45WK5	9N	6W	17	1948
	WV?	45WK6	9N	6W	7	1948
	WV	45WK10	9N	6W	26	1948
	WV	45WK11	9N	6W	26	1948
	WV?	45WK50	9N	6W	7	1973
	HFC	45WK53	9N	7W	12	1977
	HFC	45WK54	9N	6W	7	1977
	HFC	45WK55	8N	6W	15	1982
INLAND	WV	35CLT3	8N	9W	28	1951
	HFC	35CLT6	8N	9W	17	1951
	HFC	35CLT31	7N	9W	3	1978
	HFC	35CLT36	7N	10W	1	1978
	HFC	35CLT38	7N	9W	10	1978
	HFC	35CLT39	7N	9W	10	1978
	HFC	35CLT40	7N	9W	3	1978
	HFC	35CLT41	7N	9W	3	1978
	HFC	35CLT42	7N	9W	4	1978
	HFC	35CLT44	7N	9W	15	1978
	HFC	35CLT45	8N	9W	30	1978
	HFC	35CLT46	7N	9W	7	1978
	HFC	35CLT50	7N	9W	15	1978
	HFC	35CLT52	9N	7W	14	1978
	HFC	35CLT53	9N	7W	34	1977
	HFC	35CLT56	8N	9W	32	1981
	HFC?	35CLT57	8N	9W	32	1981
	HFC?	35CLT58	7N	9W	14	1981
	HFC	35CLT62	7N	9W	15	1981
	HFC	35CLT63	7N	10W	10	1981
	HFC	35CLT64	8N	7W	35	1977
	HFC?	45WK12	10N	8W	33	1955
	HFC	45WK51	10N	8W	27	1977
	HFC	45WK52	10N	8W	34	1977
	HFC	45WK56	9N	6W	4	1982

* SFC = shellfish-gathering camp; HFC = hunting-fishing camp; SV = summer village; WV = winter village

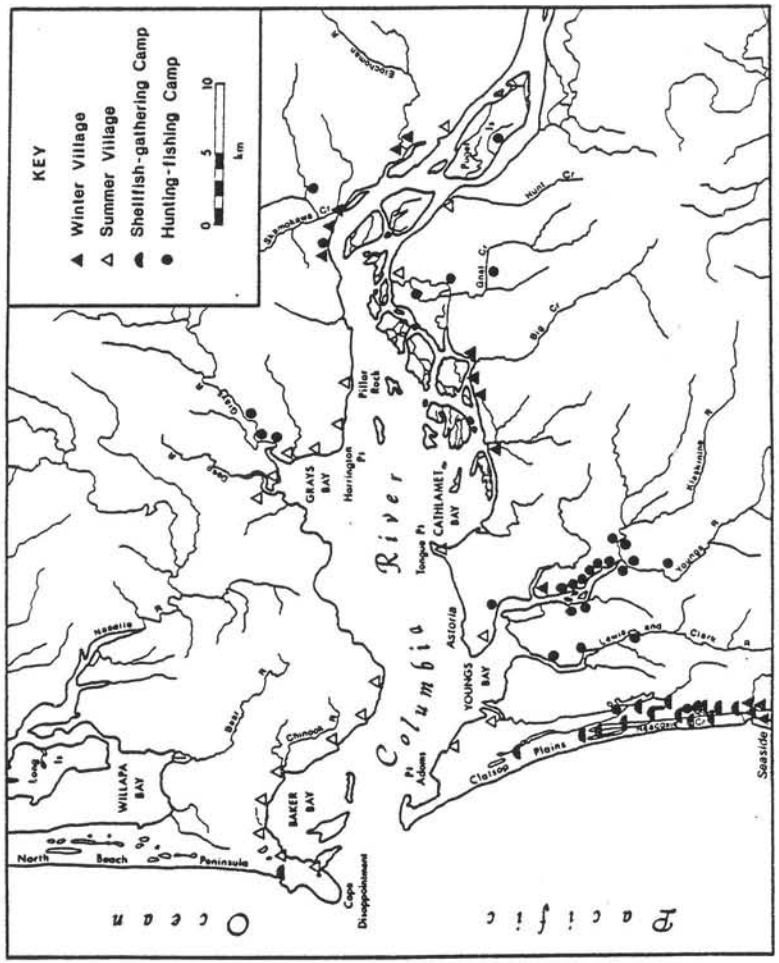

Figure 4-3. Distribution of recorded archaeological sites by type.

one of the four ethnographic settlement types on the basis of its setting, description as contained in the site record form, and, in a few cases, information from ethnographic or ethnohistoric sources. As a whole, approximately one-half of all the sites recorded within the study area are known to have historic components. With only a few known exceptions (Minor 1979b, n.d.), the recorded archaeological sites in the area appear to date from late prehistoric and early historic times. In view of this fact, the assumption is made here that these sites represent aspects of contemporaneous settlement systems, and their distribution is examined accordingly.

A summary of the distribution of archaeological sites within the study area by settlement type and environmental use zone is presented in Table 4-4. Fourteen sites are classed as winter villages. Four of these are situated around the estuary of the Necanicum River at present-day Seaside. Three more winter villages are situated in protected settings along the south shore of the upper estuary. Another six are located upstream in the riverine environment above the Columbia River estuary. A single site classified as a winter village is situated in the inland zone.

In contrast to the winter village distribution pattern, 16 of the 21 sites classified as summer villages are located around the Columbia River estuary, with the remaining five situated upstream in the riverine zone. This distribution pattern reflects the concentration of the aboriginal population along the shores of the Columbia River during the summer fishing season.

Table 4-4. Summary of Archaeological Sites by Settlement Type and Environmental-Use Zone

Settlement Type	Zone				
	Coastal	Estuarine	Riverine	Inland	Total
Winter Village	-	7	6	1	14
Summer Village	-	16	5	-	21
Shellfish-Gathering Camps	15	-	-	-	15
Hunting-Fishing Camps	1	-	3	24	28
Total	16	23	14	25	78

Fifteen archaeological sites within the study area are classified as shellfish-gathering camps. All but one of these are associated with the open sandy coast along Clatsop Plains to the south of the Columbia River. The remaining shellfish-gathering camp recorded within the study area is located on the outer rocky coast just north of Cape Disappointment at the mouth of the Columbia River. Additional sites of this type, of course, are known to occur in large numbers to the north of the study area along Willapa Bay.

The remaining 28 archaeological sites recorded within the study area are classified as hunting-fishing camps. Twenty-four of these sites are located in the inland zone. Three are situated in the riverine zone and only one is found in the coastal zone. The paucity of sites classified as hunting-fishing camps in the estuarine and the riverine zones is probably a reflection of the fact that most hunting

and fishing in these zones was probably carried out directly from villages. Likewise, any hunting and fishing in the coastal zone may have been carried out from sites which have been classified as shellfish-gathering camps.

In view of the limited information contained in the survey data, the classification of the archaeological sites within the study area into ethnographic settlement types must be considered tentative. This step has been undertaken here mainly to provide a framework for organizing the archaeological site survey data and to guide in the selection of sites for further investigation. The assignment of archaeological sites to ethnographic settlement types has been based in most cases on only limited information. The true test of whether a site has been correctly assigned to a particular ethnographic settlement type must await the excavation and analysis of its contents.

For this reason, excavations were subsequently conducted on a small scale at six archaeological sites within the study area. An attempt was made to select sites for investigation which are located in different environmental-use zones and which represent different ethnographic settlement types. Because virtually all of the ethnographic settlements in the study area have been destroyed, many of the sites which ideally should have been examined during this study are no longer available for investigation. Among the sites selected for excavation (see Figure 4-4) were the Fishing Rocks site (45PC35) in the coastal zone, Eddy Point (35CLT33) and Ivy Station (35CLT34) in the estuarine zone, Knappa Docks (35CLT37) in the riverine zone, and the Burkhalter site (45WK51)

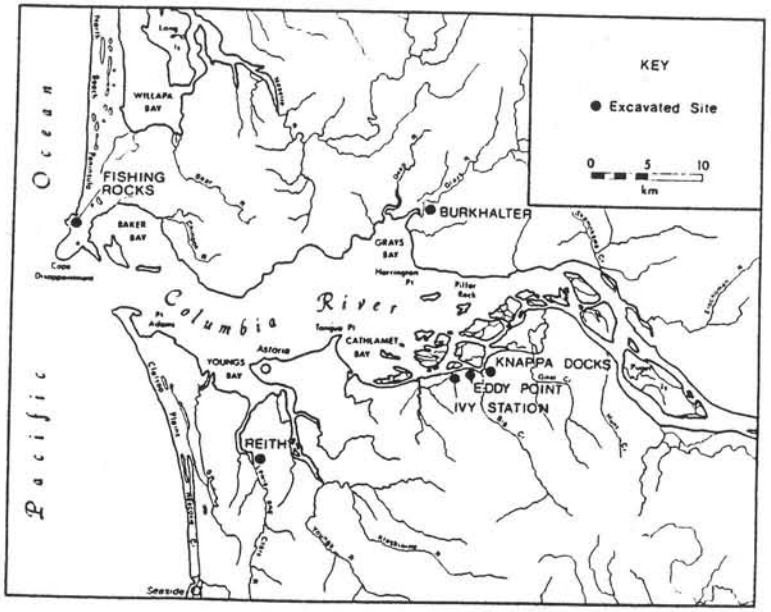

Figure 4-4. Location of sites excavated during this study.

and the Reith site (35CLT36) in the inland zone. These six sites represent a sampling of three of the four ethnographic settlement types previously defined within the study area. The results of the excavations of these six archaeological sites are presented in the following four chapters.

CHAPTER FIVE

COASTAL ZONE: FISHING ROCKS

A single archaeological site located in the coastal zone was excavated during the present study. The site selected for investigation received its name from a Chinook informant who, upon visiting the site during the course of excavations, remarked that this was the location of the "fishing rocks" used by native peoples in early historic times (Betsy Trick, personal communication). Archaeological investigations indicate that this locality was first inhabited around 1000 years ago, and the cultural deposits contain a record of aboriginal exploitation of coastal resources spanning the late prehistoric and early historic periods.

Fishing Rocks (45PC35)

The Fishing Rocks site is located just north of the mouth of the Columbia River on the northwest side of Cape Disappointment. It is situated in a small, rocky cove locally known as Beard's Hollow. The site consists of a shell midden which rests on a rock ledge overlooking the ocean (Figure 5-1). As a result of jetty construction at the mouth of the Columbia River, extensive sand deposits have accumulated along the Pacific Coast both to the north along the Long Beach Peninsula and to the south along Clatsop Plains. These deposits have completely filled in Beard's Hollow, with the result that the shell midden is now

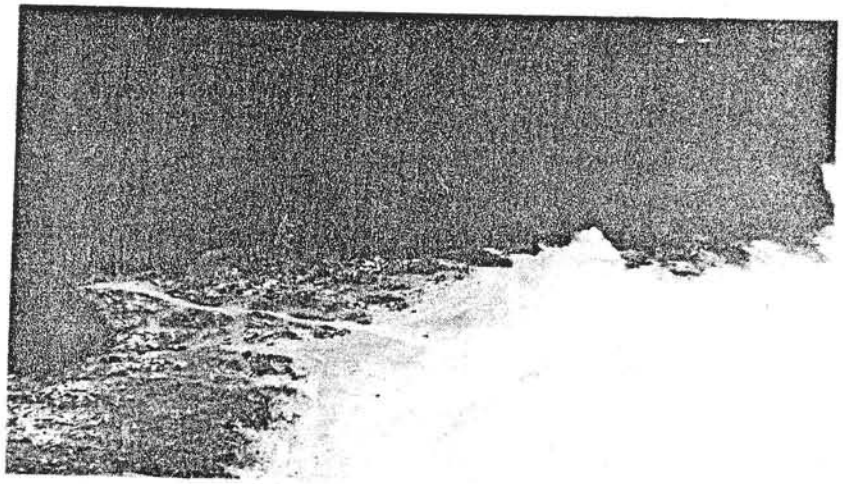

Figure 5-1. Aerial view of the Fishing Rocks site on the southern Washington coast.

located some distance inland from the present shoreline.

The site was initially recorded and auger-tested in 1959 by Robert Greengo of the University of Washington. The shell midden was found to be relatively restricted in areal extent, occupying an area roughly 30 m by 15 m. The cultural deposits are rather deep, however, reaching a maximum depth of 140 cm.

Field Procedures

Fieldwork was carried out at Fishing Rocks from July 1-4, 1978, and July 6-8, 1979. Two 2 x 2 m units were excavated, designated Units A and B. In order to minimize disturbance to the remainder of this small site, these units were placed adjacent to one another to form a 2 x 4 m

excavation area. Excavations were conducted in arbitrary 10 cm levels, and the cultural deposit was passed through ¼-inch mesh screen. Both units were excavated to the limits of the cultural deposit.

Description of the Deposit

The Fishing Rocks site is a shell midden in which only two gross depositional strata were identified (Figure 5-2). Stratum I, the cultural deposit, consists of many layers of dark sand (Ia), light sand

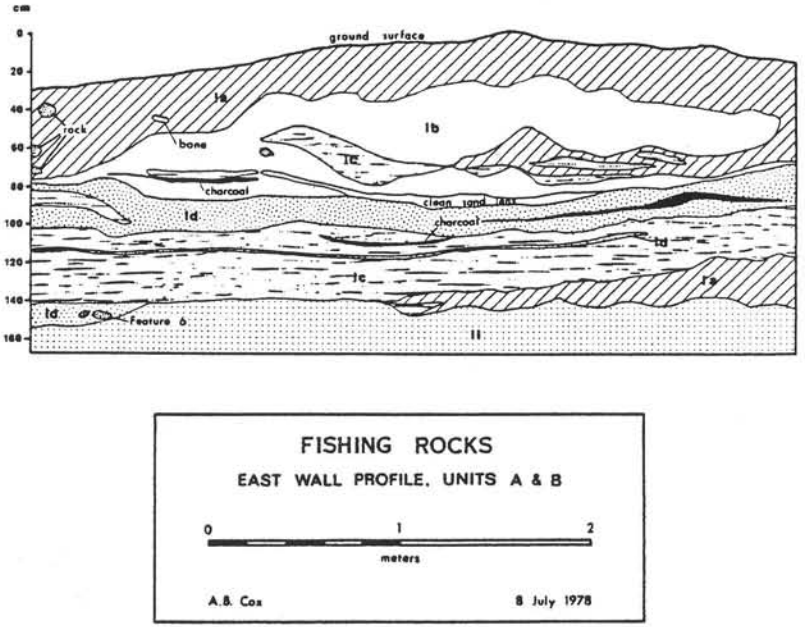

Figure 5-2. Stratigraphic profile of cultural deposits at Fishing Rocks.

with bits of charcoal and marine shell (Ib), discrete lenses of marine shell (Ic), and reddish brown clay mixed with charcoal and bits of shell (Id). Evidence of aboriginal occupation is found throughout this stratum in the form of fire-cracked rocks, charcoal, artifacts, and animal bone. Stratum I yielded pH values ranging from 7.4 to 8.1, indicating neutral to slightly alkaline sediments, a situation which fostered the preservation of bone-antler artifacts and faunal remains at this site. Stratum II, which underlies the cultural deposit, is reddish-yellow clay which is sterile of cultural materials.

Cultural Features

Seven cultural features were encountered during the course of excavations at Fishing Rocks. Fragments of marine shell and charcoal were associated with all of these features and they appear to represent the remains of aboriginal camp fires in which molluscs, and perhaps other animals, were prepared for consumption. Summary descriptions of these cultural features are presented in Table 5-1.

Cultural Assemblage

The types of cultural materials recovered from Fishing Rocks, their frequency, and their vertical distribution within the cultural deposit are listed in Table 5-2. The assemblage contains both stone and bone-antler tools (Figures 5-3 to 5-5). One worked piece of shell, perhaps a shell knife fragment, was also found. Rounding out the assemblage are a few historical artifacts obtained by the aboriginal inhabitants

Table 5-1. Summary Description of Cultural Features at Fishing Rocks

Feature Number	Unit	Depth Below Surface (cm)	Description	Dimensions (cm)	Association
1	A	20-30	cluster of fire-cracked cobbles	60 x 70	radiocarbon date of A.D. 1310
2	A	60-70	cluster of fire-cracked cobbles	24 x 24	radiocarbon date of A.D. 1900
3	A	90-100	cluster of fire-cracked cobbles	31 x 33	none
4	A	100-110	cluster of fire-cracked cobbles	53 x 77	radiocarbon date of A.D. 980
5	A	130-140	3 shallow pits, 1 containing charcoal, 2 with beach sand	45 x 50 65 x 65 50 x 50	radiocarbon date of A.D. 1430
6	B	50-60	basin-shaped shell lens underlain by fire-cracked rocks exposed in wall	55 x 10+	none
7	B	110-120	cluster of fire-cracked rocks	40 x 105	none

after the time of historic contact.

Faunal Assemblage

Faunal remains were well preserved at Fishing Rocks. Not only were faunal remains abundant, but a wide variety of species are also represented. A list of the species identified from the site is presented in Table 5-3.

As the name of the site implies, fishing appears to have been a major activity at this location. Remains of "bottom fish," especially rockfish and sea perch, are by far the most common fish represented. The Fishing Rocks site is situated in close proximity to both sandy and rocky intertidal areas and shellfish characteristic of both habitats are found there. Most common are bentnose and razor clams, both of which

Table 5-2. Artifact Inventory from Fishing Rocks

Artifact Category	Levels 1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
CHIPPED STONE INDUSTRY															
Bifacial Series															
Projectile Points:															
Type 9					1			1							2
Type 10		1			1	1			1						4
Fragments		2			1										3
Knife: Foliate										1					1
Unifacial Series															
Hafted End Scrapers			2												2
Unhafted End Scrapers		1				1									2
End Scraper Fragment				1											1
Marginally Modified Series															
Flake Knife											1				1
Flake Scrapers			1		1			1							3
Used Flakes		2						1	1	1					5
Core and Flake Series															
CCS Core						1									1
Debitage: CCS Flakes	18	5	2	7	26	14	3		21	3	4	1	1		105
HEAVY TOOL INDUSTRY															
Unmodified Series															
Hammer												1			1
Flaked Series															
Chopper		1													1
Cobble Flake Scraper											1				1
ABRADER INDUSTRY															
Tabular Abraders		2	1	1					3		2	1			10
Pumice Abraders			1					1	1						3
Cobble Abraders				1								1			2
BONE-ANTLER INDUSTRY															
Harpoon Series															
Composite Toggling Harpoon Valve					1										1
Awl Series															
Straight Awls								1	1		1				3
Split-bone Awls							1	1	1	1				1	5
Bird Radius Awl							1								1
Ulna Awl									1						1
Awl Tip Fragments		1							1			1	1	1	5

Table 5-2 (continued)

Artifact Category	Levels 1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
BONE-ANTLER INDUSTRY															
Miscellaneous Series															
Bone Chisels	1						1				1		1		4
Bone Wedges			1				1		3						5
Antler Wedge					1										1
Bone Pendant									1						1
Tooth Pendants			1		1		1								3
Miscellaneous Worked Bone	2	1	5	1		1	3	2	3		5				23
SHELL INDUSTRY															
Ground Mussel Shell		1													1
HISTORIC MATERIALS															
Ceramics															
Chinese Porcelain	2	1	1												4
Glass															
Chimney Glass		1	1												2
Metal															
Unidentified Fragments		1		1											2

occur in sandy habitats. Also found in high frequency are mussels, which characteristically occur in rocky habitats. Fishing Rocks was also ideally located for the hunting of sea mammals. These animals frequently rest on the rocky shores at Cape Disappointment during their seasonal migrations along the Pacific coast.

Perhaps the most surprising aspect of aboriginal subsistence at Fishing Rocks was the recovery of faunal evidence indicating the intensive hunting of sea birds. A sea bird rookery exists on the heights of Cape Disappointment above the site. Most of the faunal remains appear to represent a single species, Cassin auklet, but a number of other

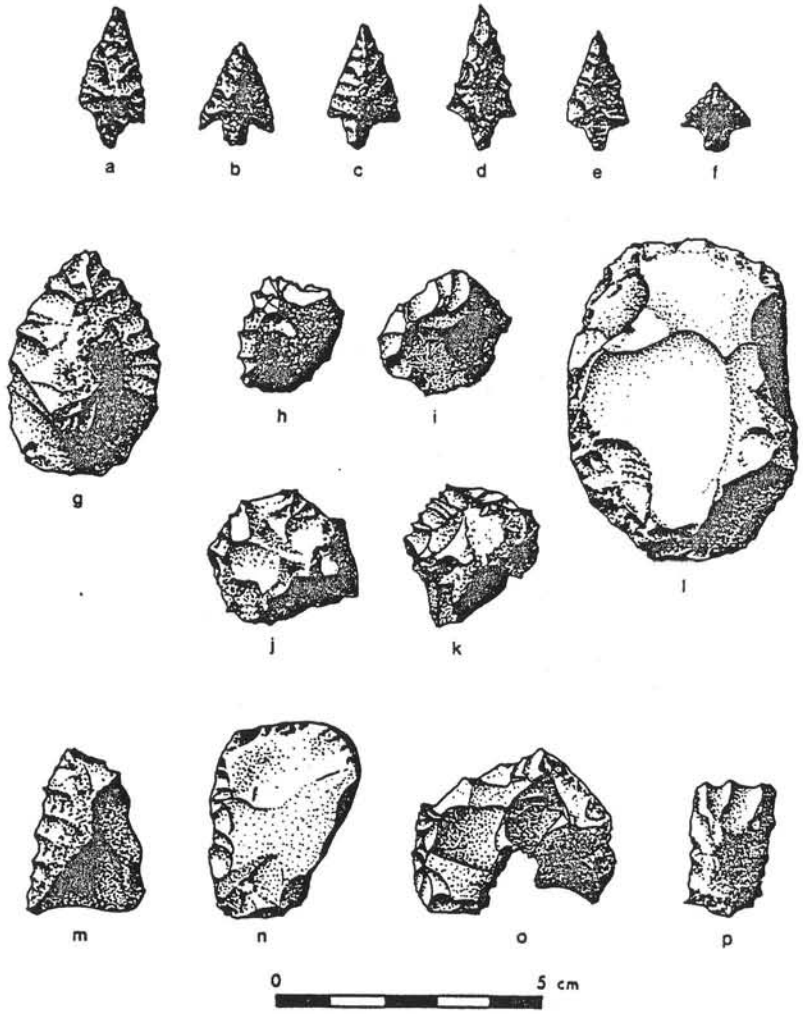

Figure 5-3. Chipped stone tools from Fishing Rocks: a-b, Type 9 points; c-f, Type 10 points; g, foliate knife; h-i, hafted end scrapers; j-l, unhafted end scrapers; m, flake knife; n-p, flake scrapers.

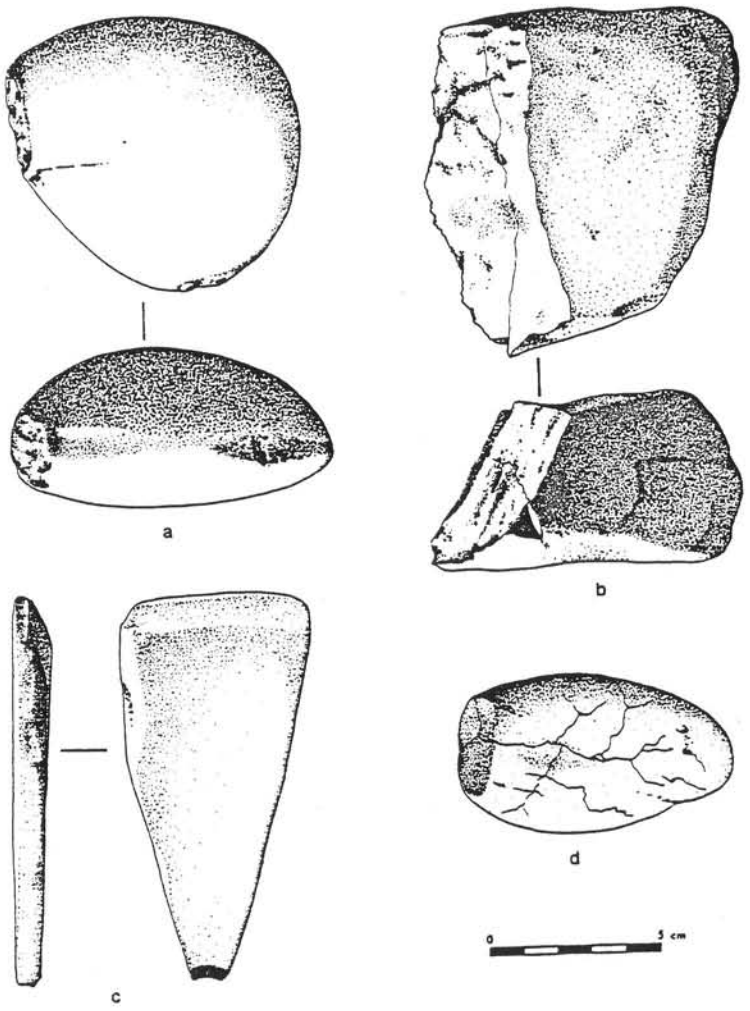

Figure 5-4. Heavy stone tools and abraders from Fishing Rocks: a, hammer; b, chopper; c, tabular abrader; d, cobble abrader.

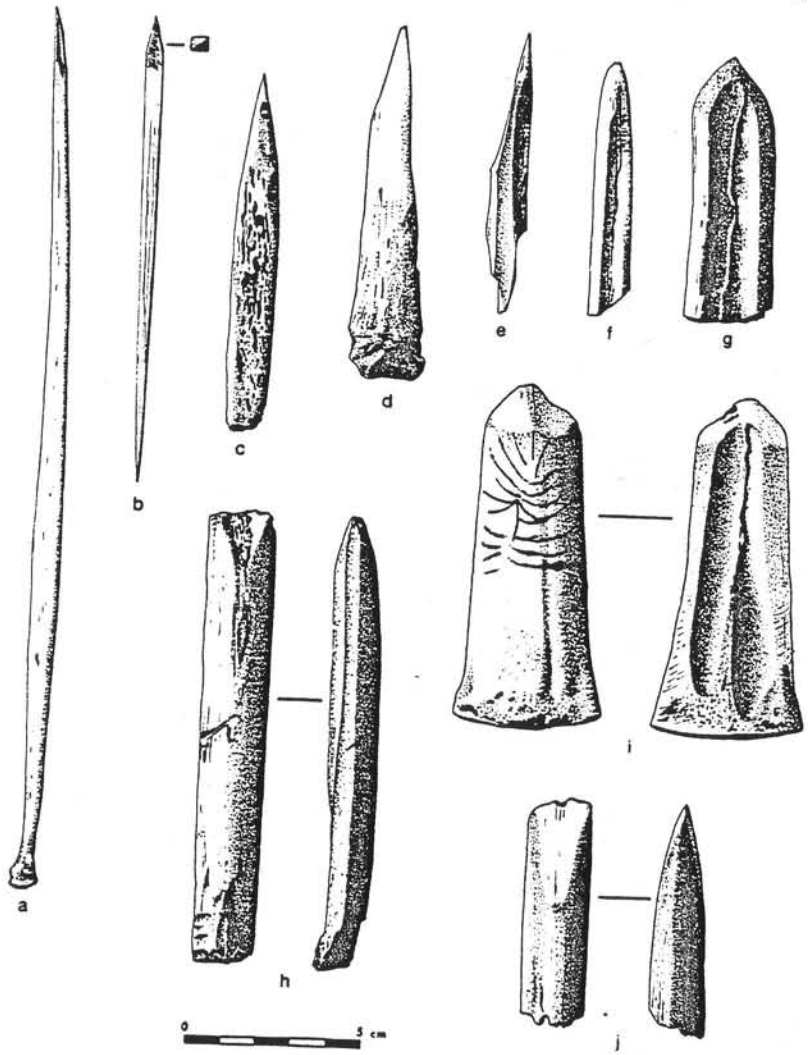

Figure 5-5. Bone-antler tools from Fishing Rocks: a, bird bone awl; b-c, straight awls; d, ulna awl; e, split-bone awl; f-h, chisels; i-j, wedges.

Table 5-3. Identified Faunal Remains from Fishing Rocks

Common Name	Scientific Name	Common Name	Scientific Name
FISH:		SEA MAMMALS (continued):	
* Perch	Embiotocidae	Porpoise/dolphin	Delphinadae
* Rockfish	*Sebastes* spp.	Whale	Cetacea
Dogfish	*Squallus* spp.		
Salmon	*Oncorhynchus* spp.	LAND MAMMALS:	
Sturgeon	*Acipenser* spp.		
Shark	Elasmobranchii	* Elk	*Cervus canadensis*
		* Deer	*Odocoileus* spp.
SHELLFISH:		* Beaver	*Castor canadensis*
		Otter	*Lutra canadensis*
* Bentnose clam	*Macoma nasuta*	Bobcat	*Lynx rufus*
* Razor clam	*Siliqua patula*	Raccoon	*Procyon lotor*
* Blue mussel	*Mytilus edulis*	Hare	*Lepus americanus*
California mussel	*Mytilus californianus*	Muskrat	*Ondatra zibethicus*
Pacific gaper clam	*Tresus nuttalli*	Dog	*Canid* sp.
Bodega tellin	*Tellina bodegensis*	Mole	*Scaparus* sp.
Cockle	*Clinocardium nuttalli*		
Giant Western Nassa	*Nassarius fossatus*	BIRDS:	
Native Pacific Oyster	*Ostria lurida*		
Smooth Washington clam	*Saxidomus giganteus*	* Northern Cassin auklet	*Ptychoramphus aleutica*
Fingered limpet	*Acmae digitalis*	* Albatross	*Diomedea* spp.
Shield limpet	*A. pelta*	* Shearwater	*Puffinus* spp.
Mask limpet	*A. persona*	* Gull	*Larus* spp.
Barnacles	*Balanus* spp.	Murre	*Uria aalge*
Crab	*Cancer magister*	Fulmar	*Fulmaris glacialis*
		Scoter	*Melanitta* spp.
SEA MAMMALS:		Cormorant	*Phalacrocorax* spp.
		Loon	*Gavia* spp.
* Sea otter	*Enhydra lutris*	Western grebe	*Aechmorphorus occidentalis*
* Harbor seal	*Phoca vitulina*		
* Steller sea lion	*Eumetopias jubata*	Duck	*Anas* spp.
California sea lion	*Zalophus californianus*	Brant	*Branta* spp.
Northern fur seal	*Callorhinus alascensis*	Northern bald eagle	*Haliaestus leucocephalus*
		Woodpecker	*Dendrocopos* spp.

* Indicates predominant species in each faunal group.

seabirds are also represented in the avifaunal remains recovered from the site.

The considerable evidence found of the hunting of terrestrial game and wildlife is also somewhat unexpected. Elk and deer constitute a significant proportion of the total faunal assemblage, and the remains of other animals associated with terrestrial habitats were also found. This evidence suggests that aboriginal subsistence in the coastal zone

was not entirely focused on resources associated with the marine environment.

Site Chronology and Function

Four radiocarbon dates are available from the Fishing Rocks site (Table 5-4). The dates do not strictly conform to the stratigraphic provenience of the charcoal samples on which they are based, a situation which indicates some disturbance of the cultural deposit presumably as a result of the activities of the site's aboriginal inhabitants.

The earliest radiocarbon date from the site is A.D. 980. Two other dates, A.D. 1310 and A.D. 1430, also reflect occupation in prehistoric times. The presence of historic artifacts indicates that occupation continued into the historic period, and the fourth radiocarbon date of A.D. 1900 may reflect use of the site in relatively recent times.

The location and size of the cultural deposit, together with the archaeological and faunal evidence, all indicate that Fishing Rocks was a camp at which a broad range of activities was carried out. The focus seems to have been primarily on activities associated with the procure-

Table 5-4. Summary of Radiocarbon Dates from the Fishing Rocks Site

Unit	Depth Below Surface	Date (B.P.)	Date (B.C./A.D.)	Laboratory Number	Association
A	20-30 cm	640 ± 90	A.D. 1310	GaK-8119	Feature 1
A	60-70 cm	50 ± 100	A.D. 1900	GaK-8120	Feature 2
A	100-110 cm	970 ± 100	A.D. 980	GaK-8121	Feature 4
A	130-140 cm	520 ± 110	A.D. 1430	GaK-8122	Feature 5

ment of food resources, including fishing, hunting of sea birds, sea and land mammals, and the gathering of shellfish. The presence of certain tools in the artifact assemblage, such as scrapers, abraders and awls, indicates that some processing and/or manufacturing activities were also carried out at the site.

The restricted size of the cultural deposit suggests that the site was visited by only a few individuals at a time, perhaps consisting of small family groups. The best indication of the season of occupation is provided by the remains of the Cassin auklet and albatross. Both of these sea birds are present around the mouth of the Columbia River from April through October (Jewett et al. 1953:66-67, 324). The presence of sea mammal remains at the site is also consistent with the idea of a basically summer occupation. Furthermore, the exposed nature of the site would have made occupation during the stormy winter months undesirable.

Aboriginal Use of the Coastal Zone

Ethnographic and ethnohistoric accounts seem to indicate that aboriginal use of the coastal zone was primarily focused on the gathering of shellfish. In contrast to this idea, the archaeological and faunal evidence from Fishing Rocks suggests a much more well-rounded use of food resources found in the coastal environment. The results of the archaeological investigations at this site, then, considerably expand the information available concerning aboriginal subsistence and settlement along the coastal margin.

Having described the broad range of subsistence activities carried out at Fishing Rocks, it should perhaps be noted that this site may be somewhat atypical in terms of its environmental setting and the exploitable resources available. This site is located on the north side of Cape Disappointment, which is the only headland on the low sand beach that extends for a distance of 150 km between Tillamook Head in Oregon and Point Grenville in Washington. It is possible that the range of subsistence resources available in the confluence of the rocky and sandy intertidal habitats at Cape Disappointment may have been greater than was the case at sites associated only with the sandy beach environment.

On the other hand, the artifact assemblage and the faunal inventory from Fishing Rocks are not out of line with those reported from the Martin site, located about 11 km to the north on the Long Beach Peninsula (Kidd 1967; Shaw 1975; Brown 1977). Both the Fishing Rocks and Martin sites are situated within the territory of the Chinook proper and their occupations overlapped temporally. Judging from the archaeological and faunal evidence from these two sites, it appears that aboriginal settlements in the coastal zone were not simply task-specific sites where shellfish gathering was the principal economic pursuit. Instead, the sites investigated to date in this zone contain evidence of more intensive use as base camps from which a range of activities was carried out.

CHAPTER SIX

ESTUARINE ZONE: EDDY POINT AND IVY STATION

Two archaeological sites, both of which are situated at the upper end of the Columbia River estuary, were selected for excavation within the estuarine zone. The first site, Eddy Point (35CLT33), contained the earliest occupation encountered in the study area during this project, which was radiocarbon dated to around 1100 B.C. Aboriginal use of this site terminated some time before the beginning of the historic era. The second site, Ivy Station (35CLT34), was first occupied a few hundred years before historic contact, with heaviest use occurring during the early historic period. Together, these two village sites provide a record of aboriginal subsistence and settlement in the estuarine zone spanning approximately the last 3000 years.

Eddy Point (35CLT33)

Eddy Point is a slight projection of land near CRM 26 on the south side of the Columbia River approximately 1.1 km downstream from Knappa, Oregon. Situated on an inland channel known as Knappa Slough, Eddy Point is separated from the main channel of the Columbia River by a series of low marshy islands. Karlson Island, one of the larger islands in this series, sits immediately across Knappa Slough from the point (Figure 6-1).

Eddy Point is located 600 m downstream from the mouth of Big Creek,

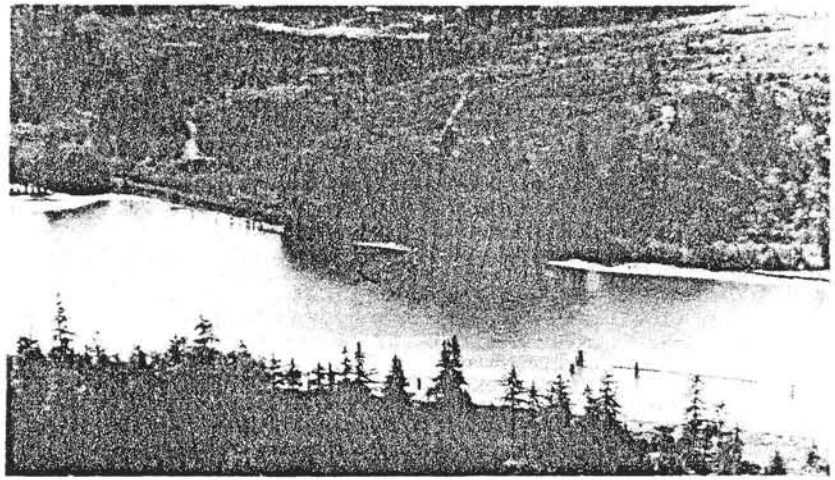

Figure 6-1. Aerial view of the Eddy Point site on Knappa Slough across from Karlson Island in foreground.

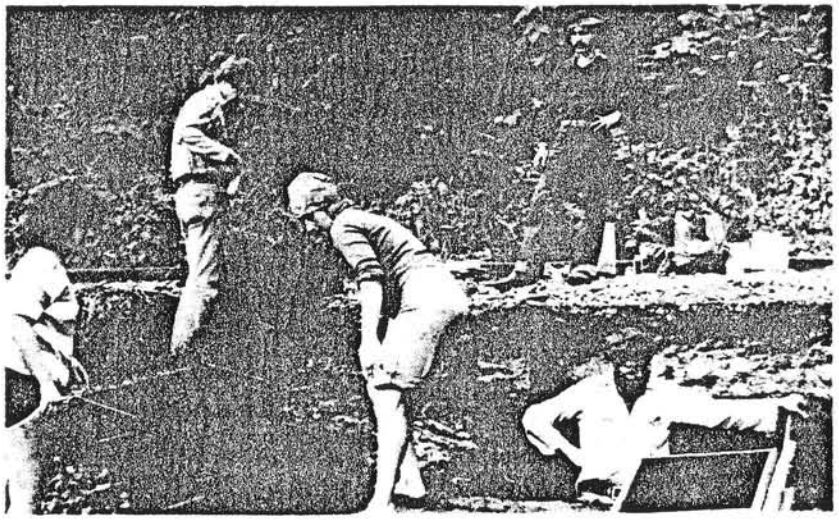

Figure 6-2. Excavations in progress at the Eddy Point site adjacent to railroad tracks.

which is one of the larger salmon spawning streams along this section of the Columbia River. As the name implies, the projection of land at this locality formerly created a sizable eddy downstream. In view of its close proximity to the mouth of Big Creek and the eddy in the river immediately downstream, the aboriginal settlement at this location was situated in an extremely favorable setting for aboriginal fishing.

Severe erosion has considerably diminished the extent of the archaeological deposits at Eddy Point. At the time the site was recorded in 1977, the cultural deposits consisted of a narrow band only about a meter wide which extended along the river bank for about 40 meters. Cultural materials previously eroded from the bank were scattered along the sand and gravel beach in front of the site. In addition to the damage caused by erosion, construction of a railroad across the site (Figure 6-2) in the early 1900s probably removed or at least disturbed the uppermost levels of the cultural deposit. More recently, relic collectors have broken down the river bank while searching for artifacts, a destructive activity that is also threatening to undermine the railroad tracks.

Archaeological investigations at Eddy Point were carried out as part of the present research program because of the apparent richness of the cultural deposit. It was also apparent that fieldwork would have to be undertaken immediately if a meaningful sample of cultural and faunal materials was still to be recovered from the remaining portion of what must have once been a very extensive aboriginal settlement. Archaeological fieldwork was carried out at Eddy Point over five brief periods in July and August, 1978, and September, 1979.

Field Procedures

The nature of the site at Eddy Point necessitated the use of excavation techniques different from those employed at other localities investigated during this project. The narrowness of the remaining cultural deposit required that excavations be carried out in 1 x 2 m units rather than the 2 x 2 m units used elsewhere. In addition, the lower levels of the cultural deposit at Eddy Point were found to lie below the water table. In view of this situation, dry-screening was discontinued when wet deposits were encountered, and water-screening commenced as the principal means of recovering cultural and faunal materials from the water-logged cultural deposit.

Seven test units were excavated at Eddy Point, designated Units A through G. Units A, C, D and F were placed on the edge of the river bank next to the railroad bed and thus encompassed the full extent of the remaining cultural deposit which was an average of about 1.7 m deep. Unit B was also placed on top of the river bank, but proved to lie outside the main midden area, as very few cultural materials were found. The remaining two units, E and G, were placed below the bank edge in an effort to recover cultural and faunal materials from the water-logged deposit along the shoreline. These latter units contained approximately 100 cm and 40 cm of cultural deposit, respectively.

In all, cultural and faunal materials were recovered from approximately 17.4 m^3 of cultural deposit excavated at Eddy Point. In addition, a sizable number of artifacts were collected from the eroded beach area below the river bank during the course of fieldwork at the site.

Description of the Deposit

Six depositional strata were present at the Eddy Point site (Table 6-1). The complete stratigraphic sequence was found in Units A, C and D and was best represented in Unit C (Figure 6-3). Overlying the cultural deposit was a layer of overburden approximately 40 cm thick (Stratum I). This layer was apparently laid down at the time the railroad tracks were constructed across the site.

The cultural deposit consisted of three strata (Strata II-IV) which differed from one another in terms of color and texture, as well as in the amount of marine shell they contained. The lowermost cultural stratum (IV) contained essentially no marine shell. In contrast, the middle

Table 6-1. Stratigraphic Sequence at Eddy Point

Stratum	Depth Below Surface (cm)	Description
I	0-40	Light brown to yellow sandy silt containing pebbles and small angular cobbles; a layer of mainly sterile overburden apparently placed over the cultural deposit during railroad construction
II	40-100	Dark brown sandy silt with flecks of charcoal and marine shell; cultural deposit containing stone and bone artifacts, animal bones, and fire-cracked rock; pH values from 6.3 to 6.9 indicate a trend from slightly acidic to neutral in the upper to lower levels of this stratum
III	100-130	Black, charcoal-impregnated sand containing a lens of marine shell; cultural deposit containing stone and bone artifacts, animal bones, and fire-cracked rock; pH values from 6.9 to 7.1 indicate neutral sediments which are neither acidic or alkaline
IV	130-210	Dark brown to black sand with flecks of charcoal; cultural deposit containing stone and bone artifacts, animal bones and fire-cracked rock; marine shell absent; pH values range from 6.9 in upper levels to 6.1 in lower levels of this stratum, indicating a trend from neutral to slightly acidic sediments towards the bottom of the cultural deposit
V	210-230	Light brown to yellow sand with gravel; sterile sediments underlying the cultural deposit
VI	below 220	yellow to brown sandstone bedrock

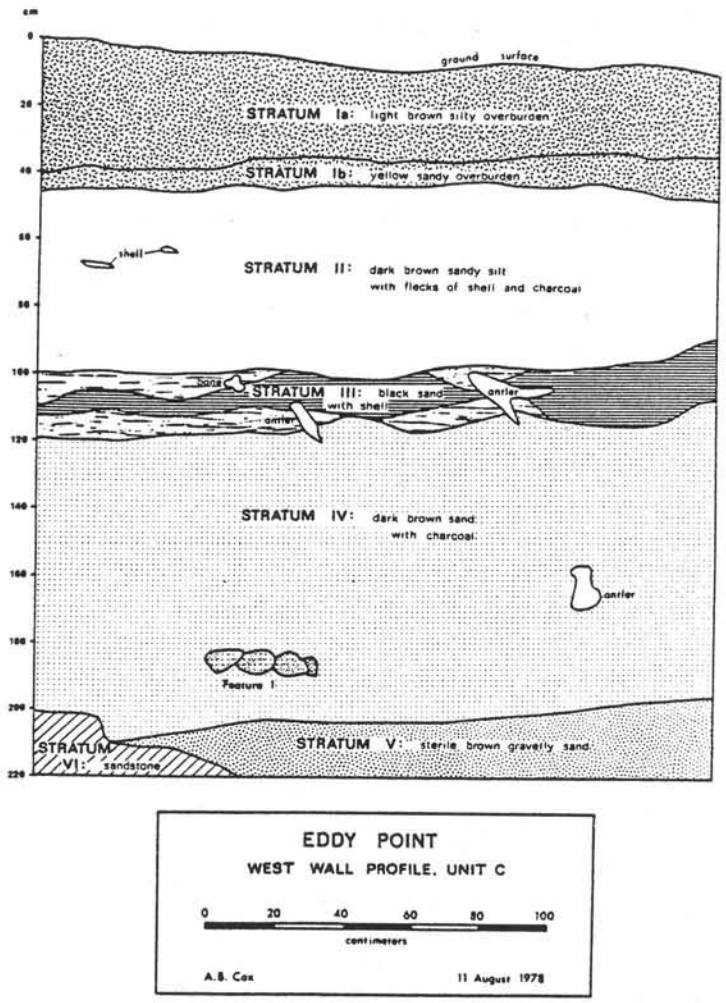

Figure 6-3. Stratigraphic profile of cultural deposits at Eddy Point.

stratum (III) contained a lens of marine shell which was 30 cm thick in Units A and C, tapering to 20 cm thick in the east end of Unit D before gradually disappearing in the west end of the same unit. The shell content decreased markedly in the uppermost stratum (II) of the cultural deposit, although scattered flecks and fragments of shell were still present. Underlying the cultural deposit was an alluvial deposit of gravelly sand (Stratum V) and/or sandstone bedrock (Stratum VI).

The stratigraphic sequence in Units B and F was abbreviated, apparently because these units were situated on the periphery of the midden. Unit B was capped by overburden to a depth of 40 cm, below which Stratum II extended to the bottom of the cultural deposit at 130 cm below surface. Unit F contained overburden to a depth of 90 cm, below which Stratum II extended to the bottom of the cultural deposit at 160 cm below the surface. The shell lens (Stratum III) and lowermost portion of the cultural deposit (Stratum IV) were not present in Units B and F.

Units E and G, situated below the river bank in an area subject to active erosion, contained water-logged cultural deposits which, in terms of elevation and absence of marine shell, appear to correlate with Stratum IV. However, charcoal from Unit E produced a series of radiocarbon dates which, while within the expected time range of Stratum IV, are not internally consistent. This inversion in the dating sequence suggests that the cultural deposits in Units E and G were mixed to some extent, perhaps as a result of their slumping from the river bank during the erosion process.

Cultural Feature

Only one cultural feature was encountered during fieldwork at Eddy Point. This consisted of an alignment of four large river cobbles which were encountered in Stratum IV in Unit C at a depth of 140-150 cm below the surface of the cultural deposit below the overburden. One broad-necked (Type 5) projectile point, a pounder, a used flake, and 11 pieces of lithic debitage were recovered in the same excavation unit/level as the cultural feature.

Other cultural features present at the site probably went unrecognized due to the relatively small areas exposed in the 1 x 2 m units. The ability of the excavators to distinguish cultural features was also hampered by the excavation of portions of the cultural deposit below the water table.

Cultural Assemblage

The types of cultural materials recovered from Eddy Point, their frequency, and their vertical distribution within each stratum are listed in Table 6-2. The assemblage contains a variety of both stone and bone-antler tools, and selected specimens from the site are illustrated in Figures 6-4, 6-5, 6-6 and 6-7.

Faunal Assemblage

Faunal remains were relatively well preserved at Eddy Point. A list of the animals represented is presented in Table 6-3. Among the mammals, the remains of elk and deer are by far the most common.

Table 6-2. Artifact Inventory from Eddy Point

Artifact Class	Stratum: Surface	I	II	III	IV	V	Totals
CHIPPED STONE INDUSTRY							
Bifacial Series							
Projectile Points:							
Type 2	1						1
Type 4				1	2		3
Type 5			1	1	2		4
Type 8	1						1
Type 9	1				2		3
Type 10			4	4	8		16
Type 12			1				1
Fragments					2		2
Knives:							
Foliate				1			1
Triangular				1			1
Bifaces	1		2		5		8
Unifacial Series							
Hafted End Scraper					1		1
Marginally Modified Series							
Flake Knives			1	1	1		3
Flake Scrapers	2				2		4
Gravers	1		2	1	1		5
Used Flakes	2	1	3	3	7		16
Core and Flake Series							
CCS Cores	9	1	1	3	7	2	23
Debitage:							
CCS Flakes		9	36	103	216	13	377
Basalt Flakes		23	24	7	114	19	187
Obsidian Flakes					1		1
HEAVY TOOL INDUSTRY							
Unmodified Series							
Pounders	1	1	1		3		6
Hammers	3		1				4
Slab					1		1
Flaked Series							
Choppers	27	3	2	1	3	1	37
Chopper/Hammer		1					1
Chopper/Anvil						1	1
Cobble Flake Scraper					1		1
Used Cobble Flakes	12	1	9	4	9	1	35

Table 6-2 (continued)

Artifact Class	Surface	Stratum I	II	III	IV	V	Totals
Pecked and Ground Series							
Mauls	1	1					2
Spherical Stones	1				1		2
Slate Adze Bit					1		1
Girdled Netsinker		1					1
ABRADER INDUSTRY							
Scoria Abrader			1				1
Cobble Abrader	2			1	5		8
BONE-ANTLER INDUSTRY							
Harpoon Series							
Bilaterally-barbed Dart Heads:							
Tips				1	1		2
Bases	1				2		3
Midsections					2		2
Unilaterally-barbed Dart Heads					2		2
Shouldered Bone Point			1				1
Wedge-based Bone Points			1		5		6
Composite Toggling Harpoon Valves			1	1	3		5
Awl Series							
Straight Awls			1	2			3
Shouldered Awls					1		1
Split-Bone Awl				2			2
Awl Tip Fragments			3	2	4		9
Miscellaneous Series							
Bone Chisels			2	2	3		7
Bone Wedges				2	2		4
Modified Antler Tips			1	3	6		10
Bird Bone Drill			1				1
Bird Bone Bead				1			1
Bone Pin			1				1
Miscellaneous Worked Bone			1	4	7		12

Waterfowl are well represented and include ducks, geese and swans. Fish bones are also numerous and include anadromous salmonids and sturgeon, freshwater suckers and minnows, as well as unidentified marine fish. Also recovered in considerable frequency were seal remains. The presence

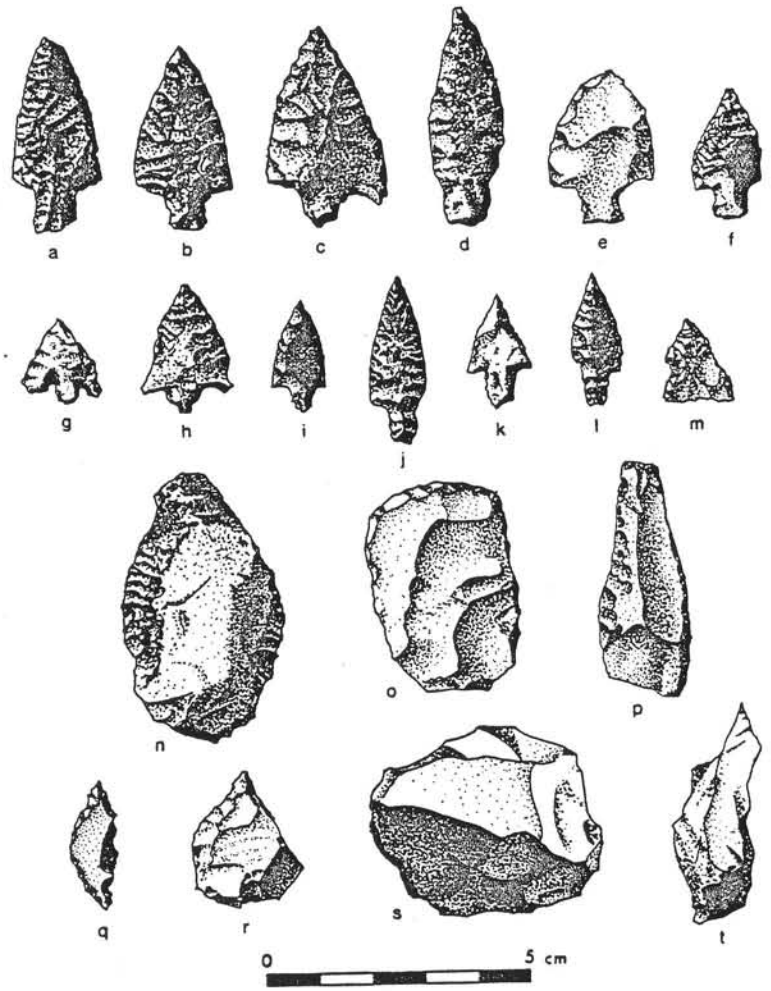

Figure 6-4. Chipped stone tools from Eddy Point: a, Type 2 point; b-c, Type 4 points; d-e, Type 5 points; f, Type 8 point; g-h, Type 9 points; i-l, Type 10 points; m, Type 12 point; n, foliate knife; o, hafted end scraper; p, flake knife; q-r, gravers; s-t, cores.

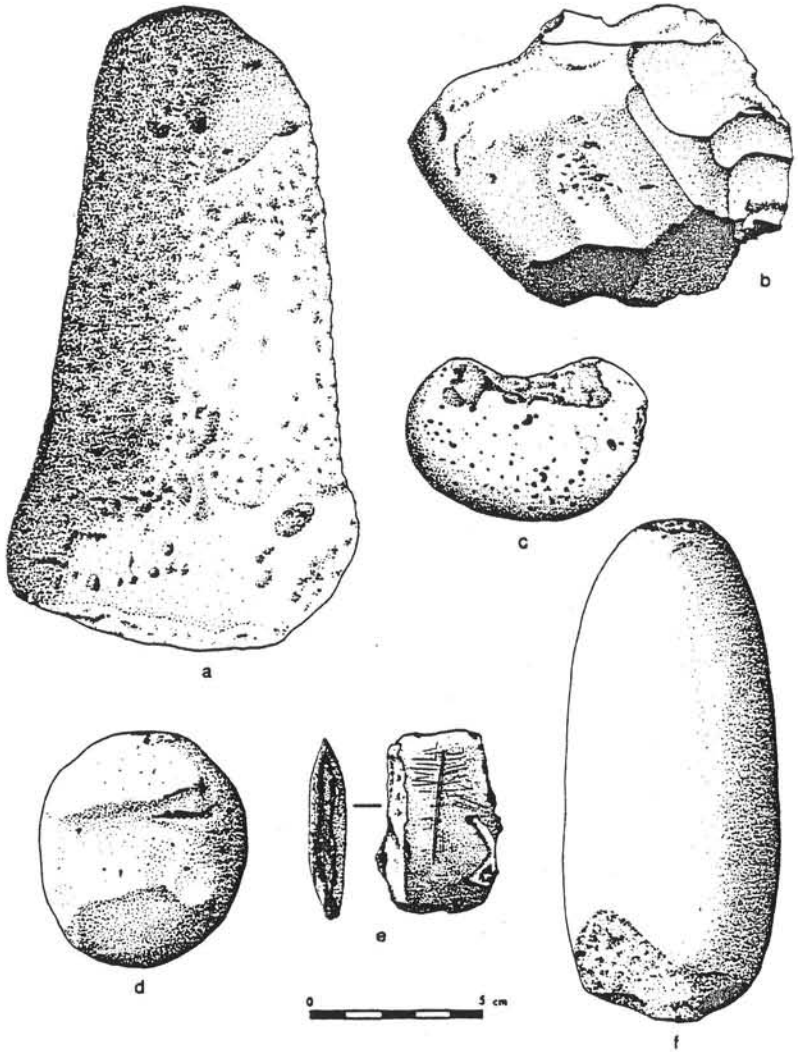

Figure 6-5. Heavy stone tools from Eddy Point: a, maul; b, chopper-anvil; c, chopper; d, girdled netsinker; e, slate adze bit; f, pounder.

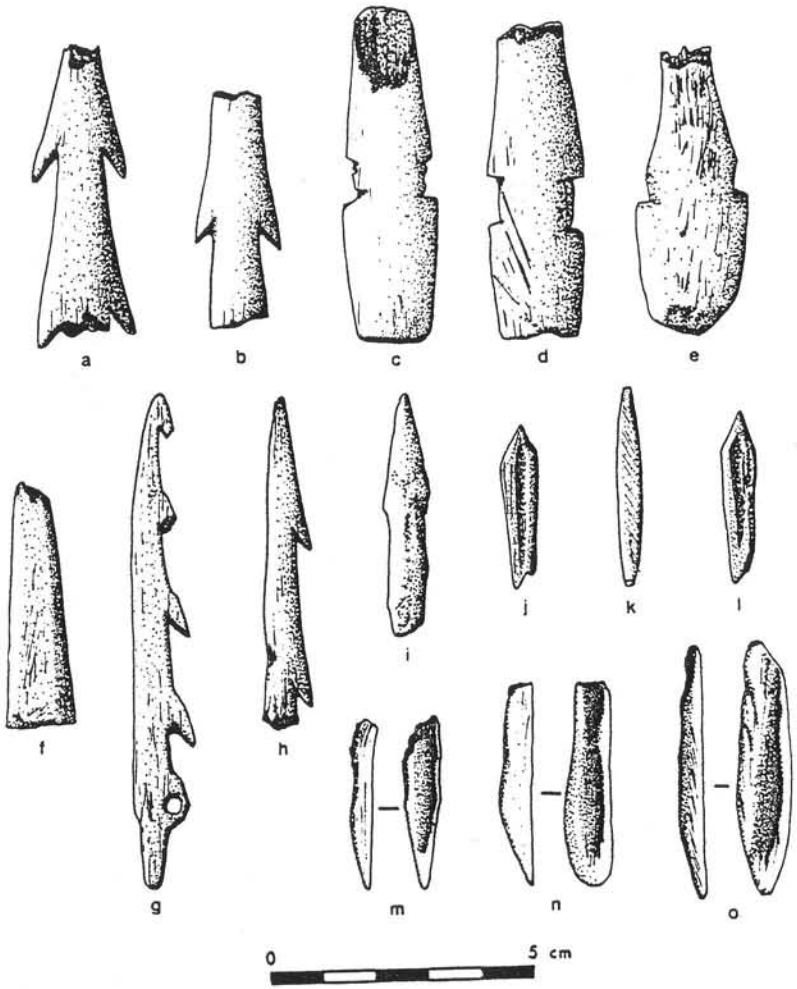

Figure 6-6. Harpoon parts from Eddy Point. Bilaterally barbed dart heads: a-b, tips; c-e, bases; f, midsection; g-h, unilaterally barbed dart heads; i, shouldered bone point; j-l, wedge-based bone points; m-o, composite toggling harpoon valves.

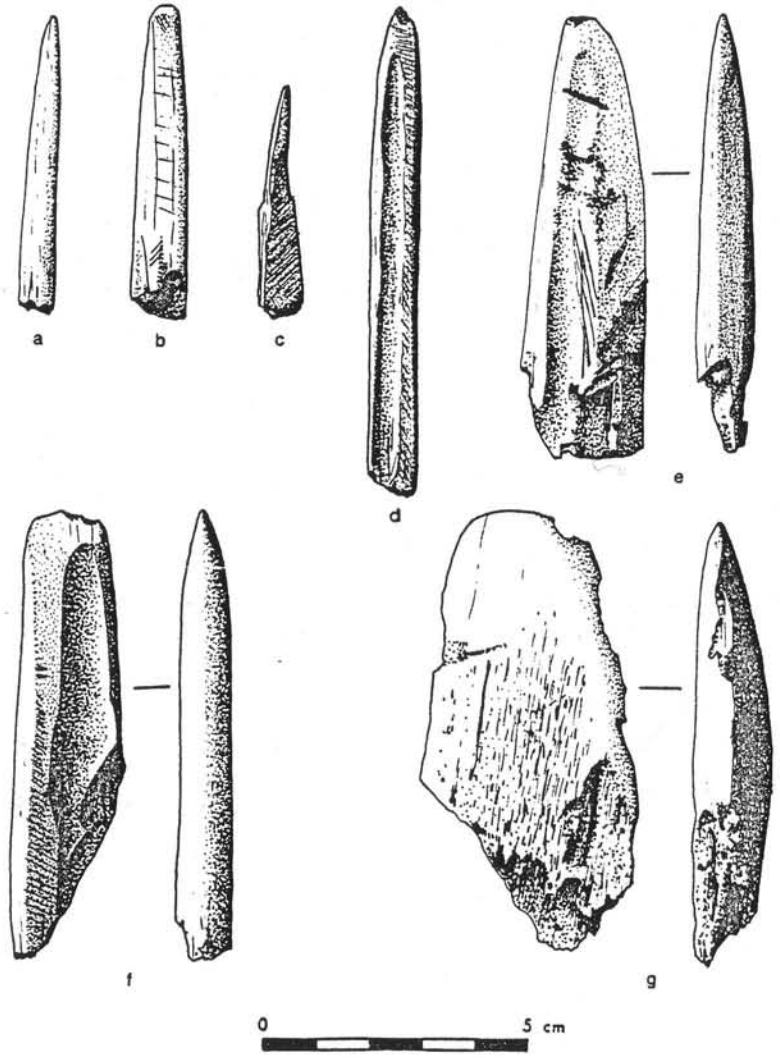

Figure 6-7. Bone-antler tools from Eddy Point: a-b, straight awls; c, shouldered awl; d, split-bone awl; e, chisel; f-g, wedges.

Table 6-3. Identified Faunal Remains from Eddy Point

Common Name	Scientific Name	Common Name	Scientific Name
* FISH:		LAND MAMMALS:	
Salmonids	*Oncorhynchus* spp./*Salmo* spp.	* Elk	*Cervus canadensis*
Sturgeon	*Acipenser* spp.	* Deer	*Odocoileus* spp.
Sucker	*Catostomus macrocheilus*	Bear	*Euarctos americanus*
Peamouth	*Mylocheilus caurinus*	Raccoon	*Procyon lotor*
Minnows	Cyprinidae	Mountain beaver	*Aplodontia rufa*
Marine fish	unidentified	Porcupine	*Erethizon* spp.
		Otter	*Lutra canadensis*
SHELLFISH:		Weasel/marten/ mink/skunk	Mustelidae
Gaper clam	*Tresus nuttalli*	Rabbit	*Sylvilagus* spp.
Butter clam	*Saxidomus nuttalli*	Rodent	Rodentia spp.
		Shrew	*Sorex* spp.
SEA MAMMAL:		* WATERFOWL:	
* Harbor seal	*Phoca vitulina*	Duck	*Anas/Aythya*
		Goose	*Anser/Chen/Branta*
		Swan	*Olor* spp.

* Indicates predominant fauna represented at Eddy Point.

of seal bones in the cultural deposit at Eddy Point is consistent with the location of this site opposite the series of islands in Cathlamet Bay which were referred to by Lewis and Clark as the "Seal Islands" (Thwaites 1905:4:198).

The marine shellfish remains present in Strata II and III were highly fragmentary. At least two species appear to make up the bulk of these remains, however--gaper and butter clams. Marine shellfish are not presently found in the vicinity of Eddy Point. The shellfish represented at the site were presumably obtained from the lower estuary area.

Site Chronology and Function

Eight radiocarbon dates are available from Eddy Point, the proven-

iences of which are listed in Table 6-4. The earliest occupation of the site is indicated by five dates from Stratum IV, which range from as early as 1180 B.C. to as late as A.D. 430. Stratum III, the lens of marine shell, has a single date of A.D. 510. The most recent use of the site is indicated by two dates from Stratum II of A.D. 1020 and A.D. 1060. No historical artifacts were recovered from the cultural deposit, and aboriginal use of Eddy Point is thus presumed to have ended sometime prior to historic contact.

The artifact assemblage from Eddy Point contains a wide variety of tool types, including both stone and bone-antler specimens. The diversity observed in the artifact assemblage in turn suggests that a wide variety of activities was carried out at the site. The diverse nature of the artifact assemblage is even more noteworthy considering the fact that the sample was recovered from the last remaining portion on the edge of the site.

Table 6-4. Summary of Radiocarbon Dates from Eddy Point

Unit	Depth Below Cultural Surface (cm)	Depth Below Ground Surface (cm)	Stratum	Date (B.P.)	Date (B.C./A.D.)	Laboratory Number
A	20-30 cm	60-70 cm	II	930 ± 80	A.D. 1020	GaK-8111
A	40-50 cm	80-90 cm	II	890 ± 120	A.D. 1060	GaK-8112
A	70-80 cm	110-120 cm	III	1440 ± 100	A.D. 510	GaK-8113
E	70-80 cm	180-190 cm	IV	1540 ± 130	A.D. 410	GaK-8116
E	90-100 cm	200-210 cm	IV	2030 ± 130	80 B.C.	GaK-8117
C	100-110 cm	140-150 cm	IV	2310 ± 110	360 B.C.	GaK-8114
E	110-120 cm	220-230 cm	IV	1520 ± 110	A.D. 430	GaK-8118
C	120-130 cm	160-170 cm	IV	3130 ± 130	1180 B.C.	GaK-8115

Inferences about the kinds of activities carried out at Eddy Point are made easier by the presence of faunal materials. Hunting was an important activity, as indicated by the frequency of projectile points as well as the faunal remains recovered. Elk and deer seem to have been the principal prey, but a variety of other animals are also represented. Additional evidence of hunting is found in the presence of harpoon dart heads and composite toggling harpoon parts. Elsewhere on the Northwest Coast these items are associated with sea mammal hunting, and the presence of seal bones among the faunal remains suggest that they may have served a similar purpose at Eddy Point. Finally, the spherical stones found at the site may represent evidence of still another hunting technique. These objects are sometimes interpreted to have been used with the bola, an early hunting instrument generally associated with the taking of waterfowl.

Fishing appears to have been another important site activity. Although only a single netsinker was recovered, fish remains constitute an important aspect of the faunal assemblage. Included are the remains of salmonids, sturgeon, suckers, and unidentified marine fish. As previously mentioned, the site's location near an eddy in the river probably contributed to the success of fishing by its aboriginal inhabitants.

The artifact assemblage from Eddy Point contains evidence that a variety of other activities were carried out at the site as well. Chipped stone cutting and scraping tools reflect the performance of butchering and hide processing. Heavy stone cutting and scraping tools, as well as bone chisels, wedges and the single slate adze bit found, indicate that woodworking was conducted. Abraders of various kinds and

the pieces of worked bone recovered reflect the manufacture of bone-antler tools. Cores and debitage indicate that chipped stone tools were manufactured at the site.

The fact that a wide variety of activities was apparently carried oft suggests that the site at Eddy Point was probably a prehistoric village. The best indicator of the season of occupation is provided by the abundance of waterfowl bones in the faunal assemblage, which suggests that occupation occurred during the fall, winter and spring. This situation indicates that the site at Eddy Point was probably a winter village. The location of the site is consistent with this interpretation, as Eddy Point is situated away from the main channel of the Columbia River in a setting characteristic of ethnographic winter villages.

Ivy Station (35CLT34)

Ivy Station is located on the south side of the Columbia River at approximately CRM 25. It is situated about 2 km downstream from Eddy Point, and 2.5 km upstream from the hamlet of Svensen, Oregon. Ivy Station received its name from its use as a railroad stop. At an earlier time, however, this locality was known as Indian Point. An 1870 U.S. Coast Survey map shows this locality under that name (Rockwell 1870), as does a USGS benchmark presently found at this location.

The archaeological site at Ivy Station is located near the confluence of a small, unnamed stream with the Columbia River (Figure 6-8). This stream drains into Calendar Slough, which parallels the main channel of the Columbia River behind a series of low, marshy islands. The site area, which measures approximately 30 m by 40 m, is presently occupied

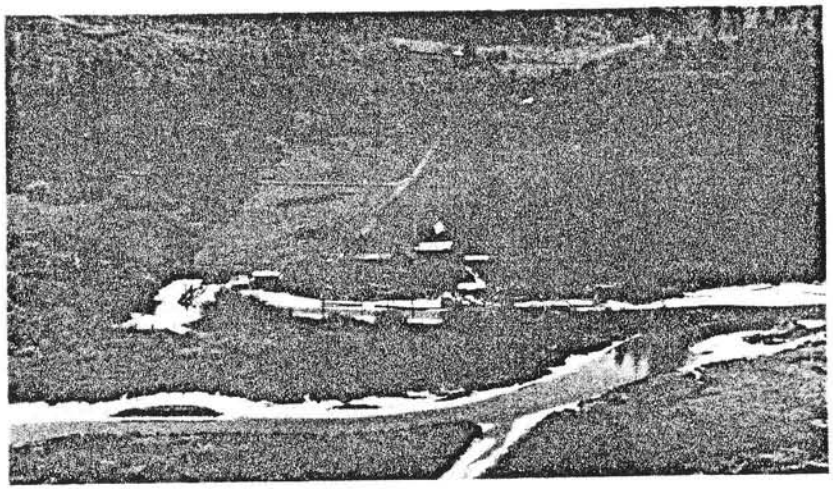

Figure 6-8. Aerial view of the Ivy Station site on Calendar Slough in the upper Columbia River estuary.

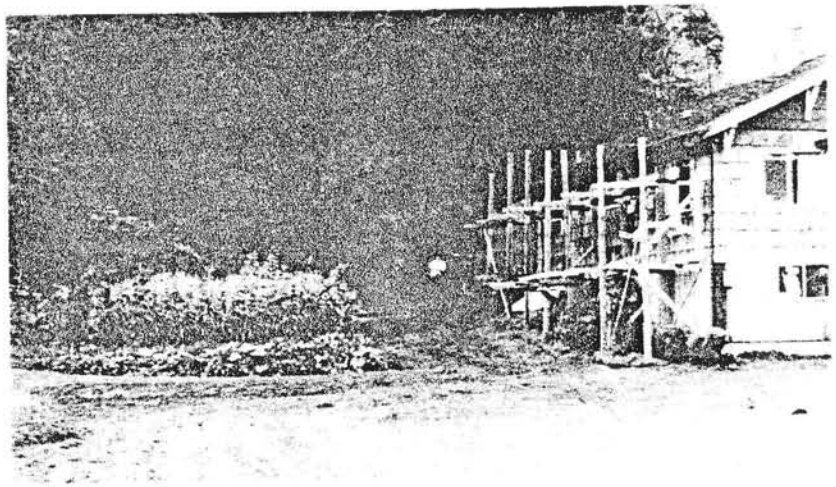

Figure 6-9. Location of excavations shown by figures between the house and garden at the Ivy Station site.

by a house and garden (Figure 6-9).

Field Procedures

Fieldwork was carried out at Ivy Station between August 21-25, 30-31 and September 1-7, 1978. Two 2 x 2 m units were excavated, aligned together to form a 2 x 4 m excavation area. The excavations were carried out in arbitrary 10 cm levels, and the cultural deposit was passed through ¼-inch mesh screen. Both units were excavated to the limits of the cultural deposit, which had a maximum depth of approximately 140 cm. In all, cultural and faunal materials were recovered from 11.6 m^3 of cultural deposit at Ivy Station. In addition, a small collection of projectile points from the site was made available for analysis by the current property owner.

Description of the Deposit

Only two depositional strata are present at Ivy Station (Figure 6-10). Stratum I, the cultural deposit, is composed of dark brown sandy sediments which contain charcoal, fire-cracked rocks, animal bones, and marine shellfish fragments. Although present throughout this stratum, shellfish fragments were especially concentrated in a sloping band which occurred in the middle levels of the cultural deposit. Stratum I has pH values ranging from 7.1 to 8.2, indicating neutral to slightly alkaline sediments. The non-acidity of the sediments presumably accounts for the well-preserved nature of the faunal remains at this site. Stratum II, which underlies the cultural deposit, is composed of mottled yellow-brown clay and is sterile of cultural materials.

Cultural Features

Seven cultural features were initially recorded during the excavations at Ivy Station. Subsequent analysis suggests that the first three represent aspects of the same manifestation and these have been combined here into one feature. All of the cultural features consist of discrete clusters of whole and fire-cracked rocks and charcoal with associated artifacts. In the case of Features 5 and 7, it was possible to determine that the fire-cracked rocks had been placed into shallow pits. Summary

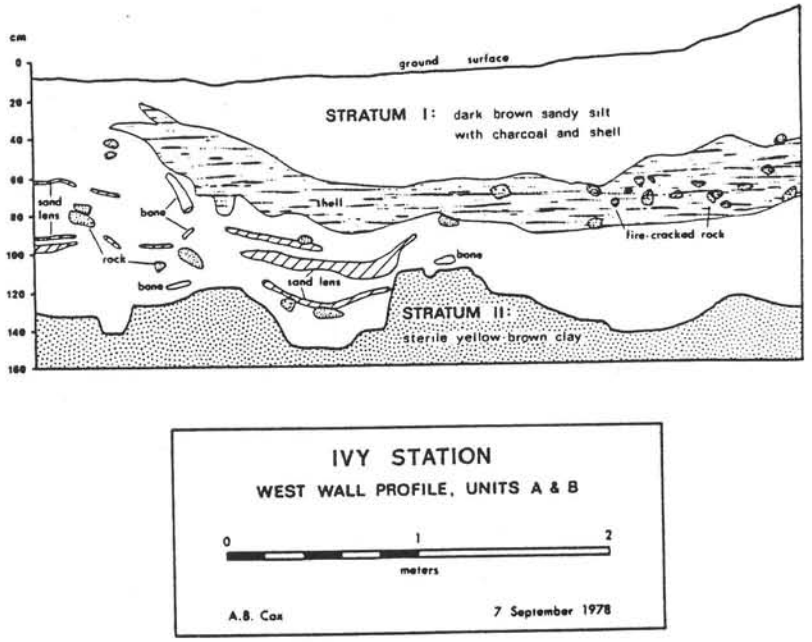

Figure 6-10. Stratigraphic profile of cultural deposits at Ivy Station.

Table 6-5. Summary Description of Cultural Features at Ivy Station

Feature Number	Unit	Depth Below Surface (cm)	Description	Dimensions (cm)	Associations
1-3	A	50-80	concentration of cultural materials, fire-cracked rock, animal bone and shell	90 x 130	projectile point fragment, used cobble flake, glass 4-hole button, 1 hammer-stone, 2 mauls
4	A/B	80-110	concentration of cultural materials, fire-cracked rock, animal bone and shell	50 x 120	used cobble flake, tabular abrader, 30 flakes, 1 perforated netsinker, 1 hammer, 1 pounder, 1 slab, 1 Type 9 point, 1 Type 12 point, 1 biface, 1 used flake, 1 carved bone figurine
5	A	100-110	discrete cluster of fire-cracked rock within a pit surrounded by clean white sand	30 x 30	1 hammer, 1 antler digging stick handle, another antler of same size as handle but unmodified
6	A	110-120	discrete cluster of fire-cracked rock and animal bone	60 x 80	none
7	A/B	130-140	2 discrete clusters of fire-cracked rocks which occurred in adjacent shallow pits dug into sterile soil	30 x 50 40 x 40	1 anvil, 2 pounders, 1 hammer, 1 slab, 2 tabular abraders; radiocarbon date of A.D. 580

descriptions of the cultural features encountered at Ivy Station are presented in Table 6-5.

Cultural Assemblage

The types of cultural materials recovered from Ivy Station, their frequency, and their vertical distribution within the cultural deposit are listed in Table 6-6. The assemblage includes a variety of stone and bone-antler tools, as well as historical artifacts obtained by the aboriginal inhabitants after the time of historic contact. Selected artifacts from Ivy Station are illustrated in Figures 6-11, 6-12, 6-13, 6-14 and 6-15.

Table 6-6. Artifact Inventory from Ivy Station

	Level														
Artifact Class	Surface	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
CHIPPED STONE INDUSTRY																
Bifacial Series																
Projectile Points:																
Type 6d					1											1
Type 7	2															2
Type 8	3				1											4
Type 9	5				3	2				2	2	2	4	1		21
Type 10	1		1		2	1					1				2	8
Type 12	2		1	1	1	2			2		2	1	1			13
Type 13	1															1
Type 15	1															1
Fragments	10				1	1					1					17
Knives:																
Triangular						2										2
Pentagonal	1											1				2
Bifaces					2	1	1	2			2	1		1		10
Unifacial Series																
Hafted End Scrapers				1	2		1	1		1	1	1	1		1	10
Unhafted End Scrapers		1				2			1							4
End Scraper Fragments			1		2	3		2			2	2				12
Scraper/Graver						1										1
Marginally Modified Series																
Flake Knives						1	1									
Used Flakes			1	2	5	5	4	1	1	1	1	4	3	2	4	34
Core and Flake Series																
CCS Cores			1			1	2	1	1	1				2		9
Debitage:																
CCS Flakes		12	28	42	72	46	29	22	30	33	32	26	8	6	10	396
Basalt Flakes			5	2	4	1	1		3	2	3				1	22
Obsidian Flakes					1		1									2
Manuport													1			1
HEAVY TOOL INDUSTRY																
Unmodified Series																
Pounders							1	2			1	1	1	1	2	9
Hammers						2	1	1	3	1	1	3	2		2	16
Anvil															1	1
Slabs									1		1				1	3
Flaked Series																
Chopper															1	1
Chopper/Anvil							1									1
Used Cobble Flakes		1	1		1		1		1	1		1			2	9

Table 6-6 (continued)

Artifact Class	Surface	Level 1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
Pecked and Ground Series																
Mauls							1	1	1		1					4
Pestle					1											1
Tiny Pecked "Bowl"						1										1
Incised Spherical Stone									1							1
Perforated Netsinker											1					1
ABRADER INDUSTRY																
Tabular Abraders					1	3			2	1		1				10
Pumice Abraders						1		2	2							5
Cobble Abraders						1				2					1	4
BONE-ANTLER INDUSTRY																
Harpoon Series																
Wedge-based Bone Points						1	1			1	1	1			1	6
Composite Toggling Harpoon Valve									1							1
Harpoon Foreshaft															1	1
Awl Series																
Straight Awl													1			1
Split-Bone Awl				1	1			1	1	1		1		1		7
Ulna Awl										1						1
Antler Awl										1						1
Awl Tip Fragments										3		1				4
Miscellaneous Series																
Bone Chisels												3				3
Bone Wedges							2			3	1	1		1		9
Modified Antler Tips									1	2		1				4
Antler Digging Stick Handle												1				1
Incised Beaver Tooth Dice										1						1
Zoomorphic Figurine												1				1
Miscellaneous Worked Bone			1			1		1	2	3		3		1	1	13
SHELL INDUSTRY																
Dentalium Bead								1								1
HISTORIC MATERIALS																
Ceramics																
Chinese Porcelain						1		1			2					4
Porcelain Doll Fragment													1			1
Ironstone China			2													2

Table 6-6 (continued)

Artifact Class	Surface	Level 1	2	3	4	5	6	7	8	9	10	11	12	13	14	Totals
Glass																
Window Glass				2	1				1							4
Chimney Glass															1	1
Bottle Glass		2														2
Glass Beads			1		1											2
Glass Buttons			1				1									2
Metal																
Buttons				1	1	1										3
Fasteners		1		1												2
Knife Blades						1			1							2
Square Nails		54	5	59	48	21	2	2	1							192
Miscellaneous Metal		6	2	3	1				2		1	3				18

Faunal Assemblage

Faunal remains were well preserved at Ivy Station. A list of the animals represented is presented in Table 6-7. Not surprisingly, the faunal assemblage recovered from Ivy Station is similar to that obtained from Eddy Point located 2 km upstream.

Elk and deer remains are by far the most common. Waterfowl bones constitute a significant proportion of the assemblage, with ducks, geese and swans all represented. A large number of fish bones were recovered, and identified specimens include anadromous salmonids and sturgeon, freshwater suckers and minnows, rockfish and other marine fish which have not yet been identified. Seal bones are also present in the faunal assemblage and, as previously mentioned for Eddy Point, it is likely that aboriginal peoples hunted these sea mammals on the islands in Cathlamet Bay.

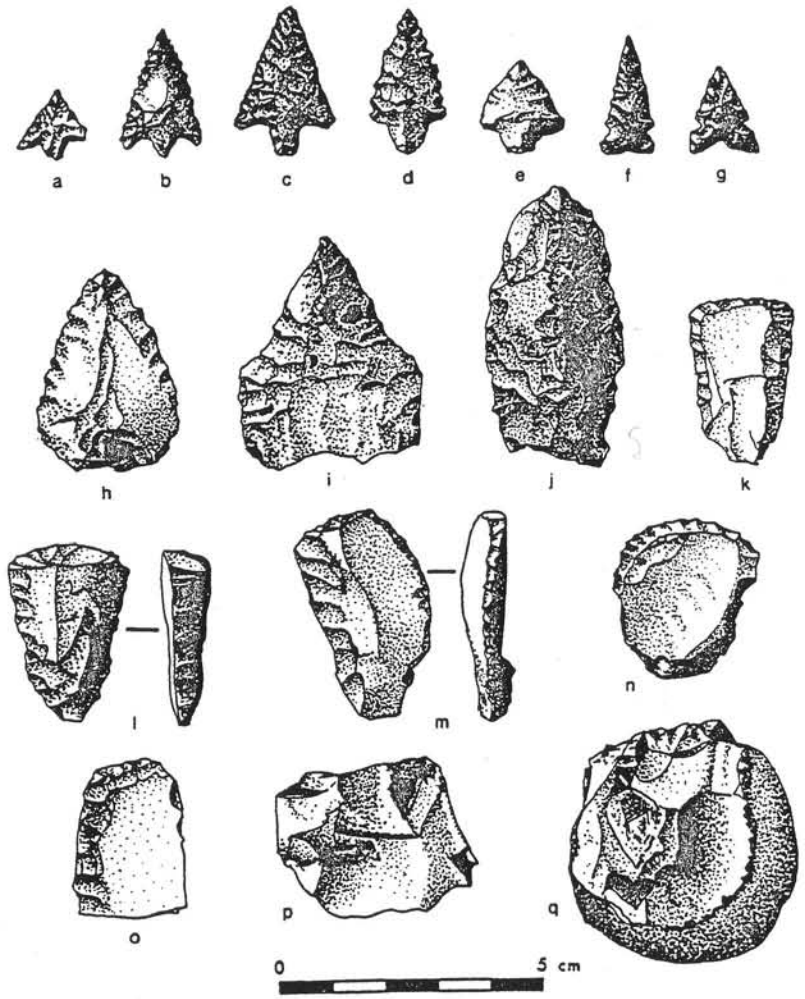

Figure 6-11. Chipped stone tools from Ivy Station: a-c, Type 9 points; d-e, Type 10 points; f-g, Type 12 points; h, triangular knife; i, pentagonal knife; j, biface; k-l, hafted end scrapers; m-n, unhafted end scrapers; o, flake knife; p-q, cores.

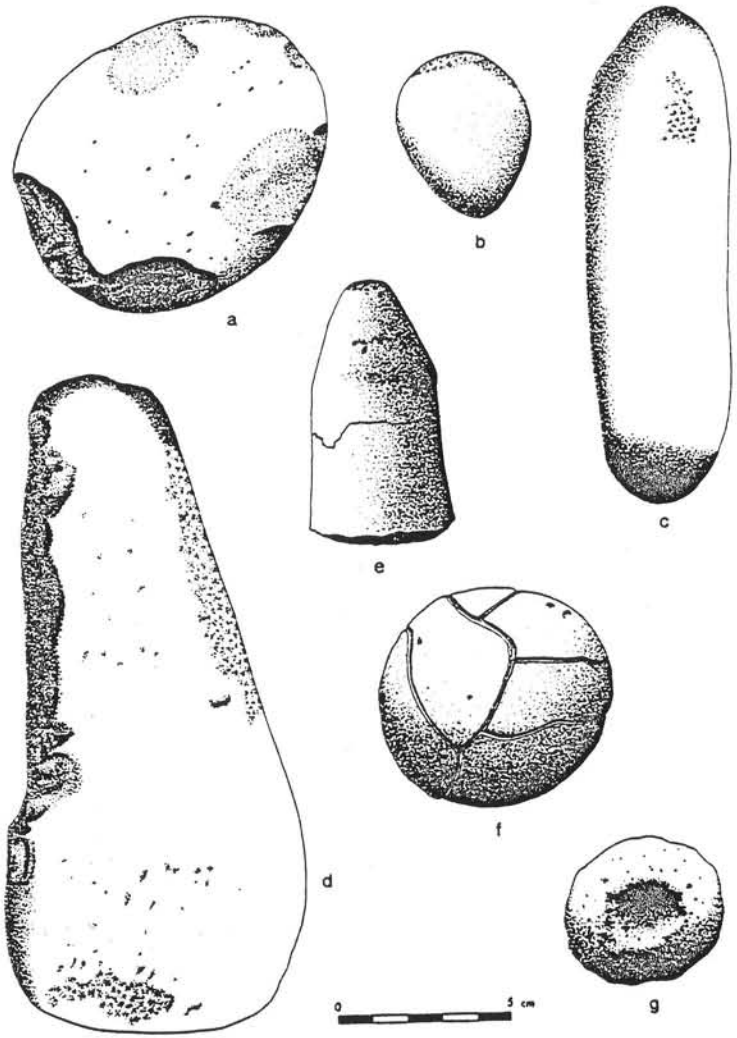

Figure 6-12. Heavy stone tools from Ivy Station: a, pounder; b-c, hammers; d-e, mauls; f, incised spherical stone; g, small pecked "bowl."

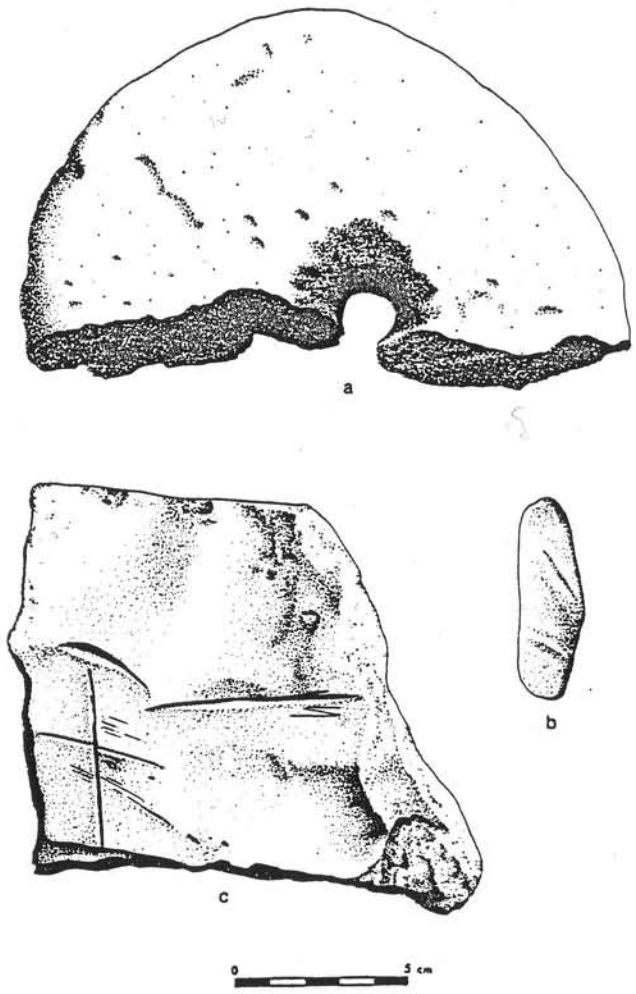

Figure 6-13. Heavy stone tools from Ivy Station: a, perforated net-sinker; b, cobble abrader; c, tabular abrader.

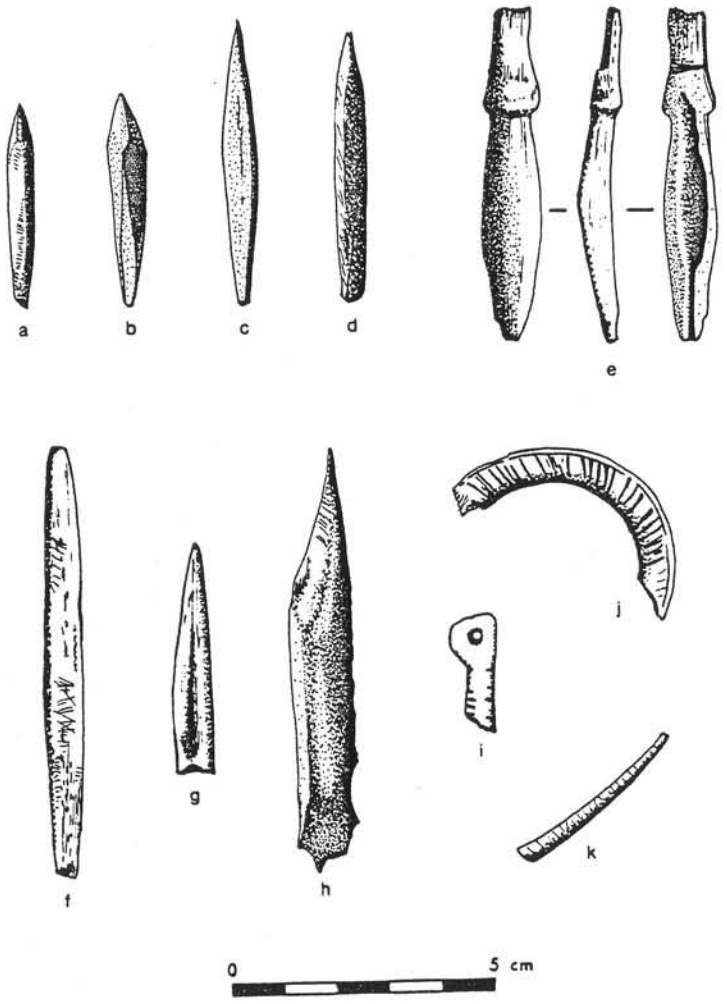

Figure 6-14. Bone-antler tools from Ivy Station: a-d, wedge-based bone points; e, composite toggling harpoon valve; f, harpoon foreshaft; g, split-bone awl; h, antler awl; i, worked bone; j, incised beaver tooth dice; k, dentalium bead.

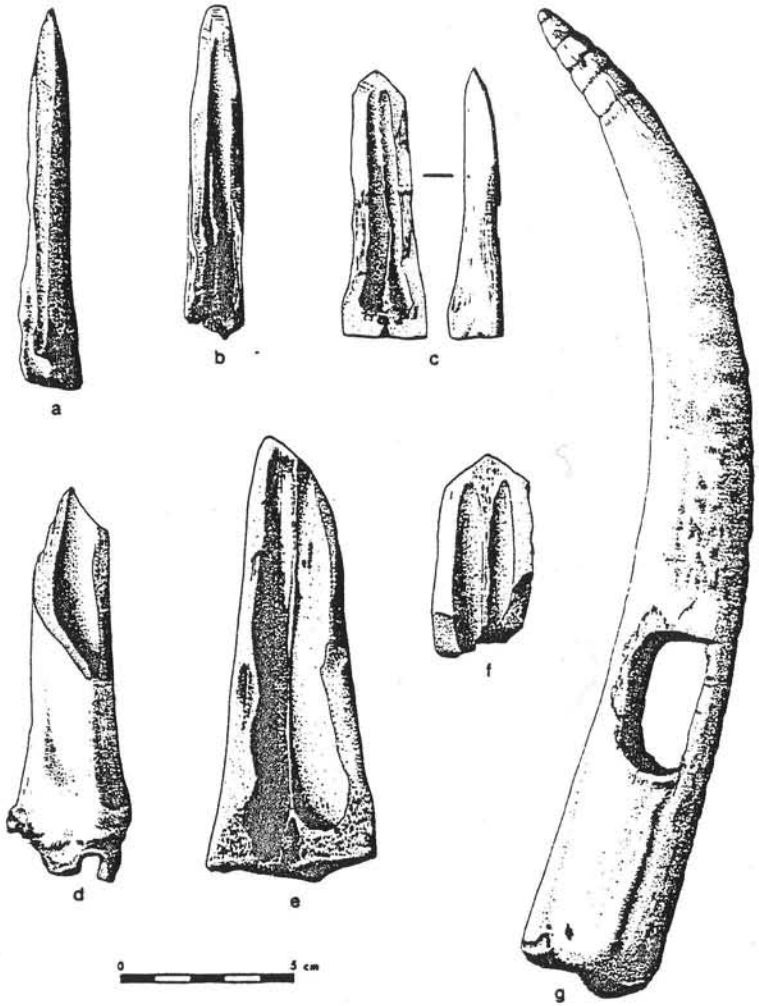

Figure 6-15. Bone-antler tools from Ivy Station: a-f, bone chisels; g, antler digging stick handle with incised tip.

Table 6-7. Identified Faunal Remains from Ivy Station

Common Name	Scientific Name	Common Name	Scientific Name
* FISH:		* WATERFOWL:	
Salmonids	*Oncorhynchus* spp./*Salmo* spp.	Duck	*Anas/Aythya*
Sturgeon	*Acipenser* spp.	Goose	*Anser/Chen/Branta*
Sucker	*Catostomus macrocheilus*	Swan	*Olor* spp.
Peamouth	*Mylocheilus caurinus*	LAND MAMMALS:	
Squawfish	*Ptychocheilus oregonensis*	* Elk	*Cervus canadensis*
Minnows	Cyprinidae	* Deer	*Odocoileus* spp.
Rockfish	*Sebastes* spp.	Bear	*Euarctos americanus*
Other marine fish	unidentified	Coyote/dog	*Canis latrans/C. familiaris*
SHELLFISH:		Raccoon	*Procyon lotor*
Gaper clam	*Tresus nuttalli*	Beaver	*Castor canadensis*
Butter clam	*Saxidomus nuttalli*	Mountain beaver	*Aplodontia rufa*
SEA MAMMAL:		Porcupine	*Erethizon* spp.
* Harbor seal	*Phoca vitulina*	Otter	*Lutra canadensis*
		Muskrat	*Ondatra zibethicus*
		Weasel/marten/ mink/skunk	Mustelidae

* Indicates predominant fauna represented at Ivy Station.

The marine shellfish at Ivy Station appear to be the same species as those at Eddy Point. Although highly fragmentary, at least two species appear to be represented--gaper and butter clams. As previously mentioned, marine shellfish are not presently known to inhabit the upper estuary around which the sites at Ivy Station and Eddy Point are situated. The shellfish represented at these two sites were thus presumably obtained from the lower estuary area.

Site Chronology and Function

Historical materials were found in almost every level of the cultural deposit at Ivy Station, indicating that the principal use of the site occurred during the early historic period. The frequency of historical artifacts declined considerably toward the bottom of the cultural deposit, however, and it was suspected that some of these materials might

have been introduced into the lowermost levels of the cultural deposit from above as a result of the natural processes of disturbance associated with aboriginal use of the site. For this reason a charcoal sample from Feature 7, which consisted of fire-cracked rock concentrations occurring in pits dug into the underlying sterile stratum, was submitted for radiocarbon analysis. This sample produced a date of 1370 ± 100 radiocarbon years: A.D. 580 (GaK-8103). This date confirms the impression that aboriginal occupation at Ivy Station actually began in the late prehistoric period, and then continued into the historic era during which time the site saw its greatest use.

As was the case at Eddy Point, the artifact assemblage from Ivy Station is characterized by a range of tool types, including both stone and bone-antler specimens. Since the occupation of this site continued into the historic period, the assemblage from Ivy Station also includes historic materials acquired by the aboriginal inhabitants from Euro-Americans. Like Eddy Point, the artifactual and faunal evidence suggests that a wide variety of activities was carried out at Ivy Station.

As indicated by the number of projectile points and the quantity of faunal remains, hunting of land mammals was an important activity at Ivy Station. Butchering and hide-processing of the game animals hunted is reflected in the frequency of chipped stone cutting and scraping tools. The presence of composite toggling harpoon parts and seal remains indicates that some hunting of sea mammals was also carried out from the site. Fishing is indicated by the presence of a netsinker and in the large number of fish remains recovered. Judging from the number of their remains, the hunting of waterfowl was another important site

activity. In addition to hunting and fishing, the recovery of a pestle indicates that some processing of plant foods was also carried out at the site.

A number of different kinds of manufacturing activities appear to have been conducted at Ivy Station. Heavy stone cutting and scraping tools, together with the bone chisels and wedges, indicate woodworking. The manufacture of bone-antler tools is reflected in the presence of numerous abraders. Chipped stone tools were also manufactured, as indicated by the recovery of chipped stone debitage at the site.

The artifact assemblage from Ivy Station stands out from those recovered from other sites investigated during this study in containing more items of what might be considered a personal nature. Among these items are an incised spherical stone perhaps used in a ball game, an antler digging stick handle, an incised beaver tooth dice, and a zoomorphic figurine.

In view of the wide variety of activities carried out at Ivy Station, the inference that this site served as an aboriginal village seems justified. As was the case at Eddy Point, the abundance of waterfowl bones provides the best indication of the season of occupation. On this basis, use of the site during the fall, winter, and spring is suggested. Again, the location of the site at Ivy Station in a protected setting away from the main channel of the Columbia River is characteristic of winter villages occupied in ethnographic times.

Aboriginal Use of the Estuarine Zone

The archaeological sites at Eddy Point and Ivy Station are located

in the upper end of the estuarine zone. In view of this fact, use of the information from these sites to characterize aboriginal subsistence and settlement in the estuarine zone as a whole must be considered provisional. The estuarine zone probably contains more microenvironments than any of the other environmental-use zones recognized in this study. For this reason, additional sites located in different settings, particularly in the lower estuary area, will need to be investigated before prehistoric use of this zone can be fully reconstructed.

Even considering their peripheral location, Eddy Point and Ivy Station contained considerable evidence of the use of estuarine resources by their aboriginal inhabitants. The resources most indicative of an estuarine adaptation at these sites are marine shellfish, seals, and marine fish. Of the latter, only rockfish have so far been identified, but other species are presumably also represented.

Both Eddy Point and Ivy Station are interpreted to have served as winter villages. Both sites have relatively deep cultural deposits, and both yielded evidence that a wide range of activities were carried out at these localities. The inference that these sites were winter settlements is based on the high frequency of waterfowl remains. This idea is consistent with the location of both of these sites away from the main channel of the Columbia River behind a series of islands. The location of winter villages in protected settings of this nature was a characteristic practice of the Chinookan peoples at the time of historic contact.

The evidence of an estuarine adaptation at Eddy Point and Ivy Station poses something of an interpretive problem. Both sites are located above Tongue Point on the south side of the Columbia River on the western

edge of the area generally assigned to the Kathlamet. The greater part of Kathlamet territory is located above the Columbia River estuary, however, and these people appear to have been primarily adapted to a riverine environment. The presence of the remains of seals and marine fish at Eddy Point and Ivy Station may reflect use by the Kathlamet of resources locally available in the upper estuary.

In terms of the basic nature of the adaptation represented, however, it seems more likely that Eddy Point and Ivy Station were occupied by the Clatsop. Support for this idea is found in the abundant presence of marine shellfish at these sites. This resource was not available in the upper estuary, and the shellfish at these sites were almost certainly obtained from Clatsop territory in the lower estuary area. The idea that the upper estuary area may in fact have been used by the Clatsop instead of being part of Kathlamet territory is also consistent with the ethnographic account that the Clatsop sometimes traveled above Tongue Point to fish at the mouth of the John Day River (Suphan 1974:207).

Finally, as noted in Chapter 3, the best indication of the territory occupied by the various Chinookan groups around the mouth of the Columbia River is provided by the location of their main villages. In this respect, it is noteworthy that Eddy Point and Ivy Station are located downstream from the nearest historically documented Kathlamet village at Knappa. Since none of the principal historic villages of either the Kathlamet or the Clatsop were located along the upper estuary, this area was probably somewhat peripheral to the main territories occupied by each of these peoples. As indicated by the archaeological evidence, however, the adaptations represented at Eddy Point and Ivy Station are clearly

estuarine rather than riverine in orientation, and occupation of this area by the Clatsop thus seems indicated.

CHAPTER SEVEN

RIVERINE ZONE: KNAPPA DOCKS

Previous archaeological investigations at the Skamokawa site (45WK5) located in the town of Skamokawa, Washington, on the north side of the Columbia River have provided some information about prehistoric settlement at the upstream end of the study area (Minor 1978, 1980). For this reason, only one archaeological site in the riverine zone above the Columbia River estuary was selected for excavation during the present study. Unlike the Skamokawa site which was occupied entirely in prehistoric times, the site selected for excavation, known as the Knappa Docks site, is known to have been a Kathlamet settlement occupied in the early historic period. Considered together, these two sites provide a record of aboriginal settlement and subsistence in the riverine zone above the Columbia River estuary beginning around 2300 years ago and continuing into historic times.

Knappa Docks (35CLT37)

The Knappa Docks site is located on the south bank of the Columbia River at about CRM 27. Situated on Knappa Slough approximately 1.1 km upstream from the previously described site at Eddy Point, the archaeological site at Knappa Docks sits on a bluff overlooking the docks at the town of Knappa, Oregon (Figure 7-1). Like Eddy Point, this site is situated across from Karlson Island, one of the largest in a series of

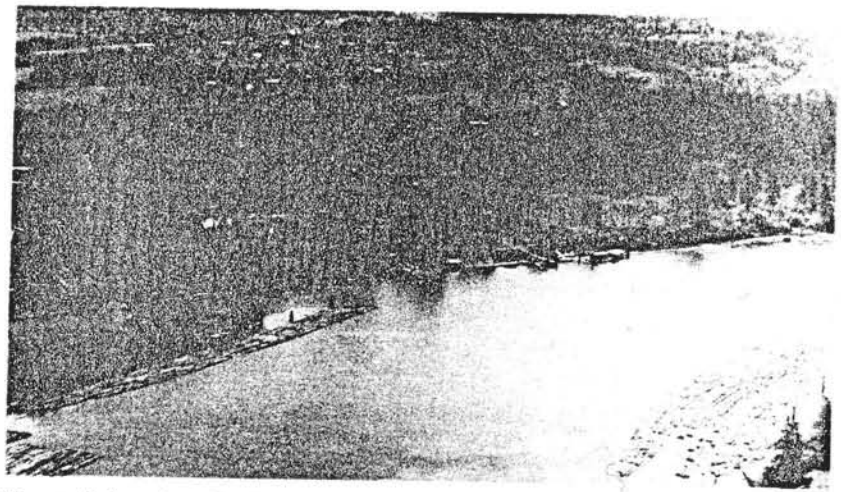

Figure 7-1. Aerial view of the Knappa Docks site on high bank above Knappa Slough.

low marshy islands which separates Knappa Slough from the main channel of the Columbia River. Unlike Eddy Point, however, the site at Knappa Docks is located above the maximum upstream boundary of the Columbia River estuary and is thus situated in a riverine environment.

The archaeological site at Knappa Docks is believed to represent the Kathlamet village of *Hlilusqahih* (Curtis 1911:182). As previously noted in Chapter 3, this settlement is best known from the accounts of Lewis and Clark, who stopped at this village on November 26, 1805, on their way down the Columbia and again on March 24, 1806, on their journey back home (Thwaites 1905:3:252; 4:199). This village was described as consisting of "nine large wood houses," and burial canoes on scaffolds were observed on Karlson Island across from the site (Thwaites 1905:3:252).

The archaeological site at Knappa Docks has been disturbed to an unknown extent by historical developments at this locality. Railroad construction along the north edge of the bluff on which the site is situated, and the building of a road from the town of Knappa to the docks along the west edge of the bluff, may have resulted in the removal of portions of the site in these areas. The remainder of the site has been protected somewhat by the placement of a modern house on this bluff, and its occupants have acted to protect the site from further destruction from either construction or the acts of relic collectors.

Field Procedures

Fieldwork was carried out at the Knappa Docks site from August 9-25, 1978. An augering program was initially undertaken to establish the boundaries of the cultural deposit, which was found to extend over an area approximately 60 m by 40 m. Four 2 x 2 m units were then set up for excavation. Units A and B were aligned together to form a 2 x 4 m excavation area on the west side of the house currently occupying this property. Excavations in these units proved to be highly productive and were carried to the limits of the cultural deposit at approximately 110 cm below the ground surface.

The other two units, C and D, were aligned together to form a 2 x 4 m excavation area on the east side of the house. These units were located in an area where a relic collector had reportedly uncovered the remains of an aboriginal house, and it was hoped that further evidence of this feature could be found. Unfortunately, excavations in these units encountered only disturbed deposits, from which only a few

artifacts were recovered.

The excavations at Knappa Docks were carried out in arbitrary 10 cm levels, and the cultural deposit was passed through ¼-inch mesh screen. Considering only the undisturbed fill in Units A and B, cultural and faunal materials were recovered from approximately 8.8 m^3 of the cultural deposit at Knappa Docks.

Description of the Deposit

Two depositional strata are present at the Knappa Docks site (Figure 7-2). Stratum I, the cultural deposit, consists of a dark brown loam

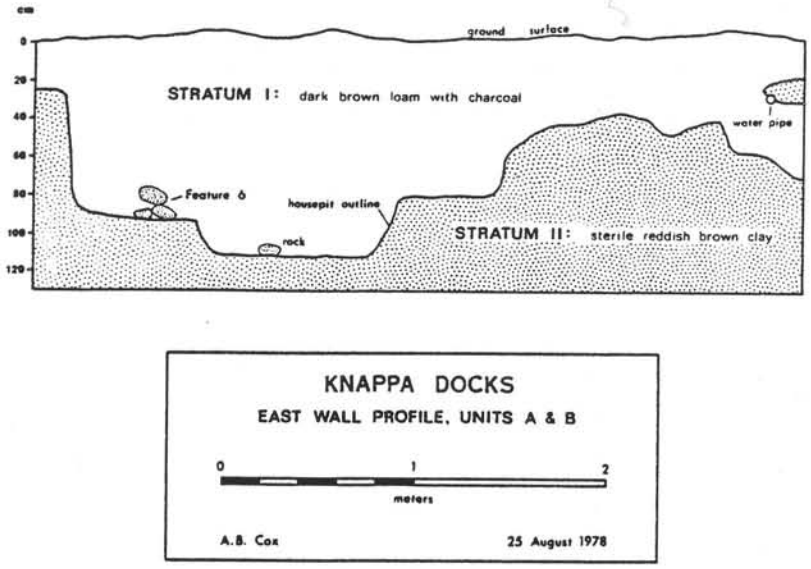

Figure 7-2. Stratigraphic profile of cultural deposits at Knappa Docks.

which contains charcoal, fire-cracked rocks, stone artifacts, and a small amount of faunal remains. This stratum yielded pH values ranging from 5.0 to 5.9, indicating moderately acidic sediments, a situation which presumably accounts for the relatively poor preservation of faunal materials at this site in comparison with Eddy Point and Ivy Station downstream. Stratum II, a reddish clay, underlies the cultural deposit and is sterile of cultural materials.

It should be noted that the wall profile in Units A and B reveals the outline of an aboriginal housepit. The occurrence of such a feature is to be expected, of course, in view of the account by Lewis and Clark of aboriginal houses at this site. That Units A and B were situated within an aboriginal housepit receives additional support from the presence of a number of cultural features in these units, which are described below.

Cultural Features

Nine cultural features were initially recorded during excavations at Knappa Docks. All of these features consisted of clusters of fire-cracked rocks, shell and associated stone tools. The nature and extent of these features suggests that they represent a succession of living surfaces such as would be found within an aboriginal housepit. The provenience, dimensions, and associations of these features are summarized in Table 7-1.

Cultural Assemblage

The types of cultural materials, their frequency, and their vertical

distribution within the cultural deposit are listed in Table 7-2. The assemblage contains only stone tools and historic materials; bone-antler artifacts apparently were not preserved at the site. Selected artifacts from Knappa Docks are illustrated in Figures 7-3, 7-4 and 7-5.

Faunal Assemblage

As mentioned previously, faunal remains were not well preserved at Knappa Docks. Among the fragmentary bones recovered, however, the

Table 7-1. Summary Description of Cultural Features at Knappa Docks

Feature Number	Unit	Depth Below Surface (cm)	Description	Dimensions (cm)	Associations
1A 1B	A	60-70	2 clusters of fire-cracked rocks, a few shells, and associated stone tools	180 x 200 50 x 230	1A overlies Features 2, 5 and 7; 1B overlies Features 3, 4, 6, and 8
2	A	70-80	2 clusters of fire-cracked rocks, a few shells, and associated stone tools	160 x 200	overlies Features 5, 7 and 9
3	A/B	70-80	cluster of fire-cracked rocks, a few shells, and associated stone tools	50 x 240	overlies Features 4, 6 and 8
4	B	80-90	cluster of fire-cracked rocks and a few shells	45 x 160	underlies Feature 3
5	A	80-90	2 clusters of fire-cracked rocks, a few shells, and associated stone tools	100 x 180	underlies Feature 2
6	B	90-100	cluster of fire-cracked rocks and associated stone tools	50 x 160	underlies Features 3 and 4
7	A	90-100	2 clusters of fire-cracked rocks, a few shells, and associated stone tools	160 x 200	underlies Features 2 and 5
8	B	100-110	cluster of fire-cracked rocks and associated stone tools	50 x 90	underlies Features 3, 4 and 6
9	A	100-110	cluster of fire-cracked rocks and associated stone tools	80 x 160	underlies Features 2, 5 and 7

Table 7-2. Artifact Inventory from Knappa Docks

Artifact Class	Level 1	2	3	4	5	6	7	8	9	10	11	Disturbed Fill	Totals
CHIPPED STONE INDUSTRY													
Bifacial Series													
Projectile Points:													
Type 6d								1					1
Type 7				2	1			1					4
Type 8	1	1	1										3
Type 9		2	1	1			1	1		1	1		8
Type 10			1		1								2
Type 12					1	1		3				2	7
Fragments		1	1	4				1					7
Bifaces			2	1			1						4
Unifacial Series													
Side Scraper						1							1
Hafted End Scrapers		1		1	3	1		1		2		2	11
Unhafted End Scrapers	1	1					1						3
End Scraper Fragments				2	1		2					2	7
Marginally Modified Series													
Flake Knives		1	1			1		1					4
Flake Scrapers		1									1	1	3
Gravers			2		1							1	4
Used Flakes	1	1	3	6	4		2	1	1	1	2	1	23
Core and Flake Series													
CCS Cores				2		1	2	1				1	7
Debitage:													
CCS Flakes	14	33	79	64	37	21	12	23	10	6	4	32	335
Obsidian Flakes	2	1	1	1		1		3				1	10
HEAVY TOOL INDUSTRY													
Unmodified Series													
Pounders				1		1			1	1		1	5
Hammers		1		1	2	3	8	2	1	2	1		21
Hammer/Anvils									1	1			2
Wrap-marked Netsinkers					2	3	5	1					11
Flaked Series													
Choppers				1	1								2
Chopper/Anvil												1	1
Used Cobble Flakes	2		1		1			1	2			2	9
Pecked and Ground Series													
Unfinished Maul								1					1
Manos											2		2
Perforated Netsinkers							1	1					2
Pipe			1										1

Table 7-2 (continued)

Artifact Class	Level 1	2	3	4	5	6	7	8	9	10	11	Disturbed Fill	Totals
ABRADER INDUSTRY													
Tabular Abraders					1		1	1	4		1		8
Pumice and Scoria Abraders				2	2		3	1					8
Cobble Abraders							2						2
HISTORIC MATERIALS													
Ceramics													
Porcelain (Oriental?)									1				1
Ironstone China	3	1	2	1									7
Banded Creamware					2		1						3
Stoneware			1	2									3
Clay Pipe Fragments			3										3
Glass													
Bottle Glass	6	5	1	7	2		1					9	31
Glass Beads		14	2	2	5	2	3	1		1	1	5	36
Metal													
Coin				1									1
Button					1								1
Copper Pendant					1								1
Rolled Copper Beads		1		4		1			1				7
Metal Projectile Point		1											1
Knife Blades			1	2		1			1				5
Musket Ball										1			1
Square Nails			1	3	2								6
Miscellaneous Fragments		2		1	3	1			1				8

remains of elk, deer, beaver, and porcupine were identified. In addition, fragments of marine shell were sparsely distributed within the cultural deposit. At least two species, razor clams and cockles, are represented.

Site Chronology and Function

Historic materials were found throughout the cultural deposit at

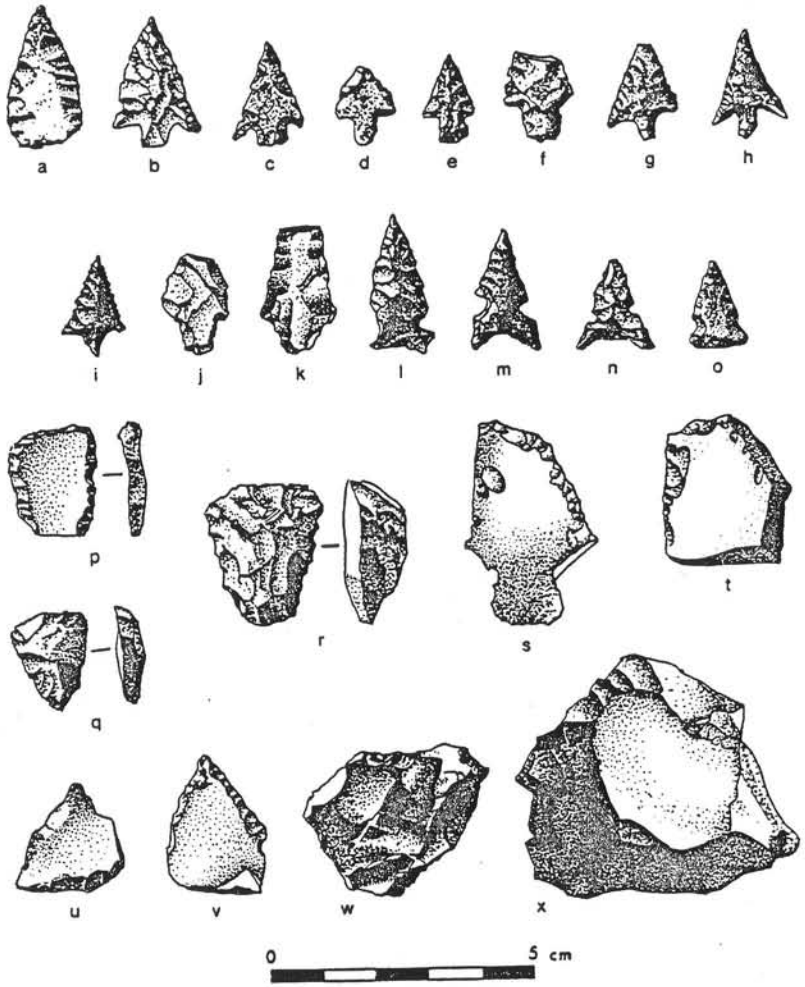

Figure 7-3. Chipped stone tools from Knappa Docks: a, Type 6d point; b-c, Type 7 points; d-f, Type 8 points; g-i, Type 9 points; j-k, Type 10 points; l-o, Type 12 points; p-r, hafted end scrapers; s, flake knife; t, flake scraper; u-v, gravers; w-x, cores.

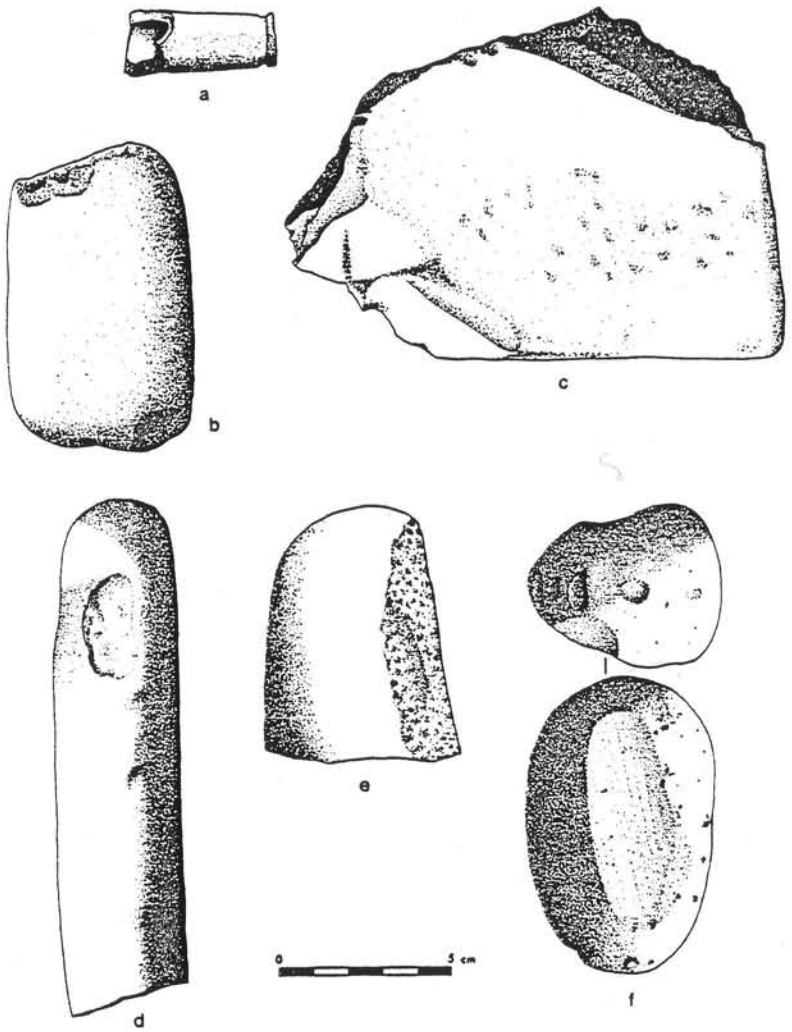

Figure 7-4. Stone pipe, heavy stone tools, and abrader from Knappa Docks: a, stone pipe; b, pounder; c, chopper/anvil; d, hammer; e, unfinished maul; f, pumice abrader.

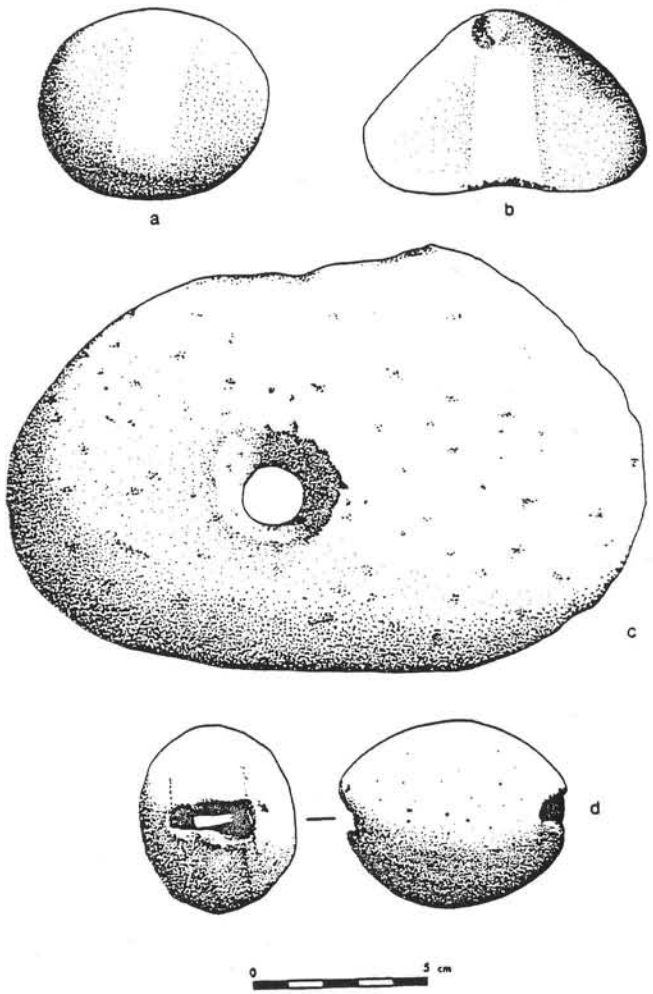

Figure 7-5. Netsinkers from Knappa Docks: a-b, wrap-marked netsinkers; c-d, perforated netsinkers.

Knappa Docks. For this reason, the site is presumed to have been occupied entirely within the historic period. The nature of the historic materials recovered at Knappa Docks is consistent with the identification of this site as the Kathlamet village of *Hlilusqahih*.

The size and diversity of the artifact assemblage from Knappa Docks indicates that many different activities were carried out at this site. Among the most obvious of these activities were hunting, fishing, woodworking, hide scraping, stone and presumably bone tool manufacture. The few identified species among the fragmentary faunal remains recovered do not permit an inference as to the seasonality of occupation. The journals of Lewis and Clark indicate that this settlement was occupied in both November and March, however, and on this basis it is concluded that the site at Knappa Docks was a winter village.

Aboriginal Use of the Riverine Zone

The only other archaeological site so far investigated in the riverine zone near the mouth of the Columbia River is the Skamokawa site (Minor 1978, 1980). Located near CRM 33 in the town of Skamokawa, Washington, this site consists of extensive cultural deposits more than a meter deep from which a broad range of stone tools was recovered. Radiocarbon dates indicate that occupation spanned the period between 350 B.C. and A.D. 600 (and possibly later). Faunal remains were poorly preserved at the Skamokawa site, but the same basic species were identified among the fragmentary bones recovered as were found at Knappa Docks.

Like Knappa Docks, the Skamokawa site is situated in a protected setting away from the main channel of the Columbia River. Although the

site investigated was occupied entirely in prehistoric times, ethnographic accounts indicate that an historic Wahkiakum village was located in this area (probably across Skamokawa Creek). This historic settlement was known as *Chahulkilhum* or "Winter Town" (Curtis 1911:182). There is therefore some indication from documentary sources that a settlement in the Skamokawa area would have been used as a winter village.

In addition to the winter villages at Knappa Docks and Skamokawa, the ethnographic/ethnohistoric record indicates that other types of settlements were also located within the riverine zone. Specifically, summer villages were situated along the main channel of the Columbia River, while hunting and fishing camps were located on the river islands. Although aboriginal settlements in these settings have been recorded in the riverine zone, none of these sites have yet been the scene of archaeological investigations.

CHAPTER EIGHT

INLAND ZONE: BURKHALTER AND REITH SITES

Two archaeological sites in the inland zone were selected for excavation. The Burkhalter site, located on Grays River in Washington, contains evidence of use as early as 710 B.C. and was occupied entirely in prehistoric times. In contrast, the Reith site, located on the Lewis and Clark River in Oregon, appears to have been used by aboriginal peoples entirely during the early historic period. These two sites, then, provide evidence of aboriginal use of the inland zone at widely separated points in time.

Burkhalter Site (45WK51)

The Burkhalter site is located on the east bank of Grays River near Rosburg, Washington. Grays River is a northern tributary which enters the Columbia River at Grays Bay at about CRM 21. The site is situated approximately 5 km upstream from the confluence of these two streams on a low knoll which comprises one of the few elevated locations near the present river channel in this area (Figure 8-1). The site consists of a 50 m by 25 m area of dark midden soil along the river bank.

The site area has been subjected to some disturbance as a result of historic occupation during the late nineteenth and early twentieth centuries. This disturbance is indicated by the mixture of historic materials, mostly square nails, with aboriginal artifacts in the upper levels

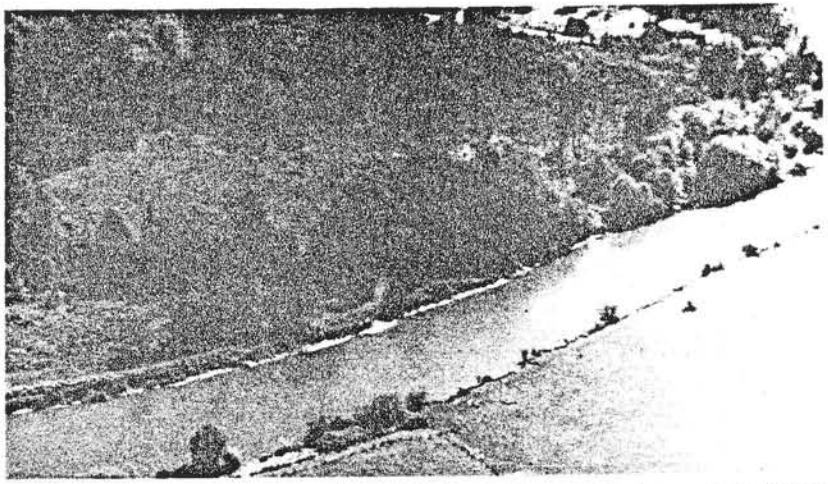

Figure 8-1. Aerial view of the Burkhalter site on the lower Grays River.

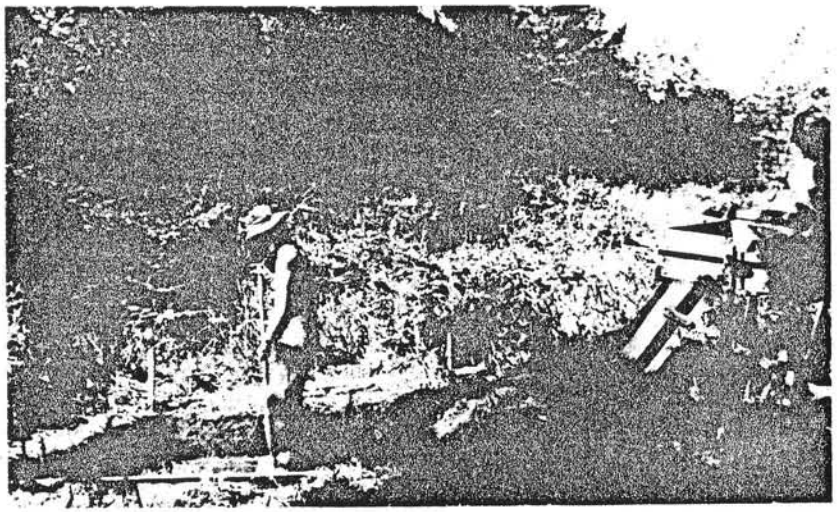

Figure 8-2. Excavations in progress at the Burkhalter site showing the heavily vegetated setting.

of the cultural deposit. Additional disturbance occurred when two old wooden structures were razed and a road cut across the site area by a bulldozer just prior to the beginning of excavations in 1978. Other portions of the site appear to be undisturbed, however, and are presently used as cattle pasture.

Field Procedures

Fieldwork was carried out at the Burkhalter site over two periods from September 7-16, 1978 and July 28-29, 1979. Four 2 x 2 m units were excavated, designated Units A through D, with the cultural deposit passed through ¼-inch mesh screen (Figure 8-2). Excavations were carried out by arbitrary 10-cm levels. Units A and B were located on the south end of the site where the cultural deposit proved to be shallow and disturbed by historic occupation. Units C and D were more centrally located in an area of the site where the cultural deposit was somewhat deeper and relatively undisturbed. In all, cultural materials were recovered from approximately 8.8 m^3 of cultural deposit. In addition, a number of artifacts were collected from the ground surface in areas disturbed by bulldozing activity.

Description of the Deposit

Only two depositional strata are present at the Burkhalter site. These strata were most clearly represented in Unit D (Figure 8-3). Stratum I, the culture-bearing stratum, is brown silty loam. The upper levels of this stratum are characterized by an abundance of gravel and a high root content. The lower levels contain little gravel and relatively few roots. Stratum II, yellow silty clay, underlies the cultural deposit. Patches of sterile clay first appeared between 50-60 cm below surface and were present throughout Unit D at a depth of 78 cm below surface.

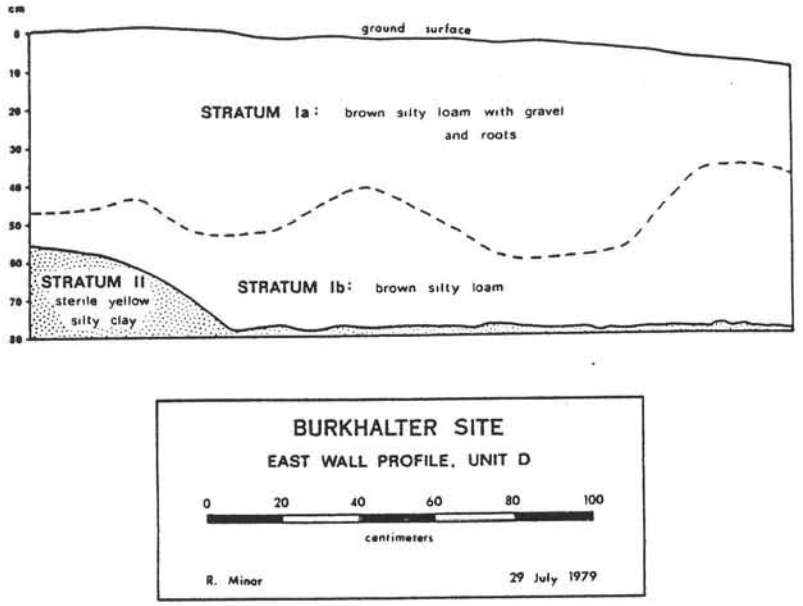

Figure 8-3. Stratigraphic profile of cultural deposits at the Burkhalter site.

As indicated by pH values, which ranged from 4.9 near the ground surface to 5.4 in the lower levels, the sediments comprising the cultural deposit are moderately acidic. This situation presumably accounts for the lack of preservation of organic remains at this site.

Cultural Features

Three cultural features were encountered during the excavations at the Burkhalter site. As indicated in Table 8-1, all three features consisted of rock clusters containing both whole and fire-cracked cobbles and charcoal. Feature 2, in particular, was a well-defined circle of stones which is interpreted to have been a hearth. The rocks comprising Features 1 and 3 were somewhat more loosely clustered, but probably also represent the remains of hearths, campfires, or other features related to the use of fire.

Cultural Assemblage

The types of cultural materials recovered from the Burkhalter site, their frequency, and their vertical distribution within the cultural deposit are listed in Table 8-2. The artifact assemblage consists entirely of stone tools and debitage. No faunal remains were recovered from the site. Selected artifacts from the Burkhalter site are illustrated in Figures 8-4, 8-5 and 8-6.

Table 8-1. Summary Description of Cultural Features at the Burkhalter Site

Feature Number	Unit	Depth Below Surface (cm)	Description	Dimensions (cm)	Associations
1	C	10-20	loose cluster of cobbles and fire-cracked rocks	90 x 90	one Type 7 point
2	C	60-70	well-defined cluster of rocks forming hearth	55 x 60	radiocarbon date of 710 B.C.
3	D	30-40	loose cluster of cobbles and fire-cracked rocks	130 x 140	one Type 2 point; radiocarbon date of 130 B.C.

Table 8-2. Artifact Inventory from the Burkhalter Site

Artifact Class	Level: Surface	1	2	3	4	5	6	7	8	Totals
CHIPPED STONE INDUSTRY										
Bifacial Series										
Projectile Points:					1					1
Type 2						1				1
Type 3			1	1	1					3
Type 5									1	1
Type 6d			1							1
Type 7		1				1				2
Fragments										
Bifaces	3	6	1	4	1				1	16
Unifacial Series										
Hafted End Scrapers		3		2		1				6
Unhafted End Scrapers		5		2	4	1				12
End Scraper Fragments		3	1	1						5
Marginally Modified Series										
Flake Knives	1	3					1			5
Flake Scrapers		1		1						2
Gravers			2		1					3
Used Flakes	3	19	4	5	4	4	2	1		42
Core and Flake Series										
Cores:										
CCS Cores	3	3	2	1	3	2				14
Basalt Cores	1		2	1	2	1	1			8
Debitage:										
CCS Flakes	109	735	345	218	219	47	185	74	19	1971
Basalt Flakes	23	81	55	73	120	50	141	79	22	644
Obsidian Flakes		3	1		1					5
CCS Manuport	1									1
HEAVY TOOL INDUSTRY										
Unmodified Series										
Pounders		1			1					2
Hammers	1						1			2
Anvil							1			1
Flaked Series										
Choppers	1			1						2
Cobble Flake Knives				2		2				4
Cobble Flake Scrapers		1			2	1	1			5
Used Cobble Flakes	3	9	2	3	1	9	3	2	1	33
ABRADER INDUSTRY										
Tabular Abraders			1		1		1			3
Pumice Abraders		2	1	2			2		1	8
Cobble Abraders	1	5	2	3	2	1				14

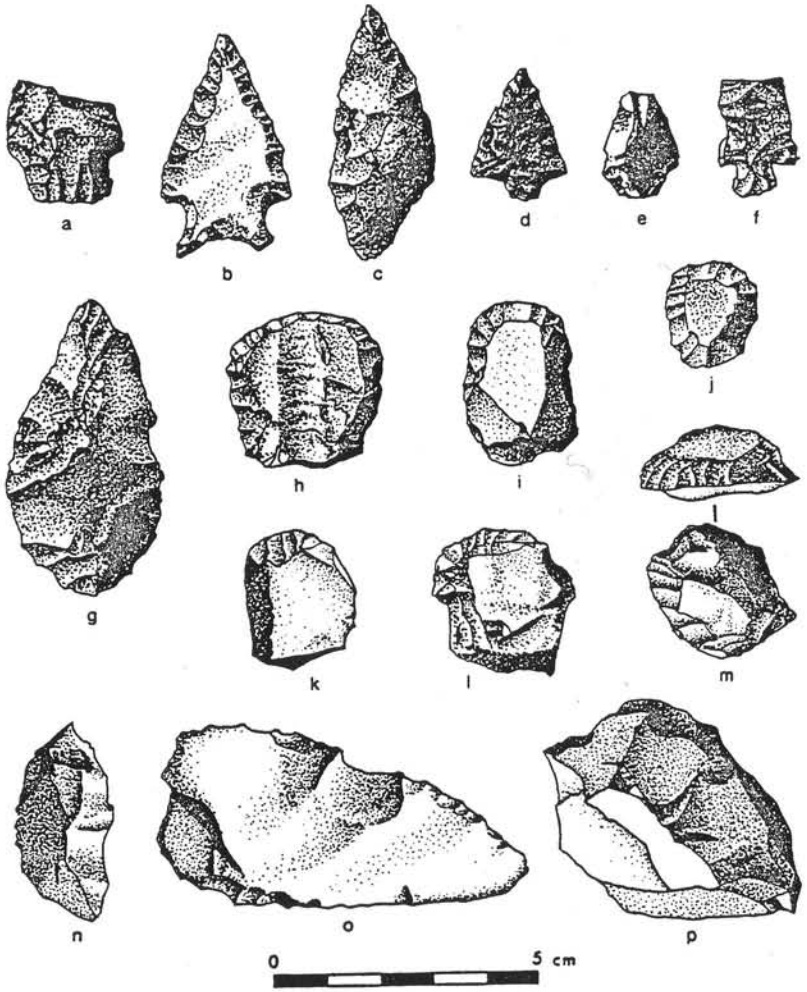

Figure 8-4. Chipped stone tools from the Burkhalter site: a, Type 2 point; b, Type 3 point; c-d, Type 5 points; e, Type 6d point; f, Type 7 point; g, biface; h-j, hafted end scrapers; k-l, unhafted end scrapers; m, unhafted end scraper with graver spur; n, graver; o, flake knife; p, CCS core.

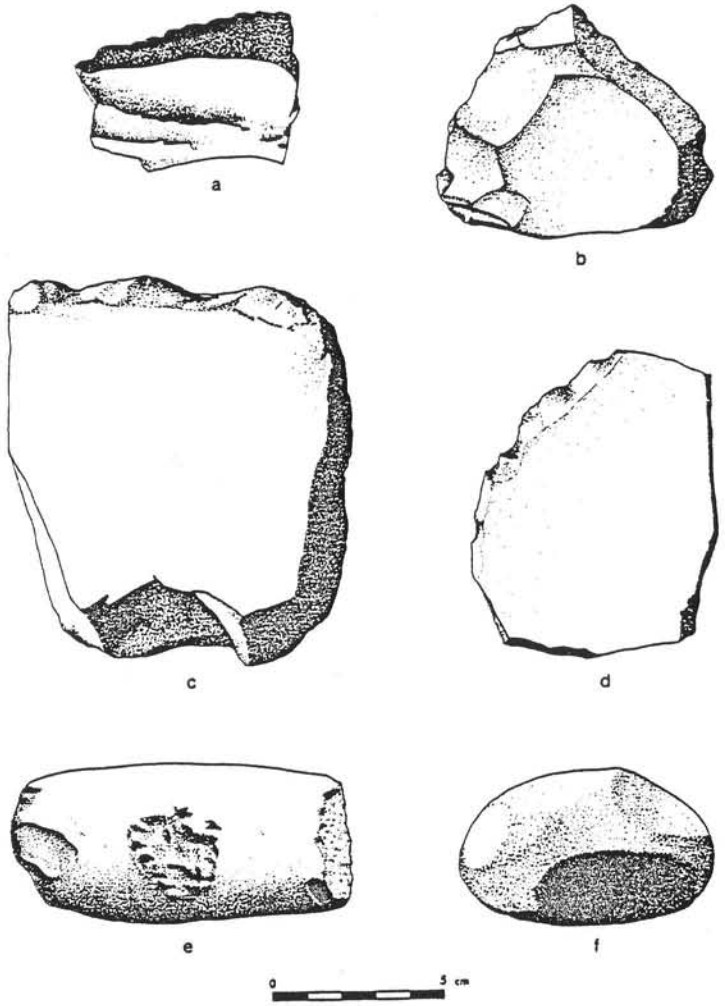

Figure 8-5. Heavy stone tools and abrader from the Burkhalter site: a, cobble flake knife; b, cobble flake scraper; c, tabular basalt chopper; d, used tabular basalt flake; e, hammer; f, cobble abrader.

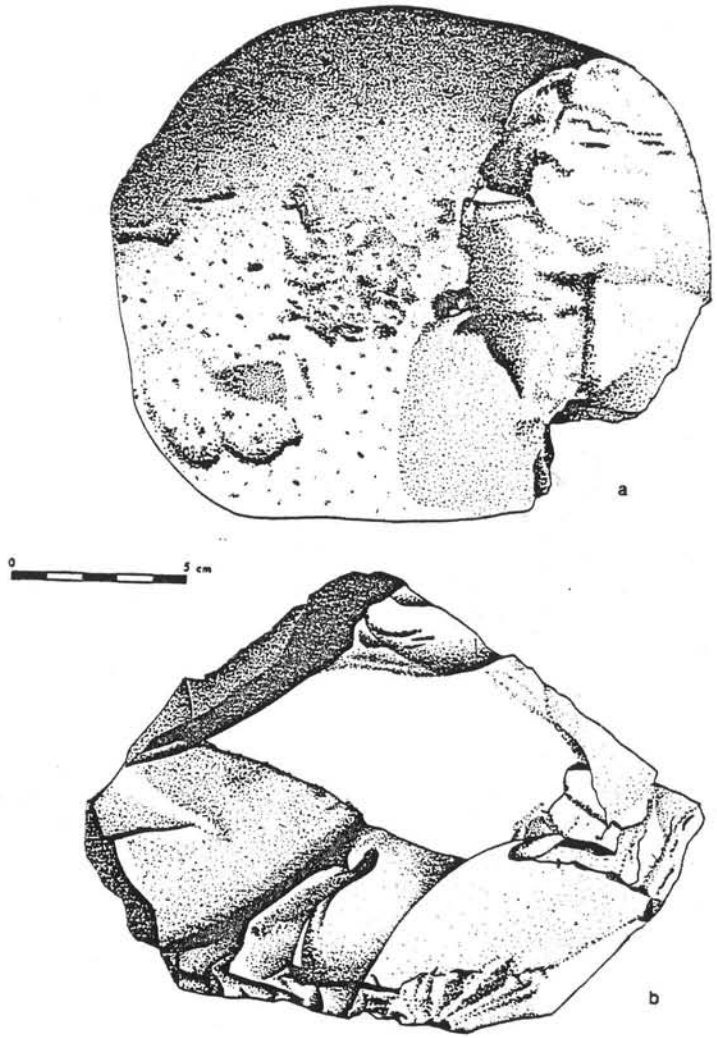

Figure 8-6. Anvil (a) and basalt core (b) from the Burkhalter site.

Site Chronology and Function

Two radiocarbon dates are available from the Burkhalter site. The earliest date, 2660 ± 130 radiocarbon years: 710 B.C. (GaK-8124), is from the well-defined hearth designated Feature 2 found in the 60-70 cm level in Unit C. The second date, 2080 ± 110 radiocarbon years: 130 B.C. (GaK-8537), is from the loose cluster of rocks designated Feature 3 in the 30-40 cm level in Unit D.

Although only nine whole and fragmentary projectile points were found, the principal use of the Burkhalter site appears to have centered around hunting-related activities. No evidence of fishing or the gathering and processing of vegetal foods was recovered. Interestingly, four of the nine projectile points are made of obsidian. These are the only tools made of this material at the site, although five pieces of obsidian debitage were also recovered.

The composition of the artifact assemblage reflects the performance of the following basic tasks: (1) butchering of game animals and the processing of hides, as reflected in the large number of cutting and scraping tools; (2) the manufacture of bone-antler tools as indicated by the large number of abraders, although bone was apparently not preserved in the site's acidic deposits; and (3) stone tool manufacturing, as indicated by the large number of bifaces, cores, and flakes recovered.

The Burkhalter site contained the largest number of cores and flakes of all the sites investigated during this study. Both cryptocrystalline materials used in the manufacture of chipped stone tools and basalt used in the manufacture of implements assigned to the heavy

tool industry were present. In particular, the reduction of cobbles of gray, coarse-grained basalt appears to have been a major site activity. Although the specific source of these cobbles is unknown, judging from the large numbers of artifacts and flakes of this material they probably occur locally, perhaps as stream gravels in Grays River.

Reith Site (35CLT36)

The Reith site is located on the east bank of the Lewis and Clark River approximately 7 km upstream from its confluence with the Columbia River at Youngs Bay. Fire-cracked rock and dark midden soil are exposed in the river bank where a sharp bend occurs in the Lewis and Clark River (Figure 8-7). The site, which measures about 30 m by 30 m in extent, is situated on the edge of an area currently used as a cattle pasture (Figure 8-8).

Fieldwork was carried out at the Reith site from August 31 through September 6, 1978. Two 2 x 2 m units were excavated, aligned together to form a 2 x 4 m excavation area. Both units were excavated in arbitrary 10 cm levels to the bottom of the cultural deposit at approximately 50 cm below the ground surface, and the cultural deposit was passed through ¼-inch mesh screen. In all, cultural materials were recovered from approximately 4.0 m^3 of deposit at the Reith site.

Description of the Deposit

Only two depositional strata are present at the Reith site (Figure 8-9). The cultural deposit is dark-brown sandy silt which contains a high proportion of charcoal and fire-cracked rock. Underlying the

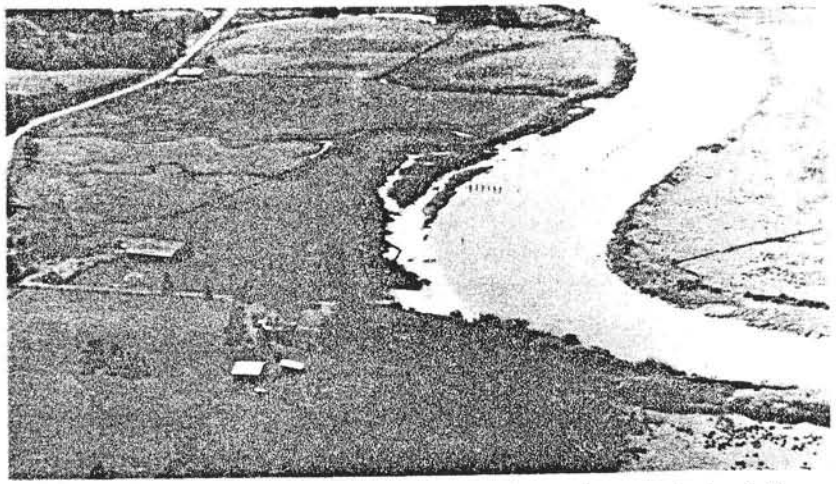

Figure 8-7. Aerial view of the Reith site along the open bank of the Lewis and Clark River.

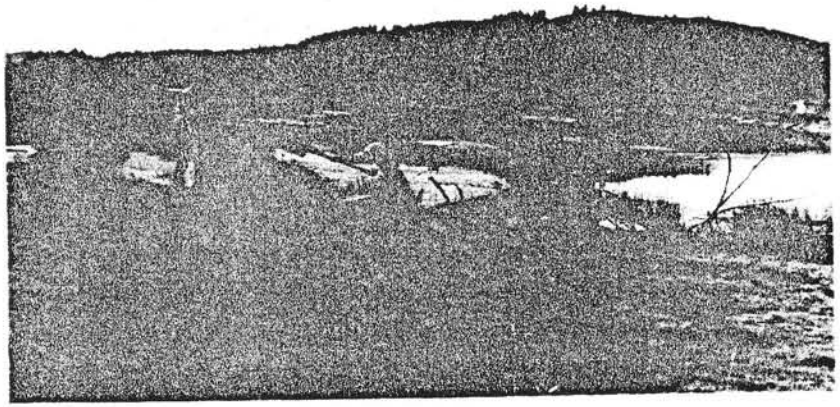

Figure 8-8. Excavations in progress in the open pasture setting of the Reith site.

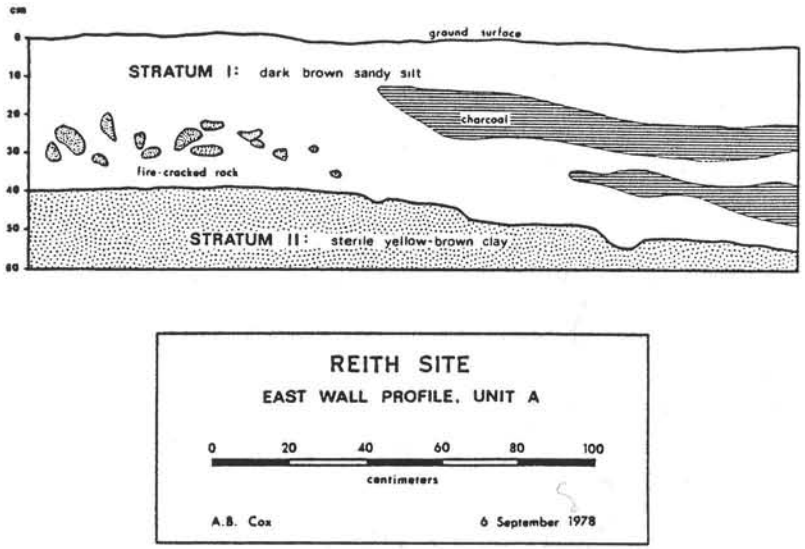

Figure 8-9. Stratigraphic profile of cultural deposits at Reith site.

cultural deposit is a culturally-sterile layer of yellow-brown clay. The cultural deposit has pH values ranging from 4.3 to 5.8, indicating moderately to intensely acidic soil. The acidic nature of the sediments presumably accounts for the fact that faunal remains were not preserved at this site.

Cultural Features

The cultural deposit at the Reith site contained abundant evidence of camp or cooking fires. Indeed, the floors of the excavation units at the bottom of each 10 cm level were essentially covered with fire-cracked rocks. Since these materials were distributed more or less

continuously throughout the cultural deposit, no attempt was made to distinguish discrete cultural features.

In addition to the fire-cracked rocks, some suggestion of the presence of postholes was observed. The evidence consisted of four circular patches of yellow clay, each about 10 cm in diameter, which were found at a depth of 40 cm below the ground surface. All four clay patches were clustered together in one corner of the same excavation unit, and no clear pattern could be inferred from their distribution.

Cultural Assemblage

The types of cultural materials recovered from the Reith site, their frequency, and their vertical distribution within the cultural deposit are listed in Table 8-3. The assemblage consists for the most part of various types of stone tools, as no bone-antler artifacts were recovered. Faunal remains were not preserved. Rounding out the cultural assemblage from the Reith site are some historical materials which were acquired by the aboriginal inhabitants after the time of historic contact. Selected artifacts from the Reith site are illustrated in Figures 8-10 and 8-11.

Site Chronology and Function

Although charcoal was abundant, no samples for radiocarbon analysis were submitted from the Reith site. This decision was based on the fact that historical artifacts were found throughout the cultural deposit. In view of this situation, it is presumed that aboriginal use of the Reith site occurred entirely after the time of historic contact.

Table 8-3. Artifact Inventory from the Reith Site

Artifact Class	Level 1	2	3	4	5	Totals
CHIPPED STONE INDUSTRY						
Bifacial Series						
Projectile Points:						
Type 6b		1				1
Type 8	1					1
Type 9		3	6	2		11
Type 10		1	4			5
Type 12	3	1				4
Unique	1					1
Fragments			3	1		4
Knives:						
Triangular				1		1
Pentagonal				1	1	2
Drills	2		1	1		4
Bifaces		1	1	5		7
Unifacial Series						
Side Scrapers			3	1		4
Hafted End Scrapers	2	5	7	3	1	18
Unhafted End Scrapers	1	2	1	2		6
End Scraper Fragments	3	1	3	2	2	11
Scraper/Knife			1			1
Marginally Modified Series						
Flake Knives	1	1	2	1		5
Used Flakes	4	8	5	4	1	22
Core and Flake Series						
CCS Cores		3	1	1	3	8
Debitage:						
CCS Flakes	168	154	106	83	12	523
Basalt Flakes	14	6	14	7		41
Obsidian Flakes			1	1		2
CCS Manuport		1				1
HEAVY TOOL INDUSTRY						
Unmodified Series						
Hammers	2	2	5	1	1	11
Anvil			1			1
Palettes		2	2			4
Flaked Series						
Chopper	1					1
Chopper/Anvil		1				1
Cobble Flake Scraper			1			1
Used Cobble Flakes	1		1	2		4

Table 8-3 (continued)

Artifact Class	Level 1	2	3	4	5	Totals
Pecked and Ground Series						
Pestle		1				1
ABRADER INDUSTRY						
Tabular Abraders	1		5	4		10
Pumice and Scoria Abraders				4		4
Cobble Abraders	2	4		7		13
HISTORIC MATERIALS						
Ceramics						
Chinese Porcelain	2	1	2	1	1	7
Stoneware Fragment	1					1
Fired Clay Fragment	1					1
Glass						
Bottle Glass	3	1				4
Glass Beads	2					2
Metal						
Iron Spike				1		1
Punch		1				1
Musket Ball		1				1
Copper Piece		1				1
Square Nails	29	6				35

For the most part, the artifact assemblage from the Reith site seems to reflect an emphasis on hunting-related activities. In addition to the large number of projectile points, the assemblage is dominated by various kinds of cutting and scraping tools, indicating that the butchering of game and the processing of hides were important activities. Some processing of plant foods is indicated by the recovery of a single pestle. No evidence of fishing was found.

The manufacture of chipped stone artifacts also appears to have been a major site activity. The amount of chipped stone debitage recovered from the Reith site is second in abundance only to the Burkhalter

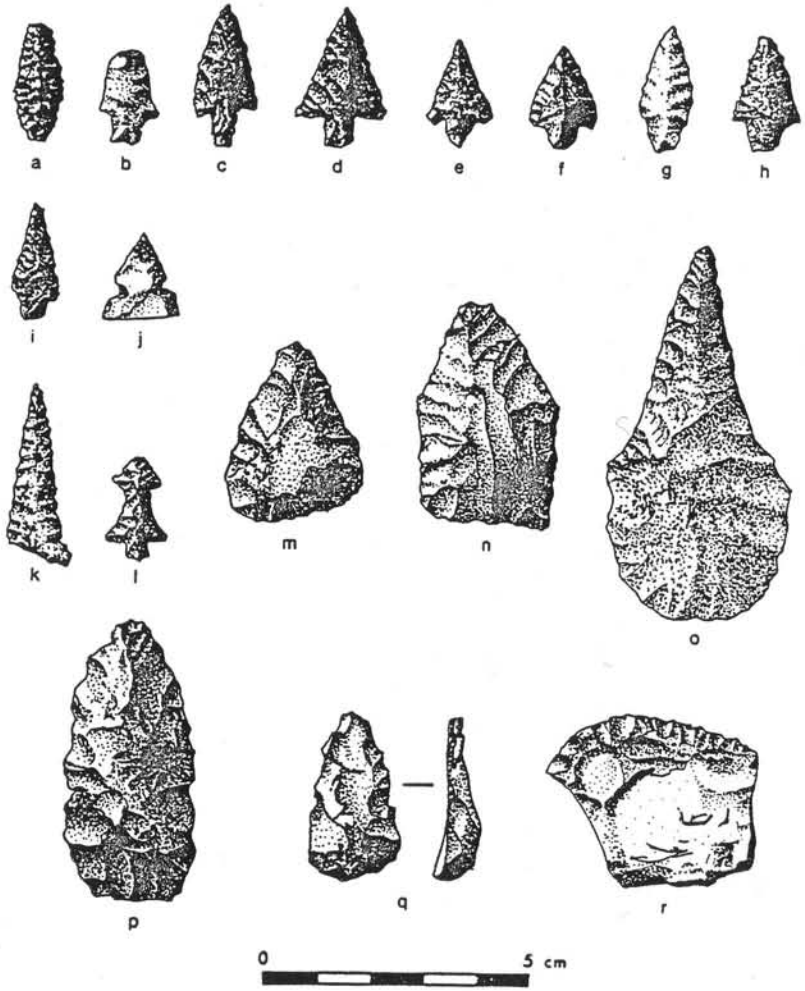

Figure 8-10. Chipped stone tools from the Reith site: a, Type 6b point; b, Type 8 point; c-f, Type 9 points; g-i, Type 10 points; j-k, Type 12 points; l, unique point; m, triangular knife; n, pentagonal knife; o, drill; p, biface; q, hafted end scraper; r, flake knife.

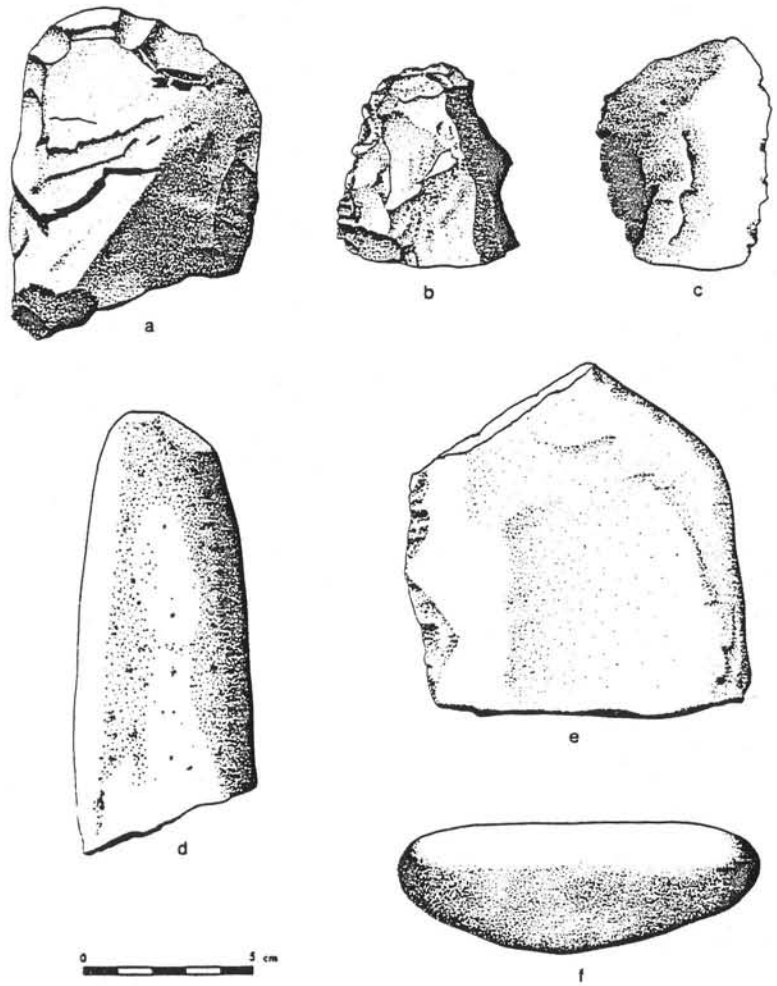

Figure 8-11. Heavy stone tools and abraders from the Reith site: a, chopper; b, cobble flake scraper; c, used cobble flake; d, pestle fragment; e, tabular sandstone abrader; f, cobble sandstone abrader.

site among the sites investigated during this study. Judging from the large number of abraders found, bone tool manufacture was also an important site activity, but any bone artifacts made at the site apparently were not preserved in the acidic soils of the cultural deposit.

Aboriginal Use of the Inland Zone

Although occupied during different time periods, the Burkhalter and Reith sites seem to reflect the performance of the same types of activities by aboriginal peoples in the inland zone. The predominance of chipped stone projectile points, various kinds of cutting and scraping tools, and the large amount of debitage at these sites is consistent with the notion that they served as camps at which hunting was the primary activity. A single pestle recovered from the Reith site indicates that some plant processing was also carried out. No direct evidence of fishing was found at either of the sites investigated.

Since faunal remains were not preserved at the Burkhalter and Reith sites, no information is available on the kinds of animals hunted by aboriginal peoples in the inland zone. The absence of faunal remains also makes it impossible to infer the seasonality of occupation on the basis of the evidence obtained from the archaeological investigations.

Although direct evidence of this activity is lacking, it is important to reiterate that the location of these and other sites on tributary streams in the inland zone would have made them good locations for fishing during certain times of the year. In particular, the concentration of archaeological sites on the upper Youngs River on the south side of the Columbia River may reflect this activity. This drainage supports

sizable fall runs of salmon and steelhead as do other tributary streams in the study area. It appears likely that further investigations may yield evidence of fishing at other archaeological sites in the inland zone.

CHAPTER NINE

SITE CHRONOLOGY AND FUNCTION: AN INTERPRETATION OF ARCHAEOLOGICAL PATTERNS

The previous four chapters have described the results of archaeological investigations at six sites around the mouth of the Columbia River. This chapter examines the chronological and functional relationships between these sites and evaluates how the archaeological data fit in terms of the subsistence-settlement model previously developed for this area.

Cultural Chronology

The present study has focused primarily on matters relating to aboriginal subsistence and settlement around the mouth of the Columbia River. Four of the six sites investigated have historic components, and there is thus a close connection with the Chinookan peoples who lived in this area at the beginning of the historic era. At the same time, however, comparisons of the cultural assemblages recovered during the archaeological excavations have provided some information about cultural chronology in this area.

The chronological relationships of the sites investigated during this project were first examined by means of seriational analysis of the projectile points in the assemblage. Of all the classes of artifacts recovered, projectile points have been demonstrated by previous research to have the greatest utility as chronological markers in the archaeological record.

The projectile points were classified into types initially defined in the Portland Basin of the Lower Columbia Valley by Pettigrew (1977, 1981). Recent research by Dunnell and Beck (1979:86-94) upstream in the Columbia River Gorge indicates that certain of Pettigrew's types may be combined without detracting from their use as chronological indicators, specifically Types 7 and 8 and Types 9 and 10. The present analysis makes use of these modifications in the Lower Columbia point typology.

In this analysis, only projectile points actually recovered during the site excavations were used. Although specimens collected from the eroded ground surface at Eddy Point and loaned by the property owner at Ivy Station are reported in the site descriptions, these points are not included in the seriation. Since these specimens were not obtained under controlled conditions, their inclusion would only obscure the recognition of separate cultural components at the sites.

Of the 14 point types in the modified version of the Lower Columbia typology, eight are represented in the archaeological sites at the mouth of the Columbia River investigated during this study. In view of the relatively small sample sizes involved, the simplest method of seriation was considered most appropriate. Accordingly, the frequency data for the distribution of the various point types at each site was analyzed in terms of battleship curves (Ford 1962).

The seriation analysis of projectile points was generally successful in separating the earlier Burkhalter and Eddy Point sites, which were occupied entirely in prehistoric times, from the other sites in the area, all of which had historic components. Because several of the sites

investigated had been occupied over rather long periods of time, however, the mixed nature of their projectile point assemblages tended to obscure their proper placement in the seriation order. In view of this situation, chronological information provided by radiocarbon dates and the presence of historic materials was used to divide some of the sites by strata and/or levels into one or more components. The results of this more refined projectile point seriation, together with the chronological information on which it is based, are shown in Figure 9-1.

The preceding analysis in turn provides the basis for making several chronological divisions in the archaeological record at the mouth of the Columbia River. The earliest evidence of aboriginal occupation in this area is represented by the *Youngs River Complex* which has been described elsewhere (Minor 1979, n.d.). In addition, three later cultural phases are tentatively proposed for this area: the *Seal Island phase* (4000 B.C. to A.D. 0), the *Iluaco phase* (A.D. 0 to A.D. 1775), and the *Ethnographic phase* (A.D. 1775 to A.D. 1851). The assignment of the various components found at the sites investigated in this area to these phases is summarized in Table 9-1. The definition of these three cultural phases is based on limited data and their cultural content will no doubt be modified when more fieldwork is carried out in the area. They are proposed here primarily as a temporal framework within which to structure the results of archaeological research until further chronological information becomes available (refer to Table 9-2).

Youngs River Complex

The Youngs River Complex is an assemblage of stylistically early

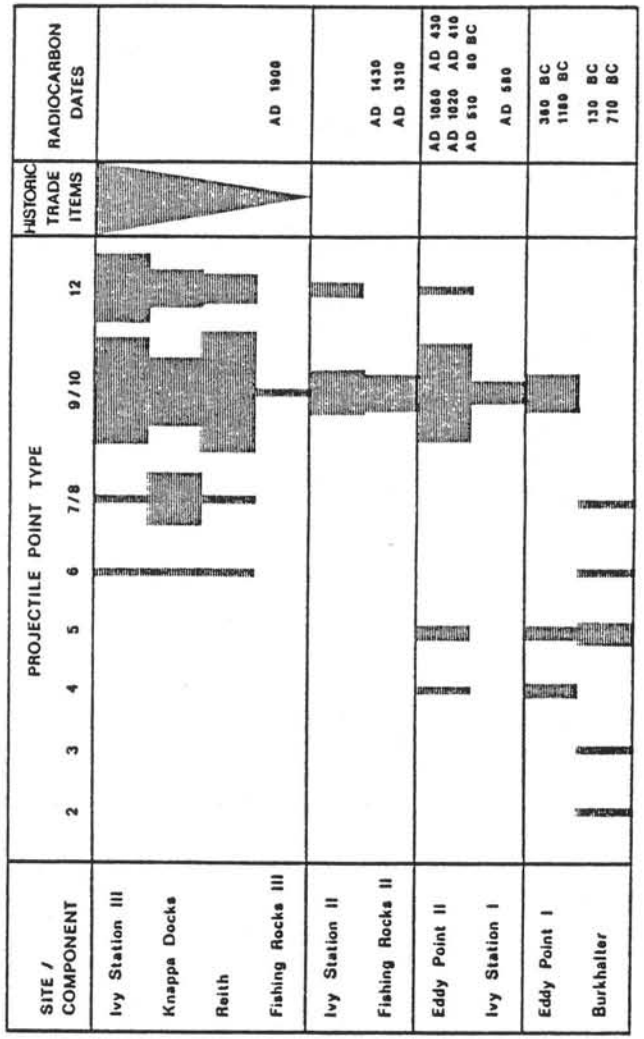

Figure 9-1. Seriation of projectile point types according to site components.

Table 9-1. Temporal Assignment of Site Components

Site/Component	Stratum/Level	Seal Island	Ilwaco 1	Ilwaco 2	Historic
Reith	all levels				X
Knappa	all levels				X
Ivy Station III	Levels 1-10				X
Fishing Rocks III	Levels 1-2				X
Ivy Station II	Levels 11-12			X	
Fishing Rocks II	Levels 3-10			X	
Eddy Point II	Strata II, III, IVa		X		
Ivy Station I	Levels 13-14		X		
Fishing Rocks I	Levels 11-14		X		
Eddy Point I	Stratum IVb	X			
Burkhalter	all levels	X			

stone artifacts collected from terraces above the Youngs River and Lewis and Clark River in northwestern Clatsop County, Oregon. Because these artifacts have so far been found only in undatable surface contexts, it has not been possible to apply the radiocarbon method to establish their age. Among these artifacts, however, are shouldered lanceolate and leaf-shaped projectile points which on typological grounds are comparable to specimens dated elsewhere in the Pacific Northwest to the interval between 4000 and 6000 B.C. Also associated with this complex are bola stones and distinctive stemmed scrapers. The Youngs River Complex

Table 9-2. Cultural Chronology for the Mouth of the Columbia River

Phase/Subphase/ Complex	Major Diagnostic Elements	Estimated Temporal Range	Radiocarbon Dates
ETHNOGRAPHIC PHASE	Historic materials (of both Oriental and Euro-American manufacture)	A.D. 1775 - A.D. 1851	A.D. 1900
	Narrow-necked points (Types 9/10 and 12 predominate with Types 7/8, 13 and 15 also present)		
	Composite toggling harpoons		
	Perforated and wrap-marked netsinkers		
	Dentalium shell beads		
ILWACO 2 SUBPHASE	Narrow-necked points (Types 9/10 and 12)	A.D. 1050 - A.D. 1775	A.D. 1430 A.D. 1310
	Composite toggling harpoons		
ILWACO 1 SUBPHASE	Narrow-necked points (Type 9/10) predominate, but broad-necked points (Types 4 and 5) persist	A.D. 0 - A.D. 1050	A.D. 1060 A.D. 1020 A.D. 580 A.D. 510 A.D. 430 A.D. 410 80 B.C.
	Single piece non-toggling and composite toggling harpoons		
	Girdled netsinkers		
	Atlatl weights		
SEAL ISLAND PHASE	Broad-necked, stemmed points (Types 2, 3, 4, 5)	4000 B.C. - A.D. 0	130 B.C. 360 B.C. 710 B.C. 1180 B.C.
	Single piece non-toggling and composite toggling harpoons		
	Girdled netsinkers		
	Atlatl weights		
YOUNGS RIVER COMPLEX	Shouldered lanceolate and leaf-shaped points	6000 B.C. - 4000 B.C.	
	Stemmed scrapers		
	Bola stones		

represents a local expression of an early hunting-fishing culture found widely throughout the Pacific Northwest (Minor 1979, n.d.).

Seal Island Phase

The earliest radiocarbon dated evidence of occupation at the mouth of the Columbia River is represented by the Seal Island phase. The entire occupation at the Burkhalter site, as well as the earliest component at Eddy Point, relate to this phase. Radiocarbon dates indicate that the previously investigated Skamokawa site was also first occupied during this phase (Minor 1978, 1980).

The artifact most diagnostic of the Seal Island phase is the broad-necked projectile point. At the Burkhalter site, six of the seven classifiable points are broad-necked. This pattern is not as clear in Eddy Point I, however, as the sample of eight points was evenly split between broad- and narrow-necked specimens. The Burkhalter site also contained the highest proportion of cobble flake tools (knives, scrapers, and used flakes) of any of the sites investigated. A similar tendency in the high frequency of cobble flake tools also seems indicated at Eddy Point, and it may be the case that tools of this type saw greater use in earlier times.

Also found in components assigned to the Seal Island phase are bilaterally and unilaterally barbed harpoon dart heads, as well as wedge-based bone points and harpoon valves, indicating the use of both single piece non-toggling and composite toggling harpoon technologies during this time. Additional tools which are associated with this phase include slate adze bits, one of which was found at Eddy Point and another at the

Skamokawa site, and girdled netsinkers and an atlatl weight from the Skamokawa site.

The beginning date of the Seal Island phase is presently unknown. It was definitely established by 1180 B.C., as indicated by the earliest radiocarbon date from Eddy Point. Until additional archaeological research determines otherwise, a date of 4000 B.C. is tentatively suggested for the beginning of the Seal Island phase in order to bring it into line chronologically with the estimated terminal date of the earlier Youngs River Complex. The terminal date for the Seal Island phase is based on radiocarbon dates and is placed at A.D. 0.

Ilwaco Phase

The Ilwaco phase is divided into two subphases on the basis of changes in artifact types and associated radiocarbon dates.

Ilwaco I Subphase

The earlier subphase, Ilwaco 1, begins about A.D. 0 and ends about A.D. 1050. This subphase is represented in the earliest levels at Ivy Station and the upper strata (IVa and above) at Eddy Point. A single radiocarbon date of A.D. 980 from Fishing Rocks also indicates occupation during this subphase, but all of the diagnostic artifacts from that site appear to relate to later times. Ilwaco 1 is also represented at the previously investigated Skamokawa site (Minor 1978, 1980).

The artifact most characteristic of Ilwaco 1 is the narrow-necked Type 9/10 projectile point. A few broad-necked points also persist into this subphase. The provenience of projectile points at the Skamokawa

site indicates that narrow-necked points were already vastly predominant over broad-necked points by as early as A.D. 0 as indicated by a radiocarbon date of that magnitude (Minor 1980). Both single piece non-toggling and composite toggling harpoons continued to be used. Other noteworthy tools carried over from the preceding Seal Island phase include a girdled netsinker found at Eddy Point, and atlatl weights found at the Skamokawa site. Evidence of plant processing is found during this subphase in the form of a pestle and several manos at the Skamokawa site. Finally, a single spherical bola stone was found at Eddy Point. Bolas are early hunting instruments which are usually associated with the hunting of waterfowl.

Ilwaco 2 Subphase

On the basis of radiocarbon dating, the end of Ilwaco 1 and the beginning of Ilwaco 2 is placed at A.D. 1050. The Ilwaco 2 subphase is represented in the middle levels at both Fishing Rocks and Ivy Station.

By Ilwaco 2 times, broad-necked projectile points are no longer found. Narrow-necked points were the only form used with Type 9/10 continuing as the predominant point type and Type 12 also represented. There was also a change in harpoon technologies, as single piece non-toggling harpoon dart heads were no longer used. Instead, composite toggling harpoons are the only form represented. Other items associated with the Ilwaco 2 subphase are the pendants of bone and elk teeth found at Fishing Rocks, and an antler digging stick handle and a zoomorphic figurine found at Ivy Station.

Ethnographic Phase

The beginning of historic contact between Euro-Americans and the Chinookan peoples at the mouth of the Columbia River and the introduction of historical materials mark the inception of the Ethnographic phase. Although the first recorded contact occurred in 1792, the aboriginal inhabitants of this area had already acquired historical materials such as iron by that time. These items had presumably been obtained by the Chinook either from wrecked ships or through trade with other aboriginal groups on the Northwest Coast whose contact with Euro-Americans began a few decades before. For this reason, a slightly earlier date of circa 1775 is suggested for the beginning of this phase. This date marks the approximate time at which the earliest explorations of the Northwest Coast were carried out by the Spanish, who were probably responsible for the first major infusion of historical materials among the native inhabitants of the region (Ruby and Brown 1976:31-34).

The Ethnographic phase is represented at four of the sites investigated during this study: the upper levels at Fishing Rocks and Ivy Station, and the entire occupations at Knappa Docks and the Reith site. The artifacts most diagnostic of this phase, of course, are historical items, including glass trade beads, rolled copper tube beads, and various other glass, ceramic and metal objects.

The inventory of aboriginal artifacts associated with the Ethnographic phase includes a number of narrow-necked projectile point types, of which Types 9/10 and 12 are more common, with Types 6 and 7/8 also represented. Single examples of Type 13 and 15 points have been

collected by the property owner at Ivy Station and probably also relate to the occupation of that site during the historic period. Use of composite toggling harpoons, manos and pestles continues into historic times. There is a change, however, in the types of netsinkers used from the girdled type of the earlier Seal Island and Ilwaco phases to the use of perforated and wrap-marked netsinkers during the Ethnographic phase. Other artifacts which are represented for the first time in components of the Ethnographic phase include the incised beaver tooth dice and dentalium shell bead found at Ivy Station.

A terminal date for the Ethnographic phase is difficult to pin down. The Chinookan peoples around the mouth of the Columbia River continued to occupy their traditional territories to at least some extent until the mid-nineteenth century, as indicated by their participation in the negotiations of the unratified Tansy Point treaties. After that time, however, they were increasingly displaced by Euro-American settlers. The remaining Chinookan peoples who had survived the epidemics of the 1830s and the other deleterious effects of historic contact were either moved to reservations or gradually merged with other native groups in the region. In view of this situation, the year A.D. 1851 is suggested for the end of the Ethnographic phase, as this date seems to mark the end of the period when a semblance of the traditional lifeways were still practiced.

The cultural phases outlined for the mouth of the Columbia River during the present study are similar in most respects to those previously defined for the Portland Basin by Pettigrew (1977, 1981). In both areas there is a basic change from the use of broad-necked points during the

earlier phases (Seal Island and Merrybell) to narrow-necked points during the later phases (Ilwaco and Multnomah). It seems appropriate in both areas to divide the later phase into subphases, based primarily on changes in projectile point type frequencies.

In the Portland Basin, the division between the Multnomah 1 and 2 subphases is also reflected by a change in settlement locations associated with the Cascade Landslide Flood of A.D. 1250 (Pettigrew 1981:121-22). It has been speculated that this flood may have resulted in the abandonment of the Skamokawa village site (Minor 1980:37), which is slightly upriver from the sites investigated during the present study. Aside from this possibility, however, no evidence was found that the Cascade Landslide Flood had affected settlements at the mouth of the Columbia River.

A Comparison of Site Functions

As set forth previously in Chapters 3 and 4, ethnographic and ethnohistoric information indicates that the Chinookan peoples around the mouth of the Columbia River occupied several types of settlements in various locations at which different activities were carried out. On the basis of the ethnographic/ethnohistoric record, an archaeological model consisting of four basic site types and four different environmental-use zones was developed for the study of aboriginal subsistence and settlement in this area. In order to evaluate the utility of this model, a simple classification of artifact classes by function or "activity set" was devised.

This functional grouping of artifacts, summarized in Table 9-3,

Table 9-3. Classification of Artifact Types by Activity *

Activity Set	Activity Subset	Artifact Type
I. FOOD PROCUREMENT	A. Terrestrial Game	Projectile points
	B. Sea Mammals	Harpoons
	C. Fishing	Netsinkers
	D. Shellfish or Plant Food Gathering	Digging Stick Handles **
	E. Waterfowl	Bola stones
II. FOOD PROCESSING	A. Butchering/Filleting	Knives Flake Knives Used Flakes Cobble Flake Knives Choppers
	B. Shellfish Preparation	Wedges ** Chisels ** Hammers **
	C. Miscellaneous Food Preparation	Manos Pestles
III. MANUFACTURING	A. Stone Tools	Cores Anvils Hammer/anvils Bifaces Debitage
	B. Woodworking	Chisels Wedges Antler tips Adze bits Pounders Cobble flake scrapers
	C. Hideworking/Basketry Making	Awls End scrapers Side scrapers Flake scrapers
	D. Boneworking	Abraders Worked bone
	E. Miscellaneous (generally applying to more than one manufacturing activity)	Hammers Scraper/knives Scraper/gravers Drills Gravers Chopper/hammers Chopper/anvils Used cobble flakes Slabs Palettes Mauls

Table 9-3 (continued)

Activity Set	Activity Subset	Artifact Type
IV. MISCELLANEOUS	A. Personal Items	Bone pendant Bone bead Shell bead Zoomorphic figurine Tiny stone "bowl" Stone pipe
	B. Games	Beaver tooth dice Spherical stone

* Historic items of Euro-American manufacture are not included.

** These tools are interpreted as shellfish procurement/processing tools in the context of a shell midden.

assigns each class to one of four general activity sets--food procurement, food processing, manufacturing, and miscellaneous (personal items and gaming pieces). In turn, each activity set is subdivided into two or more broad subsets. Food procurement technology can be distinguished for fishing, hunting terrestrial game or sea mammals, gathering shellfish or plant foods, or catching waterfowl. Food processing is confined primarily to a distinction between game butchering or fish filleting and shellfish preparation; manos and pestles are grouped under a third subset for miscellaneous food preparation which is intended to cover the grinding, mashing or cooking of a variety of dried or fresh foods. Most of the tool types fall into the manufacturing activity set which is divided into tools and by-products thought to be related to stone tool manufacturing, boneworking, and general manufacturing activities. The final activity set encompasses items of a more personal nature--ornaments and gaming pieces--which were restricted in number.

Two caveats should be entered concerning the application and interpretation of the proposed functional scheme. First, it incorporates only

those artifact classes which were identified at the six sites forming the focus of this study (as described in the appendix). As such, the listing of artifact classes and activity sets/subsets should not be considered exhaustive. Secondly, because of the small samples recovered from the sites in this study, a particular artifact class was assigned to only one activity set/subset. Although it is obvious that a number of artifact classes may have been used for more than one particular type of task, mutually exclusive activity sets are operationally much easier to handle for comparative purposes. It should also be noted that in the following functional comparison of sites, historic trade items and materials collected from a site's surface are not included in the proportional analysis.

Functional Classification of Site Components

An initial tally of activity sets/subsets by site type and zone (Table 9-4) indicates that the artifact types which would be most functionally suggestive belong to the procurement and preparation activity sets. In order to better distinguish those artifact classes which were indicative of site activities, the artifacts within the various components of the six sites (defined earlier in this chapter) were tallied individually and converted to proportions of the component assemblages (Table 9-5).

Apparent temporal differences in artifact types have been described previously in this chapter. Aside from primarily stylistic or technological differences in similar artifact types, only minor differences are visible between the various components within each site. Because

Table 9-4. Summary of Activity Sets/Subsets by Site Type/Use Zone

		Site Type/Use Zone			
Activity Set/Subset		Coastal Camp	Estuarine Villages	Riverine Villages	Inland Camps
PROCUREMENT	I.A. Terrestrial Game	X	X	X	X
	I.B. Sea Mammals	X	X		
	I.C. Fishing		X	X	
	I.D. Shellfish/Plants		X		
	I.E. Waterfowl		X		
PROCESSING	II.A. Butchering/ Filleting	X	X	X	X
	II.B. Shellfish Preparation	X	X		
	II.C. Miscellaneous Food Preparation		X	X	X
MANUFACTURING	III.A. Stone Tools	X	X	X	X
	III.B. Woodworking	X	X	X	X
	III.C. Hideworking/Basketry	X	X	X	X
	III.D. Boneworking	X	X	X	X
	III.E. Miscellaneous Manufacturing		X	X	X
MISC.	IV.A. Personal Items	X	X	X	
	IV.B. Games		X		

Table 9-5. Proportional Tally of Artifact Types by Site Component *

		Site Component										
		Fishing Rocks			Eddy Point		Ivy Station			Knappa Docks	Burk-halter	Reith
Artifact Type		I	II	III	I	II	I	II	III			
I.A.	Projectile points	-	10%	19%	16%	14%	10%	20%	16%	19%	5%	17%
I.B.	Harpoons	-	2%	-	5%	12%	7%	2%	3%	-	-	-
I.C.	Netsinkers	-	-	-	-	1%	-	-	1%	8%	-	-
I.D.	Digging stick handles	-	-	-	-	-	-	2%	-	-	-	-
I.E.	Bola stones	-	-	-	-	1%	-	-	-	-	-	-
II.A.	Knives	-	2%	7%	-	1%	-	2%	1%	-	-	2%
	Flake knives	5%	-	-	2%	2%	-	-	1%	2%	2%	3%
	Used flakes	-	5%	13%	-	5%	21%	16%	12%	13%	22%	13%
	Cobble flake knives	-	-	-	-	-	-	-	-	-	2%	-
	Choppers	-	-	7%	5%	5%	3%	-	-	1%	1%	1%
II.B.	Chisels	12%	2%	7%	-	2%	-	-	-	-	-	-
	Wedges	-	10%	-	-	2%	-	-	3%	-	-	-
	Hammers	5%	-	-	-	-	-	-	1%	-	-	-
II.C.	Manos	-	-	-	-	-	-	-	-	1%	-	-
	Pestles	-	-	-	-	-	-	-	1%	-	-	1%
III.A.	Cores	-	2%	-	10%	6%	7%	-	4%	4%	11%	5%
	Anvils	-	-	-	-	-	3%	-	-	-	1%	1%
	Hammer/anvils	-	-	-	-	-	-	-	-	1%	-	-
	Bifaces	-	-	-	8%	2%	3%	2%	4%	2%	8%	4%
III.B.	Chisels	-	-	-	5%	2%	-	7%	-	-	-	-
	Wedges	-	-	-	3%	-	3%	2%	1%	-	-	-
	Modified antler tips	-	-	-	5%	5%	-	2%	2%	-	-	-
	Adze bits	-	-	-	2%	-	-	-	-	-	-	-
	Poundars	-	-	-	2%	3%	10%	4%	2%	3%	1%	-
	Cobble flake scrapers	5%	-	-	2%	-	-	-	-	-	3%	1%
III.C.	Awls	26%	14%	7%	-	10%	3%	7%	6%	-	-	-
	Scrapers	-	5%	7%	2%	-	3%	9%	12%	12%	12%	21%
	Flake scrapers	-	5%	-	3%	-	-	-	-	2%	1%	-
III.D.	Abraders	21%	14%	13%	8%	2%	3%	2%	9%	10%	12%	16%
	Worked bone	26%	23%	20%	5%	7%	7%	7%	5%	-	-	-
III.E.	Hammers	-	-	-	-	1%	7%	12%	5%	12%	1%	7%
	Scraper/knives	-	-	-	-	-	-	-	-	-	-	1%
	Scraper/gravers	-	-	-	-	-	-	-	1%	-	-	-
	Drills	-	-	-	-	-	-	-	-	-	-	2%
	Gravers	-	-	-	2%	2%	-	-	-	2%	1%	-
	Chopper/hammers	-	-	-	-	1%	-	-	-	-	-	1%
	Chopper/anvils	-	-	-	2%	-	-	-	1%	1%	-	-
	Used cobble flakes	-	-	-	11%	12%	7%	2%	4%	5%	17%	2%
	Slabs	-	-	-	2%	-	3%	-	1%	-	-	-
	Palettes	-	-	-	-	-	-	-	-	-	-	2%
	Mauls	-	-	-	-	1%	-	-	2%	1%	-	-
IV.A.	Personal items (pipes, beads, pendants, small "bowl," figurines)	-	6%	-	-	1%	-	2%	1%	1%	-	-
IV.B.	Beaver tooth dice	-	-	-	-	-	-	-	½%	-	-	-
	Spherical stone	-	-	-	-	-	-	-	½%	-	-	-

* Proportions are based on total artifact count by site component minus stone debitage.

intrasite variability appeared to be minimal on the basis of Table 9-5, the artifact tallies were collapsed in calculating the proportions of each tool category by use zone and site type (Table 9-6). Examination of this table indicated that some tool types predominated in certain site types/environmental-use zones:

1. A majority of the harpoon pieces are associated with the estuarine villages, while most of the netsinkers are from the riverine village.

2. The inland hunting and fishing camps together exhibit a high proportion of used flakes, the highest proportion of lithic debitage, and the highest proportion of scrapers.

3. The coastal shellfish-gathering camp contains the highest proportion of bone awls, abraders and worked bone.

Interpretation of Archaeological Site Assemblages

General trends in site activities became more apparent when the proportional frequencies were summarized by activity subset (Table 9-7). Major activities at all site types, as indicated by the tool types, were the hunting of terrestrial game, butchering or filleting (meat preparation), hideworking or basketry making, and boneworking. Three of the four site types also contained a high proportion of general manufacturing tools. The trends noted for each individual site type/environmental-use zone are summarized as follows.

Coastal Shellfish-gathering Camps

The one site investigated contained the lowest proportion of projectile points, but their presence suggests that hunting land mammals

Table 9-6. Summary of Proportions of Artifact Types by Site Types/ Use Zones

Artifact Type		Site Type/Use Zone: Coastal Camp	Estuarine Villages	Riverine Village	Inland Camps
I.A.	Projectile points	9%	15½%	19%	10%
I.B.	Harpoons	1%	6%	-	-
I.C.	Netsinkers	-	½%	8%	-
I.D.	Digging stick handles	-	½%	-	-
I.E.	Bola stones	-	½%	-	-
II.A.	Knives	2%	1%	-	1%
	Flake knives	1%	1%	2%	3%
	Used flakes	5%	11%	13%	18%
	Cobble flake knives	-	-	-	1%
	Choppers	1%	3%	1%	1%
II.B.	Chisels	4%	½%	-	-
	Wedges	6%	2%	-	-
	Hammers	1%	-	-	-
II.C.	Manos	-	-	1%	-
	Pestles	-	½%	-	½%
III.A.	Cores	1%	5%	4%	8%
	Anvils	-	½%	-	½%
	Hammer/anvils	-	-	1%	-
	Bifaces	-	2%	2%	6%
	Debitage *	52%	69%	66%	90%
III.B.	Chisels	-	2%	-	-
	Wedges	-	1%	-	-
	Modified antler tips	-	3%	-	-
	Adze bits	-	½%	-	-
	Pounders	-	3%	3%	½%
	Cobble flake scrapers	1%	½%	-	1½%
III.C.	Awls	16%	7%	-	-
	Scrapers	5%	6%	12½%	17%
	Flake scrapers	3%	½%	2%	½%
III.D.	Abraders	16%	6%	10%	14½%
	Worked bone	24%	6½%	-	-
III.E.	Hammers	-	4%	12%	4%
	Scraper/knives	-	-	-	½%
	Scraper/gravers	-	½%	-	-
	Drills	-	-	-	1%
	Gravers	-	1%	2%	1%
	Chopper/hammers	-	½%	-	-
	Chopper/anvils	-	½%	1%	½%
	Used cobble flakes	-	7%	5%	10%
	Slabs	-	1%	-	-
	Palettes	-	-	-	1%
	Mauls	-	1%	1%	-
IV.A.	Personal items	4%	1%	½%	-
IV.B.	Gaming pieces	-	½%	-	-

* Debitage proportions are calculated using total assemblage count; other artifact proportions are based on total artifact count minus stone debitage.

Table 9-7. Proportion of Activity Sets/Subsets Represented in Archaeological Assemblages by Site Type/Use Zone

	Activity Set/Subset		Site Type/Use Zone: Coastal Camp	Estuarine Villages	Riverine Villages	Inland Camps
PROCUREMENT	I.A.	Terrestrial Game	9%	15½%	19%	10%
	I.B.	Sea Mammals	1%	6%	-	-
	I.C.	Fishing	-	½%	8%	-
	I.D.	Shellfish/Plants	-	½%	-	-
	I.E.	Waterfowl	-	½%	-	-
PROCESSING	II.A.	Butchering/Filleting	9%	16%	16%	24%
	II.B.	Shellfish Preparation	11%	2½%	-	-
	II.C.	Miscellaneous Food Preparation	-	½%	-	½%
MANUFACTURING	III.A.	Stone Tools	1%	7½%	7%	14½%
		Debitage *	52%	69%	66%	90%
	III.B.	Woodworking	1%	9½%	3%	2%
	III.C.	Hideworking/Basketry	24%	13½%	14½%	17½%
	III.D.	Boneworking	40%	12½%	10%	14½%
	III.E.	Miscellaneous Manufacturing	-	15%	21%	17½%
MISC.	IV.A.	Personal Items	4%	1%	½%	-
	IV.B.	Games	-	½%	-	-
	Number of Activity Subsets Represented		9	16	10	9

* Debitage frequency is based on total assemblage count; artifact frequencies are based on artifact counts without debitage.

or birds was still an important activity. Sea mammal hunting gear is also present. The presence of butchering or fish filleting tools is consistent both with the nature of the procurement tools and with the faunal remains from the site. It seems doubtful that the hammer, chisels and wedges found at this small shell midden reflect woodworking. Research at other coastal sites suggests that these objects were more likely used for cracking shellfish, and accordingly they are interpreted as shellfish preparation tools in this context.

This site contains the lowest proportion of lithic debitage and lithic manufacturing tools, an activity which would be expected to be de-emphasized at a coastal shell midden. The high proportion of awls may suggest an emphasis on hideworking or on making basketry from locally available plants. A very high proportion of abraders and worked bone indicates that boneworking was a major site activity; the bone pendants recovered from the shell midden may be a product of this work. The task-specific nature of the site appears to be reflected as well in the lack of more general manufacturing tools which are present at the other five sites. In summary, the site assemblage reflects specific tasks including hunting, shellfish preparation, boneworking, and probably hideworking or basketry making.

Estuarine Villages

The two estuarine villages were the only sites containing a complete range of procurement tools; this is interpreted to be a reflection of the wide range of resources available in the estuary. They also contained the highest proportion of sea mammal procurement tools. The full range

of food processing tools was present as well. Woodworking appears to be a significant activity in comparison with other sites, but this may be a result of the non-preservation of bone-antler tools such as chisels and wedges at the riverine and inland sites. The estuarine sites also exhibit a wide variety of manufacturing tools, perhaps a reflection of the generalized nature of long-term village activities as opposed to a restricted number of task-specific activities. The number and range of personal items recovered also suggests a longer-term occupation, such as would be characteristic of a village.

Riverine Villages

The one riverine village investigated contained the highest proportions of both terrestrial game hunting tools and fishing implements. No other procurement tools were recovered, indicating greater emphasis on land mammal hunting and fishing in contrast to the more well-rounded procurement pattern of the estuarine villages. Accordingly, the food preparation items from this site are restricted primarily to butchering/filleting tools. Like the estuarine sites, the riverine village contains a broad range of manufacturing tools, particularly multi-purpose tools (Subset III.E.), a situation which is interpreted to conform with the classification of this site as a village.

Inland Hunting-Fishing Camps

The tools from both inland camps indicate a strong emphasis on land mammal procurement and processing. There is no evidence of fishing in the artifact assemblages. The procurement tools at these sites

indicate only the hunting of terrestrial game, and a relatively high proportion of the artifacts relate to butchering. Stone tool manufacture, as indicated by the high debitage proportion, unfinished bifaces, and cores, was emphasized at inland camps more than at the other sites. Hideworking and boneworking were also major site activities.

The results of the foregoing functional comparisons document the fact that certain differences did exist in the nature of the activities carried out at archaeological sites around the mouth of the Columbia River. A general correlation does exist between certain tool types, as represented in activity sets/subsets, and sites in different environmental-use zones. This situation is most apparent where procurement and processing activities are concerned. Tools associated with manufacturing activities, on the other hand, occur at sites in all of the environmental-use zones, though in varying proportions. The differences observed in the content of artifact assemblages are presumably a reflection of the existence of different types of settlements—villages and camps—which were expected to be represented in this area on the basis of ethnographic and ethnohistoric information.

CHAPTER TEN

SUMMARY AND CONCLUSION

Since very little archaeological research had been previously carried out in the area, the present study basically represents an initial exploration of the archaeological record around the mouth of the Columbia River. In order to comprehend the broader outlines of the culture history of an area, it is first necessary to understand the particular cultural adaptations practiced by the aboriginal inhabitants. The most direct method of studying the cultural adaptations of aboriginal peoples is through a reconstruction of their subsistence-settlement systems. The accomplishment of that task for the area around the mouth of the Columbia River has been the basic objective of the present research program.

The present study has relied heavily on the use of ethnographic and ethnohistoric information in reconstructing the subsistence-settlement systems of the Chinookan peoples at the mouth of the Columbia River. This approach runs counter to a recent trend among archaeologists away from the use of ethnographic information in interpreting the archaeological record. The recollections of aged informants, many archaeologists feel, are too incomplete or prone to error to serve as an accurate guide to aboriginal lifeways in prehistoric times. Counter to this view, the ethnographic record was considered an appropriate point of departure for this particular study for two reasons.

First, in the case of the Chinookan peoples at the mouth of the Columbia River, a second source of documentary information exists in the form of ethnohistoric accounts against which the accuracy of the ethnographic record can be measured. Because of their location at the nexus of a major trade and travel route in historic times, information about the Chinookan groups in this area is available in the accounts of numerous explorers, fur traders, and travelers. In this respect, more is known about the Lower Chinook at the mouth of the Columbia River than any other aboriginal group on the southern Northwest Coast. It is noteworthy that shortcomings were in fact found in the ethnographic record for this area, particularly in the lack of recognition given to the differences in the cultural adaptations of the various Chinookan groups. The information obtained from ethnohistoric sources proved to be crucial in supplementing, and in some instances correcting, the ethnographic record for this area.

A second reason an ethnographic approach is appropriate for interpreting the archaeological record around the mouth of the Columbia River is the recency of the archaeological remains in this area. The effects of erosion and deposition associated with the Columbia River, and perhaps a rise in sea level as well, have combined to severely limit the survival of archaeological sites. The oldest radiocarbon dated site is only 3100 years old. More importantly, approximately half of the sites recorded in the study area are known on the basis of either archaeological or documentary evidence to have historic components. There is thus a close link between the archaeological record and the Chinookan peoples who occupied this area at the time of historic contact.

Analysis of the ethnographic and ethnohistoric information indicates that two different subsistence-settlement systems were practiced around the mouth of the Columbia River: one by the Lower Chinook which emphasized estuarine and coastal resources and another by the Middle Chinook upstream which was riverine in its orientation. Although the cultures of the Lower and Middle Chinook were similar in many respects, environmental differences and related differences in ecological adaptations appear to have fostered economic specializations which over time resulted in the formation of distinct and separate cultural entities. The divergence of the Lower and Middle Chinook proceeded to such an extent over a sufficient period of time that a language boundary developed between these Chinookan peoples prior to historic contact.

The subsistence-settlement systems of both the Lower and Middle Chinook involved a biseasonal settlement pattern which included summer and winter villages as the principal settlement types. Summer villages were situated along the main channel of the Columbia River where fishing the spring and summer runs of anadromous fish was the main economic activity. During the fall and winter, the focus of settlement and subsistence shifted away from the main channel of the Columbia River for the "second fishing season." Winter villages were generally situated on tributary streams where the fall runs of anadromous fish were available. A setting protected from winter storms was also an important consideration in the location of winter villages. In addition to the two kinds of villages, temporary camps were occasionally occupied, principally for the purpose of shellfish gathering or hunting and fishing.

On the basis of the ethnographic/ethnohistorical information, an archaeological model for the study of aboriginal settlement and subsistence and settlement around the mouth of the Columbia River was developed. Four basic settlement types were defined for the study area: summer villages, winter villages, shellfish-gathering camps, and hunting-fishing camps. Since aboriginal subsistence involved the exploitation of animals and plants found in different habitats, four general environmental-use zones were also recognized: coastal, estuarine, riverine and inland.

The resulting model of aboriginal settlement types and environmental-use zones was then used to organize the archaeological survey data available for this area and to guide in the selection of specific sites for investigation. The decision as to which sites to investigate was complicated by the fact that virtually all of the ethnographic settlements in the study area have been destroyed, and thus many of the sites which ideally should have been examined in a study of this nature are no longer available for excavation. Small-scale investigations were subsequently undertaken at one site in the coastal zone (Fishing Rocks), two sites in the estuarine zone (Eddy Point and Ivy Station), one site in the riverine zone (Knappa Docks), and two sites in the inland zone (Burkhalter and Reith sites). The results of the archaeological excavations at the six sites investigated during this study have contributed artifactual and subsistence information not available in the ethnographic/ethnohistoric record. As a result, a clearer, more detailed picture has been obtained of the nature of aboriginal subsistence and settlement around the mouth of the Columbia River.

In general, there appears to be a close fit between the archaeological sites investigated during this study and the subsistence-settlement model developed for the area on the basis of information from ethnographic and ethnohistoric sources. For example, the extent and depth of the archaeological sites investigated, as well as the nature and range of the artifact and faunal assemblages, generally corresponds with the type of settlement represented. Sites interpreted to have been villages on the basis of the model were generally greater in size and had larger and more varied artifact assemblages than did the sites interpreted to have been shellfish-gathering or hunting-fishing camps.

Although the proportions of certain procurement and processing tools were found to vary between site types and environmental-use zones, overall there was a relatively high degree of uniformity in the types of tools recovered from the six sites investigated during this study. This situation is presumably a reflection of the fact that the most important subsistence resources, especially anadromous fish and terrestrial game, could be obtained in more than one environmental-use zone (refer to Figure 4-1). In turn, the relatively wide distribution of the most important subsistence resources made frequent shifts in settlement by the aboriginal peoples of this area unnecessary, since these resources could be obtained while residing at certain key locations. In this respect, the dual village settlement pattern of the Chinookan groups around the mouth of the Columbia River represented a close accomodation to the availability and seasonality of subsistence resources in this area.

It is apparent from the archaeological and faunal evidence recovered during this study that the Chinookan peoples around the mouth of the

Columbia River made use of subsistence resources associated with a range of environments. The relatively well-rounded nature of aboriginal subsistence in this area, even considering the primacy of anadromous fish, has been previously noted in the results of archaeological research on the coast to the south at Netarts Bay (Newman 1959) and to the north at Willapa Bay (Kidd 1967; Shaw 1975) and Grays Harbor (Roll 1974). This situation seems to contrast with the subsistence strategies of aboriginal peoples on the northern Northwest Coast which tended to involve the more intense exploitation of fewer resources occurring in a narrower range of environmental contexts.

Perhaps the most important result of this study is recognition of the significance of the Columbia River estuary in the development of Chinookan culture. The estuarine environment contains a wider variety and greater concentration of subsistence resources in comparison with the riverine environment upstream (refer to Figure 4-1). The adaptation of the Lower Chinook to the use of estuarine resources seems to have effectively separated these people from their riverine-oriented linguistic relatives living elsewhere in the Lower Columbia Valley. Previous ethnographic accounts of the Chinookan groups, however, had obscured the significance of the estuary in the lifeways of these peoples.

The results of the present study, then, indicate that a greater degree of variability existed in the subsistence-settlement systems of the Chinookan peoples around the mouth of the Columbia River than has been previously acknowledged. Moreover, the results of recent research upstream in the Portland Basin by Saleeby (1983) suggests that a certain degree of variability may have existed in the subsistence-settlement

systems of the separate Chinookan groups adapted to the riverine environment of the Lower Columbia Valley as well. The different subsistence-settlement systems so far delineated in the Lower Columbia Valley seem to correlate closely with the division of the ethnographic groups in this area along linguistic lines. For this reason, it is suggested that any definition of cultural subareas in the Lower Columbia Valley begin with a consideration of the distribution of linguistic groups within the region.

Based on the results of the excavations carried out during this study, a sequence of aboriginal occupation documented by radiocarbon dates has been established for the area around the mouth of the Columbia River encompassing the last 3100 years. Aside from primarily stylistic or technological differences in artifact styles, no substantial changes appear to have occurred in the nature of aboriginal lifeways in this area during that time. A similar cultural continuum encompassing the past 2600 years was previously documented in the Portland Basin (Pettigrew 1981:137). The results of archaeological research in these two areas, then, suggests that the Chinookan peoples inhabiting the Lower Columbia Valley at the time of historic contact have occupied this region for at least the last three millennia.

APPENDIX

ARTIFACT CLASSIFICATION

This appendix presents the system developed to classify the aboriginal cultural materials recovered from the archaeological sites around the mouth of the Columbia River investigated during this study. The general principal involved in the formulation of this artifact classification system is that certain artifacts served particular functions which generally reflect the major economic adaptations of aboriginal peoples. The classification attempts to provide a basis for measuring the importance of a number of broad classes of cultural behavior as reflected in different activity sets (refer to Chapter 9).

Some of the variables involved in the classification of these artifacts have culture-historical dimensions as well as purely functional ones. With this aspect in mind, it has been found most convenient to classify the projectile points—the most temporally-sensitive of the artifact classes recovered— in terms of a typology previously developed for the Portland Basin of the Lower Columbia Valley by Pettigrew (1977, 1981). The use of this particular typology provides some basis for relating occupations at the mouth of the Columbia River to those represented elsewhere in the region within a common culture-historical framework.

The artifact collections from each of the sites investigated were first broken down into major industries based on the nature of the raw material, including chipped stone, heavy tool, abrader, bone-antler and shell (Table A-1). The artifacts were then assigned on technological grounds to different series (for example, the bifacial series within the chipped stone industry). Within each industry, the basic artifact category is the class; classes are generally distinguished from one another on functional grounds. Commonly used terms, such as projectile point, knife, scraper, etc., are employed here to reflect the assumed function of various artifacts, but with the understanding that the actual function of each individual specimen may not be fully delimited by any one particular term.

Brief descriptions of the various aboriginal artifact types recovered from the sites around the mouth of the Columbia River are presented below. In order to supplement the descriptive information, references to illustrated specimens in the main text are included with the artifact descriptions.

Table A-1. Summary of Artifact Types

Industry	Series	Class/Type
CHIPPED STONE	Bifacial	Projectile Points
		Knives (foliate, triangular, pentagonal)
		Drills
		Bifaces
	Unifacial	Side Scrapers
		Hafted End Scrapers
		Unhafted End Scrapers
		End Scraper Fragments
		Scraper/Knife
		Scraper/Graver
	Marginally Modified	Flake Knives
		Flake Scrapers
		Gravers
		Used Flakes
	Core and Flake	Cores
		Debitage
		Manuports
HEAVY TOOL	Unmodified	Pounders
		Hammers
		Anvils
		Hammer/Anvils
		Slabs
		Palettes
		Wrap-marked Netsinkers
	Flaked	Choppers
		Chopper/Hammers
		Chopper/Anvils
		Cobble Flake Knives
		Cobble Flake Scrapers
		Used Cobble Flakes
	Pecked and Ground	Mauls
		Pestles
		Manos
		Pecked "Bowl"
		Spherical Stone
		Slate Adze Bit
		Perforated Netsinkers

Table A-1 (continued)

Industry	Series	Class/Type
HEAVY TOOL	Pecked and Ground	Girdled Netsinkers
		Pipe
ABRADER		Tabular Abraders
		Pumice and Scoria Abraders
		Cobble Abraders
BONE-ANTLER	Harpoon	Bilaterally-barbed Dart Heads
		Unilaterally-barbed Dart Heads
		Shouldered Bone Point
		Wedge-based Bone Points
		Composite Toggling Harpoon Valves
		Harpoon Foreshaft
	Awl	Straight
		Shouldered
		Split-bone
		Ulna
		Antler
		Bird Radius
		Awl Tip Fragments
	Miscellaneous	Chisels
		Wedges
		Modified Antler Tips
		Bird Bone Drill
		Bird Bone Bead
		Bone Pin
		Bone Pendant
		Tooth Pendants
		Digging Stick Handle
		Incised Beaver Tooth Dice
		Zoomorphic Figurine
		Miscellaneous Worked Bone
SHELL		Ground Mussel Shell
		Dentalium Bead

Chipped Stone Industry

Artifacts assigned to the chipped stone industry are almost entirely made of various cryptocrystalline silica (CCS) materials, such as chert, jasper and chalcedony. These materials occur naturally as float gravels in the Columbia River. In addition to these locally available raw materials, obsidian is sparsely represented in the form of artifacts and debitage at the sites in this area. There are no known sources of obsidian in the Lower Columbia Valley; this material was presumably obtained from one of the nearest known sources in the Cascade Range to the east.

A. Bifacial Series

1. Projectile Points: This is a traditional artifact class composed of symmetrical pointed bifaces with a sharp tip and a low edge angle on blade edges. Preparation for hafting is obvious in most cases. These artifacts were classified in terms of the typology previously developed for projectile points in the Portland Basin (Pettigrew 1977, 1981). The following types are represented in this study:

a. Type 2: broad-necked, shouldered, with a diverging stem (Figures 6-4,a; 8-4,a).

b. Type 3: broad-necked, with an incurvate stem base (Figure 8-4,b).

c. Type 4: broad-necked, barbed, with a non-diverging stem (Figure 6-4,b-c).

d. Type 5: broad-necked, shouldered, with a non-diverging stem (Figures 6-4,d-e; 8-4, c-d).

e. Type 6b is narrow and almost bipointed in outline (Figure 8-10,a); Type 6d is lozenge or tear-drop shaped in outline (Figures 7-3, a; 8-4,e).

f. Type 7: narrow-necked, barbed, with a diverging stem (Figure 7-3,b-c; 8-4,f).

g. Type 8: narrow-necked, shouldered, with a diverging stem (Figures 6-4,f; 7-3,d-f; 8-10,b).

h. Type 9: narrow-necked, barbed, with a non-diverging stem (Figures 5-3,a-b; 6-4,g-h; 6-11,a-c; 7-3,g-i; 8-10,c-f).

i. Type 10: narrow-necked, shouldered, with non-diverging stem (Figures 5-3,c-f; 6-4,i-l; 6-11,d-e; 7-3,j-k; 8-10,g-i).

j. Type 12: triangular bladed, side-notched, unstemmed (Figures 6-4,m; 6-11,f-g; 7-3,l-o; 8-10,j-k).

k. Type 13: unnotched and unstemmed, with an incurvate base.

l. Type 15: stemmed and side-notched.

m. Unique type: narrow-necked, stemmed, double-barbed (Figure 8-10,l).

n. Point fragments: projectile points too fragmentary to assign to one of the above types.

2. Knives: These are well-made bifaces with well-defined working edges formed by careful percussion or pressure flaking. They are generally larger and/or thicker than artifacts classified as projectile points. Three types of knives are recognized based on differences in form:

a. Foliate Knives: These are relatively large knives with convex sides and foliate outlines (Figures 5-3,g; 6-4,n).

b. Triangular Knives: These are knives with straight to convex sides and a generally triangular outline. Specimens of this type tend to be smaller than the foliate knives described above (Figures 6-11,h; 8-10,m).

c. Pentagonal Knives: These distinctive knives have a pentagonal outline (Figures 6-11,i; 8-10,n).

3. Drills: These tools are characterized by a narrow, bifacially flaked distal tip projecting from a broader proximal base (Figure 8-10,o).

4. Bifaces: These are bifacially-worked pieces without well-defined working edges and/or areas of use-wear on edges or faces. They tend to be thick and somewhat irregular in outline and frequently have obvious flaws in the lithic material which resulted in their never being completed (Figures 6-11,j; 8-4,g; 8-10,p).

B. Unifacial Series

1. Side Scrapers: Flakes with one or both of the lateral edges steeply retouched to form a straight, convex, or slightly concave working edge.

2. End Scrapers: These tools are distinguished from side scrapers by the location of the steeply retouched edge on the end of the flake. Two types of end scrapers are recognized:

a. Hafted End Scrapers: On these end scrapers, the end opposite the working edge is modified on one or both lateral edges (by retouching and/or grinding) to facilitate hafting of the specimen in a socket (Figures 5-3,h-i; 6-4,o; 6-11,k-l; 7-3,p-r; 8-4,h-j;8-10,q).

b. Unhafted End Scrapers: These specimens are the same as the hafted end scrapers except that no observable modification for hafting is present (Figures 5-3,j-l; 6-11,m-n; 8-4,k-l).

3. End Scraper Fragments: Due to their fragmentary condition, it cannot be determined whether the end scrapers in this category were used free-hand or hafted in a socket. The fact that so many are snapped through the stem area strongly suggests, however, that most of these specimens were hafted end scrapers which were broken during use and discarded at the site where they were found.

4. Scraper/Knife: The single specimen of this type is a combination tool in that it has one steeply-retouched edge suitable for scraping and another bifacially-modified edge suitable for use as a knife.

4. Scraper/Graver: The single specimen of this type is another combination tool, in that it has one steeply-retouched edge suitable for scraping as well as a shaped tip or spur suitable for graving.

C. Marginally-Modified Series

1. Flake Knives: These tools have low-angled retouched edges which are generally straight or slightly convex in outline (Figures 5-3,m; 6-4,p; 6-11,o; 7-3,s; 8-4,o; 8-10,r).

2. Flake Scrapers: These tools exhibit unifacial retouch along a steep-angled working edge (Figures 5-3,n-p; 7-3,t).

3. Gravers: These tools are characterized by the presence of a small tip or spur suitable for graving or incising (Figures 6-4,q-r; 7-3,u-v; 8-4,n).

4. Used Flakes: These tools are pieces of chipped stone debitage which show evidence of use without purposeful modification of the working edge.

D. Core and Flake Series

1. Cores: These are irregular chunks of lithic material from which a number of flakes have been removed. Included in this class are cores which appear to have been reduced both by direct free-hand percussion and bipolar percussion (Figures 6-4,s-t; 6-11,p-q; 7-3,w-x; 8-4,p; 8-6,b).

2. Debitage: Flakes or chunks of raw lithic material which have not been modified or used as tools.

3. Manuports: Unmodified nodules of raw lithic material which were presumably intended for use in the manufacturing of chipped stone tools.

Heavy Tool Industry

Artifacts assigned to the heavy tool industry are made of basalt. This material occurs in both cobble and tabular form in the gravels of the Columbia River.

A. Unmodified Series

1. Pounders: Large cobbles characteristically exhibiting evidence of heavy percussion in the form of crushed ends or sides, with spall scars often running back from the battered area (Figures 6-5,f; 6-12,a; 7-4,b).

2. Hammers: Small cobbles and large pebbles exhibiting light to heavy pecking on an end or side. Wear on these objects is generally not so great as to crush an extensive area (Figures 5-4,a; 6-12,b-c; 7-4, d; 8-5,e).

3. Anvils: Large cobbles or pieces of tabular basalt exhibiting pecks or linear cuts on one or more surfaces (Figure 8-6,a).

4. Hammer/Anvil: Combination tool featuring the edge-battered wear characteristic of hammers and the pitting on flat surfaces characteristic of anvils.

5. Slabs: Flat river cobbles or pieces of tabular basalt without observable modification.

6. Palettes: Thin tabular pieces of basalt or sandstone without observable modification.

7. Wrap-marked Netsinkers: River cobbles with a banded stain or negative discoloration across the midsection, indicating attachment to a line, and presumably used to weight the bottom of a fishing net (Figure 7-5,a-b).

B. Flaked Series

1. Choppers: Cobbles or pieces of tabular basalt exhibiting a chopping edge created by the removal of a few flakes from an end or side (Figures 5-4,b; 6-5,c; 8-5,c; 8-11,a).

2. Chopper/Hammers: Combination tools featuring the edge-battered wear characteristic of hammers on one part of the specimen and the removal of flakes to form a chopping edge on another.

3. Chopper/Anvils: Combination tools featuring the removal of flakes to form a chopping edge on one part of the specimen, as well as exhibiting the pitting on flat surfaces indicative of additional use as an anvil (Figures 6-5,b; 7-4,c).

4. Cobble Flake Knives: Large flakes struck from a basalt cobble or piece of tabular basalt which have low-angled retouched edges suitable for cutting (Figure 8-5,a).

5. Cobble Flake Scrapers: Large flakes struck from a basalt cobble or piece of tabular basalt which exhibit unifacial retouch along a steep-angled working edge suitable for scraping (Figures 8-5,b; 8-11,b).

6. Used Cobble Flakes: Large flakes struck from a basalt cobble or pieces of tabular basalt which show evidence of use as cutting or scraping tools without purposeful modification of the working edge (Figures 8-5,d; 8-11,c).

C. Pecked and Ground Series

1. Mauls: Elongated cobbles shaped by abrasion or pecking which are broadest at the distal end where evidence of pounding or battering is present (Figures 6-5,a; 6-12,d-e; 7-4,e).

2. Pestles: Cylindrical cobbles which feature an end worn to a roughly smoothed to slightly polished texture, apparently through use as a grinding tool (Figure 8-11,d).

3. Manos: Hand-held grinding stones which feature one or more flat or nearly flat surfaces showing indications of wear as a result of being used to grind materials on a flat stone surface.

4. Pecked "Bowl": The single artifact of this type is a basalt pebble into one side of which has been pecked or ground a tiny bowl or depression (Figure 6-12,g).

5. Spherical Stones: Pebbles which have been artificially shaped into a spherical form. They may have been used as bola stones or perhaps in games (Figure 6-12,f).

6. Slate Adze Bit: The single artifact of this type is a midsection fragment of a slate adze bit; the specimen exhibits evidence of having been both flaked and polished (Figure 6-5,e).

7. Perforated Netsinkers: Large cobbles featuring a biconically-drilled perforation to facilitate attachment to a line and presumably used to weight the bottom of a fishing net (Figures 6-13,a; 7-5,c-d).

8. Girdled Netsinkers: Cobbles with a pecked girdling groove around the midsection apparently to facilitate attachment to a line and presumably for use in weighting the bottom of a fishing net (Figure 6-5,d).

9. Pipe: The single specimen of this type is the proximal fragment of a stone pipe (Figure 7-4,a).

Abrader Industry

Tools which exhibit signs of abrasive wear are relatively common in artifact assemblages from sites at the mouth of the Columbia River. These artifacts are thought to indicate the manufacture and/or maintenance of bone, antler and wood tools. Three broad categories of abrading tools are represented:

1. Tabular Abraders: Pieces of sandstone (common) or tabular basalt (rare) which show evidence of abrasion on a flat working surface (Figures 5-4,c; 6-13,c; 8-11,e).

2. Pumice and Scoria Abraders: Pieces of volcanic pumice (common) and scoria (rare) which show evidence of abrasion. Wear on these specimens generally consists of either grooves or facets and striations (Figure 7-4,f).

3. Cobble Abraders: Cobbles of basalt and other macrocrystalline materials exhibiting evidence of abrasion on an end or side (Figures 5-4,d; 6-13,b; 8-5,f;8-11,f).

Bone-Antler Industry

Items in this industry are made of bone or antler.

A. Harpoon Series

1. Bilaterally-barbed Dart Heads: Bone points with barbs along both sides (Figure 6-6,a-f).

2. Unilaterally-barbed Dart Heads: Bone points with barbs along only one side of the specimen (Figure 6-6,g-h).

3. Shouldered Bone Point: The single specimen recovered is a tip fragment with asymmetrical shoulders (Figure 6-6,i).

4. Wedge-based Bone Points: Small bone points ground flat and worked on all faces; specimens reach their maximum width immediately behind the tip, then gently taper to a thinned, well-defined base; these items are interpreted as being arming points for composite toggling harpoon heads (Carlson 1960:579) (Figures 6-6,j-l; 6-14,a-d).

5. Composite Toggling Harpoon Valves: Distinctively-shaped bone pieces with grooves on the inner surface and flaring slightly at the base of the item; all classifiable specimens had channelled point beds for round or wedge-based bone points (Figures 6-6,m-o; 6-14,e).

6. Harpoon Foreshaft: Long bone piece nearly 9 cm in length which has been fashioned into slender shaft form (Figure 6-14,f).

B. Awl Series

Whole or fragmentary bones with sharp tips comprise the awl series. Several types are distinguished, including straight (Figures 5-5, b-c; 6-7,a-b), shouldered (Figure 6-7,c), split-bone (Figures 5-5,e; 6-7,d; 6-14,g), ulna (Figure 5-5,d), antler (Figure 6-14,h), bird radius (Figure 5-5,a), and awl tip fragments.

C. Miscellaneous Series

1. Chisels: Implements manufactured from land mammal long bone with bits ground to a rounded spatulate form (Figures 5-5,f-h; 6-7,e; 6-15,a-f).

2. Wedges: Implements manufactured from land mammal long bones or antler with bits ground to a straight or flat working edge (Figures 5-5, i-j; 6-7,f-g).

3. Modified Antler Tips: Antlers featuring evidence of wear on the tips suggesting their use as chisels or wedges.

4. Bird Bone Drill: Short length of bird bone exhibiting wear on the tip suggesting use as a drill or punch.

5. Bird Bone Bead: Short section removed from the long bone of a bird.

6. Bone Pin: Long slender piece of worked bone.

7. Bone Pendant: Flat piece of bone featuring incised designs and a hole for attachment.

8. Tooth Pendants: Elk teeth with a groove incised around one end to facilitate attachment.

9. Digging Stick Handle: Large elk antler with a slot for wedging onto the end of a digging stick (Figure 6-15,g).

10. Incised Beaver Tooth Dice: Beaver tooth with incised lines on one side (Figure 6-14,j).

11. Zoomorphic Figurine: Piece of bone worked into the shape of an (unidentified) animal.

12. Miscellaneous Worked Bone: Pieces of bone which exhibit indications of having been worked in the form of cut marks but lacking diagnostic features (Figure 6-14, i).

Shell Industry

1. Ground Mussel Shell: Piece of mussel shell featuring eivdence of having been ground along one edge.

2. Dentalium Bead: Distinctive bead of dentalium shell presumably obtained in trade from areas to the north.

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