

Kennewick Man

Final Determination

Enclosure 3**Human Culture in the Southeastern Columbia Plateau,
9500-9000 BP and Cultural Affiliation with
Present-day Tribes**

Department of the Interior

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Introduction

The March 1998 interagency agreement between the Department of the Army (DOA) and the Department of the Interior (DOI) delegated responsibilities to DOI for certain decisions related to the set of human skeletal remains recovered on July 26, 1996, from Columbia Park, land controlled by the U.S. Army Corps of Engineers (COE), near the city of Kennewick, Benton County, Washington. The agreement calls for DOI to investigate and resolve two basic issues.

First, DOI had to determine whether or not the remains meet the definition of "Native American" according to the definition in the Native American Graves Protection and Repatriation Act (NAGPRA), as interpreted by DOI. This was resolved and determined by the DOI in January, 2000 (11 January 2000 Memorandum to Assistant Secretary, concurred with, 11 January 2000). This determination was based upon chronological information supplied by the radiocarbon analysis of bone samples and previously conducted scientific examinations.

Since the remains were determined to be "Native American," the DOI now must determine their disposition under the requirements of NAGPRA. One important step in recommending the appropriate disposition is to determine whether there is a cultural affiliation between the remains and one or more modern Indian tribes.

This report describes the consideration for determining whether the Kennewick human remains are culturally affiliated with a present-day Indian tribe. If a cultural affiliation is determined to exist, the remains are subject to disposition to the Indian tribe or tribes that have the closest cultural affiliation with the remains that, upon notice, makes a claim for their reception.

In making this determination about cultural affiliation, representatives of the DOI have consulted with representatives of the Confederated Tribes of the Colville Reservation, the Nez Perce Tribe, the Confederated Tribes of the Umatilla Reservation, the Confederated Tribes and Bands of the Yakama Reservation, and the Wanapum Band. The consultations were held to discuss DOI's plans and activities related to the Kennewick remains, as required by the law and regulations (43 CFR 10.5). Meetings were held on 12 May and 14 July 1998, 27 July and 14 October 1999, and 11 February and 7 July 2000. All meetings were held in Walla Walla, Washington at the COE District headquarters, except for the 7 July 2000 meeting which was held in Spokane, Washington. Most of the tribes also provided written information related to cultural affiliation and other issues raised during the

consultation meetings (Colville 2000a, 2000b; Hicks 2000a, 2000b; Jaehnig 2000; Lyon 2000; Moura 2000; Sprague 2000; Uebelacker 2000).

Between December, 1999, and July, 2000, specialists in archeology, cultural anthropology, and linguistics were hired as consultants to prepare four anthropological studies to describe and summarize evidence for use by DOI officials in the cultural affiliation determination of the Kennewick human remains (Ames 2000; Boxberger 2000; Hackenberger 2000; Hunn 2000). Following a taphonomic investigation and visual inspection of the remains by an expert interdisciplinary team (Walker, Larsen, and Powell 2000), bone micro-samples were taken in April, 2000, for in-depth chemical testing to ascertain the most appropriate skeletal elements from which to obtain viable samples for DNA analysis. Based upon the information generated from the taphonomic study, visual inspection, and micro-sample analysis, bone samples were selected from the Kennewick human remains and transported to laboratories for DNA testing. The results of this analysis also is summarized here as it contributes to the cultural affiliation determination.

In order to detail DOI's assessment of the evidence and information related to determining cultural affiliation of the Kennewick human remains, this report summarizes and synthesizes the prior studies and published works consulted in reaching this determination. Information supplied by present-day Indian tribes, previously conducted DOI sponsored investigations, and other appropriate published sources are presented to clarify. This report describes the process DOI implemented to marshal and weigh the broad-based, relevant lines of evidence that have been relied upon to determine the cultural affiliation status of the Kennewick human remains.

The series of decisions and actions undertaken leading to this cultural affiliation determination do not establish a precedent for requiring destructive tests for every set of human remains falling under section 3 of NAGPRA. The Kennewick remains were recovered under a unique and clouded set of circumstances from a context that was particularly disturbed. The most basic archeological, geological, and historical information necessary to make any informed decisions was not initially available and had to be collected (e.g., Fagan 1999; Huckleberry and Stein 1999; Powell and Rose 1999; Wakeley *et al.* 1998). Such basic information is needed under NAGPRA. In this particular case, certain destructive tests were determined to be necessary, this will not always or invariably be so.

Legal Framework

Section 3 of NAGPRA sets forth the procedures to follow for the disposition of Native American human remains and other cultural items, as defined by the Act. This includes Native American human remains that are inadvertently discovered on, and excavated or removed from, Federal or tribal lands after November 16, 1990. In the case of human remains, if lineal descendants are not identified and if the remains are not found on tribal lands, the statute provides that control of the remains shall be with the Indian tribe or Native Hawaiian organization which has the "closest cultural affiliation" with the remains and, upon notice, makes a claim for the remains (25 USC 3002(a)).

The Kennewick human remains were recovered from Federal land, under the control of COE, after November 16, 1990. Therefore, 25 USC 3002 of the Act controls the decisions addressing the scientific examination, determination of custody, and disposition of the Kennewick remains. Under section 3 of NAGPRA, the Archaeological Resources Protection Act is also invoked to ensure the appropriate recovery, description, analysis, and documentation of excavated or removed human remains and cultural items from Federal lands occurs. The Kennewick remains were

found as an inadvertent discovery.

"Cultural affiliation" is defined by the statute as "a relationship of shared group identity which can be reasonably traced historically or prehistorically between a present day Indian tribe or Native Hawaiian organization and an identifiable earlier group (25 USC 3001(2))." Cultural affiliation may be established using the following types of evidence: geographical, kinship, biological, archeological, anthropological, linguistic, folklore, oral tradition, historical, or other relevant information or expert opinion (43 CFR 10.14(e)).

A finding of cultural affiliation must be based upon an overall evaluation of the totality of the circumstances and evidence pertaining to the relationship between the claimant and the remains and is not precluded solely because of some gaps in the record (43 CFR 10.14(d)). Cultural affiliation is established by a preponderance of the evidence (43 CFR 10.14(f)). Scientific certainty is not required in order to establish cultural affiliation. Cultural affiliation is established when DOI determines that a preponderance of the evidence shows a relationship of shared group identity.

In examining the issue of cultural affiliation for the Kennewick remains, DOI followed the procedures set forth at 43 CFR 10.14. Several requirements must be met for cultural affiliation to exist between a present-day Indian tribe or Native Hawaiian organization and the human remains, funerary objects, sacred objects, or objects of cultural patrimony of an earlier group. There must be an identifiable present-day Indian tribe or Native Hawaiian organization with standing under NAGPRA and its implementing regulations (43 CFR 10.14(c)(1)). In the case of Kennewick, several of the tribes that have been consulted with and claimed the remains meet this criteria.

There also must be evidence of the existence of an identifiable earlier group. Such evidence may relate to identified cultural characteristics of an earlier group, or it also may be possible to establish the existence of the earlier group as a biologically distinct population by examining the chemical, genetic, or physical characteristics of skeletal remains (43 CFR 10.14 (c)(2)(i)-(iii)). In the following sections of this report, various kinds of evidence are used to attempt to identify the characteristics of the "earlier group" or culture that Kennewick Man was part of.

The final criteria for determining a relationship of cultural affiliation is evidence of the existence of a shared group identity that can be reasonably traced between the present-day Indian tribe(s) and the earlier group. Evidence to support this requirement must establish that a present-day Indian tribe or Native Hawaiian organization has been identified from prehistoric or historic times to the present as descending from the earlier group (43 CFR 10.14 (c)(3)). In the following sections on different kinds of evidence, the relationship between the earlier group or culture represented by the Kennewick remains and present-day tribes also is described.

Kinds and Sources of Evidence

NAGPRA identifies various kinds of evidence that may be used in evaluations of cultural affiliation: geographical, kinship, biological, archeological, anthropological, linguistic, folklore, oral tradition, historical, or other relevant information or expert opinion (43 CFR 10.14(e)). For this investigation, we have focused on the kinds of evidence that could be readily found and are relevant for evaluating the cultural affiliation criteria described at the end of the preceding section. The kinds of evidence focused upon are: geographical, biological, archeological, anthropological, linguistic, and oral tradition.

Much of the evidence is summarized in the reports prepared by Ames, Boxberger, Hackenberger, and Hunn, and in the additional information submitted by some of

the tribes. We also have received some information submitted by the Bonnicksen plaintiffs and have considered this in reaching the determination described here. In addition, published sources have been utilized and are cited and listed in the references section of this report.

We have evaluated evidence from as many credible, reliable, and relevant sources of information as available. For this case, various kinds of geographic evidence, biological evidence, archeological evidence, linguistic evidence, and evidence from traditional stories has been used. The collected evidence regarding cultural affiliation is summarized in the following sections.

In the Kennewick case, the kinds and sources of evidence present various challenges of description and interpretation. The archeological evidence of sites as ancient as the Kennewick remains are relatively rare. A smaller number of sites from very ancient times have been systematically investigated than for later eras. The sites themselves tend to be small and lack dense cultural deposits. The range of artifact types and frequencies of artifacts found is smaller than later time periods. In part, this is a reflection of the cultural adaptation of the human groups living at that time in the area, as is described in later sections. In part, the pattern observed may be due to destruction of such ancient sites over time and greater decomposition of remains within these sites. In interpreting the evidence, we have taken such "sampling" problems in mind.

Evaluating the historical content and accuracy of oral tradition stories for very ancient times also presents challenges. Use of oral traditions to interpret historical events is not a new approach, but it one that is not as developed in its methods and techniques as some kinds of historical research (Echo-Hawk 2000:270; Mason 2000; Vansina 1985:3-32). Linking the historical aspects of oral traditions to independent collaborating evidence is one means of affirming its accuracy and we have tried to do this in our use of this kind of evidence.

Chronological and Environmental Information

The Chronology of the Kennewick Remains

This section of the study provides background information summarizing the cultural periods defined through archaeological study and the evidence of environmental change through time derived from a range of data sources. The general summary and temporal comparison of environmental and cultural data is presented in Table 1.

A series of radiocarbon dates now available from the Kennewick skeletal remains indicate a date of between 9500 and 8500 years ago during which the Kennewick Man lived. A variety of additional scientific information support this chronological placement and determination. Geomorphologic and sedimentary investigations of the river bank near the discovery site (Wakeley *et al.* 1998; Huckleberry *et al.* 1998) indicate that sediment layers consistent with these dates exist in the alluvial terrace where we believe the remains were buried originally. The documentation, examination, and analysis of the skeletal remains themselves (Powell and Rose 1999) suggest a pre-Columbian context for the remains. Comparison of sediments adhering to the skeletal remains and sediments from the river bank profile are consistent with the skeletal remains having been buried in sediments stratigraphically dated earlier than 7600 years ago (Huckleberry and Stein 1999). Information from the analysis of the lithic artifact lodged in the ilium of the skeletal remains also is consistent with an ancient date for the remains themselves (Fagan 1999). In all, information derived using the methods and techniques of archeology, geomorphology, physical anthropology, sedimentology, and other scientific disciplines support this determination.

Four C14 dates have been reported for the samples extracted by the Department of the Interior and Corps of Engineers in September, 1999. The samples have been processed and dated by Beta Analytical, Inc. (BA), of Miami, Florida, the Radiocarbon Laboratory of the University of California, Riverside (UC-R), and the NSF-Arizona AMS Facility of the University of Arizona (UA). Two of the four new dates show a substantial conformance with the initial radiocarbon date of the portion of the metacarpal submitted by Benton County in 1996. The DOI has made the background information available on the Worldwide Web at <http://www.cr.nps.gov/aad/kennewick/c14memo.htm>.

Taylor *et al.* (1998), however, added an extra step in calibrating the 1996 date. They made an assumption about the diet of the Kennewick man, suggesting a diet of 70% marine food, specifically salmon, based upon the Delta C13 value of -14.9 per mil associated with the dated bone. Taking into account this assumed marine diet, which would have had the Kennewick man ingesting "old carbon" picked up by salmon during their stay in the deep ocean, Taylor *et al.* (1998) suggest a "reservoir-corrected age" of 9200-8340 calibrated years BP (2 sigma range) for the Kennewick remains. Combining this estimated date with the calibrated dates obtained in 1999, we have an approximately 1000 year period during which the Kennewick man and the cultural group he belonged to lived his life in the Columbia Plateau region.

The C14 dates indicate that the Kennewick man and his cultural group are represented in the archeological record as part of the Windust and early Cascade archeological phases. These terms for the cultural phases were defined by Leonhardy and Rice (1970) in their classic study of archaeological sequence in the lower Snake River. The chronological framework for these periods have Windust beginning about 13,000 years ago and the Early Cascade period ending about 7,000 years ago (Ames *et al.* 1998; Ames 2000). The temporal boundary between Windust and Early Cascade is estimated by Ames (2000:28) at about 9000 years ago. The radiocarbon determinations of approximately between 9500 and 8500 place Kennewick man in the region sometime during the latest portion of the Windust phase or the earliest portion of the Cascade phase. The specific cultural details that distinguish these phases are described in greater detail in the following sections that address topics such as settlement pattern, technology, and subsistence

A dramatic geologic event—the eruption of Mt. Mazama in southern Oregon—occurred about 7600 years ago and is used to divide the Early and Late Cascade phases. Since ash from this eruption of Mt. Mazama (modern Crater Lake) was deposited across wide expanses of the Plateau, the ash served as a useful stratigraphic horizon on archaeological sites that were excavated prior to the advent of radiocarbon dating. The sites shown on Figure 1 are all associated with pre-Mazama occupations, (i.e., Windust and Early Cascade phases) and therefore date prior to, during, or shortly after the life span of the Kennewick individual. Subsequent cultural phases also are listed with dating provided in Table 1.

Table 1. A Temporal Correlation of Environmental Conditions on the Columbia Plateau with Cultural Phases for the Southeastern Portion of the Plateau

<u>Years B.P.^a</u>	<u>Climate and Vegetation Patterns^b</u>	<u>Cultural Phases, SE Plateau^c</u>
11 _____		11 _____ Windust (Period IB)
10 _____		10 _____
9 _____	warm, dry (continental climate); <u>grass steppe vegetation dominant</u>	9 _____ Kennewick^d
8 _____	warmer, wetter (maritime climate); shrub steppe emerging on plateau	8 _____ Early Cascade (Period IB)
7 _____	Mazama ash ^e	7 _____ Late Cascade (Period IB) ^f
6 _____	post-Mazama: northern highlands moister, basin lowlands drier	6 _____
5 _____		5 _____
4 _____	cooler, wetter yet overall still warm; <u>shrub steppe with expanding forests</u>	4 _____ Tucannon (Period II)
3 _____	coldest, wettest period; <u>dense shrub steppe, forest expansion</u>	3 _____
2 _____		2 _____ (Period III)
1 _____	warmer; modern vegetation patterns; bunchgrass (in eastern plateau) with bison; shrub steppe less dense,	1 _____
0 _____	<u>forests thinner</u>	0 _____ <u>Modern (horse appears c 1720 AD)</u>

^a The chronological scale is based on calibrated years before present (B.P.) derived from the sources listed below, principally from the calibrated calendar dates (B.C.) found in Ames (2000).

^b Sources: Chatters and Hoover (1992), Chatters (1998). The earlier study listed B.P. dates, while the Smithsonian *Handbook* series, in which the latter was published, used uncalibrated B.C. dates.

^c Sources: Leonhardy and Rice (1970), Ames *et al.* (1998), Ames (2000).

^d The Kennewick age span reflects the 95% confidence ranges from two radiocarbon determinations on the Kennewick remains: 8410 ± 40 B.P., or 9320-9510 calibrated B.P. (Beta-133993) and 8410 ± 60 B.P., or 8340-9200 reservoir-corrected and calibrated B.P. (UCR-3476/CAMS-29578).

^e Ames (2000:28) indicated that the eruption of Mt. Mazama in southern Oregon is variously dated between c. 7000 and 6700 radiocarbon years. Connolly (1999:Table 3.1) listed the radiocarbon determination of 6845 ± 50 for the Mazama ash fall (Bacon 1983) and used the CALIB program (Stuiver and Reamer 1993) to calculate a 67% confidence range of 7580-7660 calibrated B.P. for the ash fall.

^f Ames (2000:28) stated that the boundary between Late Cascade (Period IB) and Period II should fall about 4500 calibrated B.C., which is herein noted as c. 6500 calibrated B.P.

General Environment in the Columbia Basin

The Columbia Basin, a physiographic region within the Columbia Plateau, encompasses most of eastern Washington State north of the Snake and Palouse rivers. The Kennewick human remains were buried in a river terrace on the west side of the Columbia River near the confluence of the Columbia and Snake rivers, a site that falls within the Columbia Basin on the southeastern portion of the Plateau. The distribution of known early sites (i.e., pre-Mazama ash fall) across the Southern Plateau, including the Columbia Basin, is illustrated in Figure 1 (adapted from Ames 2000:Figures 2 and 8). Major geographic features of particular relevance to this study are also shown: the middle and upper portions of the Columbia River, the lower Snake River, and the Central Basin.

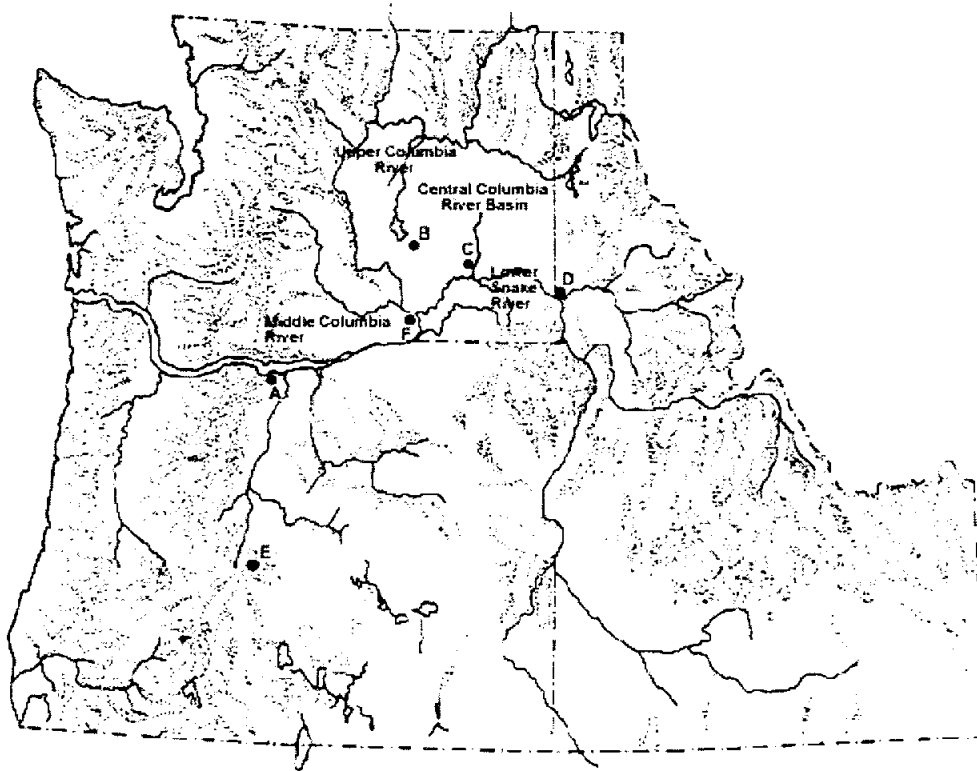


Figure 1: Sites on the Columbia Plateau mentioned in the text, with geographic features discussed in the text indicated. Specific site designations as follows:
 A. The Roadcut Site (Five Mile Rapids); B. Lind Coulee; C. Marmes; D. Hatwai;
 E. Paulina Lake; F. Kennewick

The Basin is the lowest portion of the Plateau in elevation, with the confluence of the Snake and Columbia rivers being one of the lowest portions of the Basin. The highly-distinctive landscape of the Plateau bears testament to the impact of glacial advance and retreat during the preceding Pleistocene epoch or "Ice Age." The ground surface of the Basin plain is often covered by loess, or fine sediments carried by winds in advance of glaciers. A series of glacial meltwater floods between 15,000 and 12,800 years ago (Waitt 1983, 1984; Allen *et al.* 1986:24) created a deeply-incised series of coulees, referred to as the Channeled Scablands, and entrenched river canyons along the north, west, and east perimeters of the region. The entire Basin is bounded by the Cascade Range to the west, the Okanogan Highlands to the north, the Bitterroot Range in Idaho to the east, and the Blue-Ochoco Mountains in Oregon and southeastern Washington. The portion of the Columbia Plateau south of the Blue-Ochoco Mountains borders the northern extent of the Great Basin in southeastern Oregon. Of course, throughout time, humans and human groups have moved across these physiographic and vegetative borders at various rates and frequencies (Connolly *et al.* 1999:3-12). A brief summary of the fluctuations in the general characteristics of the natural environment over time is presented below.

10,000-9000 years ago: cold winters, hot summers; spring precipitation; grass steppe vegetation; flood potential minimal due to low sedimentation rates and limited winter precipitation; open vegetation pattern provided good environment for elk, bison, deer, mountain sheep, and pronghorn; evidence of salmon at Five Mile Rapids site during this

period. this period.

9000-8000 years ago: warmer winters, hot summers; winter precipitation; transition from grass-steppe to shrub-steppe vegetation, e.g., sagebrush, etc.; flood potential increased due to more precipitation during warmer winters and soil exposure from declining grass vegetation; pronghorn increase relative to elk in the eastern Columbia Basin.

8000-4400 years ago: warm winters, hot summers; low winter precipitation; shrub-steppe vegetation; flood potential minimal: sediment exposed and available but insufficient flood runoff due to limited precipitation; ash fall from Mt. Mazama eruption (modern Crater Lake, Oregon) about 7600 years ago may coincide with major change in flora; reduced stream flows suggest that salmon runs would have been substantially lower than during historic period.

4400-3900 years ago: warm winters but cooler summers; denser shrub vegetation, forests expanding to modern ranges; floods frequent since vegetation not stabilized.

3900-2400 years ago: cold winters, cool summers; high levels of winter precipitation and dense steppe vegetation; flood potential low since soils anchored by dense vegetation while colder temperatures reduce rain-on-snow occurrences and retard melting of snow in spring; conditions good for intense but abbreviated (due to colder water) fish runs.

2400-1800 years ago: warmer winters and summers; declining winter precipitation and vegetation density; floods increase due to reduced vegetation and increased rain-on-snow runoff in winter; emergence of modern conditions.

Paleoenvironmental reconstructions like this one often reveal that environments, even in areas that have been considered to be stable or unchanging such as the Plateau, have in fact been quite variable during the Holocene, or since the end of the Ice Age (Chatters and Hoover 1992; Chatters 1998:46-48). Variations in factors such as the density of vegetation cover even with an overall shrub steppe environment or the geographic extent of forests have considerable impact upon the animals that lived on the Plateau. For example, the density of vegetation, coupled with annual temperature range and the extent and timing of annual rainfall, had a direct impact upon water and soil runoff in to Plateau rivers and the timing and duration of seasonal salmon migrations

Geographic Evidence

The discovery of the Kennewick human remains within the Columbia Basin has focused attention upon the basic question of whether the remains of Kennewick Man, who lived in the region between 9500-8500 years ago, is linked to the present-day American Indian tribes in the same general geographic location. The historical record indicates that since at least 1805, when the Lewis and Clark expedition reported on the activities and villages of Native American peoples in the Mid-Columbia region, the ancestors of the present-day Indian tribes resided within the general area (Ames 2000:34-38; Boxberger 2000; Colville 2000a:at Tab 1A-1F, 2000b:at Tab 4; Uebelacker 2000).

Several of the representatives of tribes have asserted that continuity of human occupation of the Columbia Basin for over 10,000 years is proof of cultural continuity

between the present-day tribes and the earlier group of which Kennewick man was a member (Hicks 2000a, 2000b; Jaehnig 2000; Lyon 2000:5; Uebelacker 2000:6-11). The existence of earlier human groups in the same geographic location as the historic period ancestors of the present-day tribes does not automatically indicate cultural affiliation between the former and the latter, but it can be an important fact in determining whether a shared group identity can be reasonably traced. To determine whether a relationship of cultural affiliation can be demonstrated, a variety of kinds of evidence were examined and analyzed.

DOI's investigation has focused on evidence of the "existence of a shared group identity" between the Indian tribes inhabiting the Mid-Columbia region in the early nineteenth century and the ancient group, represented by the Kennewick human remains, which spent at least a portion of their lives in the same region sometime between 9500 and 8500 years ago.

Geographic and archeological evidence from the middle Columbia region indicate the development, between about 3000 and 2000 years ago, of a pattern of human culture resembling the cultural patterns of the Native American groups residing in the same area at about the time of European and Euroamerican contact. The cultural pattern is often referred to by modern scholars as the "Plateau culture" (e.g., Ames 2000; Ames, *et al.* 1998:111-119). This cultural pattern includes the reappearance of pit house dwellings, increasing reliance on fishing, storage of salmon, exploitation of camas root for subsistence. This more or less sedentary settlement system persists nearly into the historic period. Settlements include villages in the canyons and along rivers with small camps in the uplands where seasonal exploitation of resources was undertaken during the summer and fall. After becoming established by between 3000 and 2000 years ago, this pattern persisted until the appearance of the horse in the region about A. D. 1700.

Settlement Patterns and Mobility

9500-8500 Years Ago, Settlement Pattern and Mobility

The human cultural groups, of which Kennewick man would have been a member, residing in and around the Middle Columbia River basin during the Windust and Early Cascade periods (10,000-7000 years ago) lived in very small and highly mobile bands (Ames (2000:8,9; Ames *et al.* 1998:103). The settlement pattern information and inferences about human group mobility of the region during this early period of human occupation are based upon relatively few known archeological sites that have been systematically and intensively studied. The characteristics of the human culture of the period conforms to general expectations for groups following a pattern of hunting and gathering food resources over a wide geographical range. There in particular is an absence of evidence for sedentism and extensive storage.

One investigator has argued that the settlement and mobility patterns of this early period were similar to those practiced by the nineteenth-century Nez Perce, who were known widely for substantial annual ranging following the introduction of the horse (Bense 1972). However, others (e.g., Ames 1988) have countered this assessment, viewing the earlier Windust and Early Cascade period groups as even more mobile. Some Windust groups occupied locations near food-rich areas, as reflected in the apparent residential camp at Paulina Lake in central Oregon. The structural features found at the Paulina Lake site date to about 10,000 to 9500 years ago, near the range of time of the Kennewick remains. Subsequent Cascade phase groups have been viewed as moving from one food-rich area to another. Strategies during the subsequent Late Cascade and later periods are poorly known, but the continuing lack of evidence of densely occupied sites or storage suggests continuing relatively mobile ways of life. There also is an indication for the

abandonment of the central Columbia Basin to the north of the Columbia-Snake rivers confluence exists; extensive survey has failed to uncover sites dating to this period (Ames 2000:8-9, 32). The small number of sites of these early time periods might account for this, however.

The Kennewick man would have been associated with a relatively small social group; inter-group meetings for resource exchange and to maintain wider cultural, social, and reproductive relationships probably enlarged the annual social sphere. The Kennewick man moved with his cultural group as a hunter-gatherer over substantial distances, the full scope of which is not known, but could have included traveling into central Oregon to procure obsidian or to the Pacific coast to collect marine food and shells (see following section for a discussion of these and other raw materials used).

Changing Patterns Through Time

Archeological research in the southern Columbia Plateau and Northern Great Basin area, which includes in its northern portion the Kennewick discovery site indicates that substantial movement of individuals and human groups, cultural interactions, and sporadic displacement has characterized this region (Connolly 1999:3-11). Rock shelters such as the Marmes site, on the lower Snake River not far upstream from the Kennewick discovery site, with deep and generally artifact-rich cultural layers, have traditionally been interpreted as evidence of continuous occupation. Marmes contains such dense deposits that have been dated as early as 9,000-10,000 years ago (Hicks 2000a). Most recent analyses, however, emphasize that rock shelters often reflect only seasonal occupation and, further, may preserve only an eroded remnant of deposits that reflect short-term occupation. Current interpretations therefore emphasize that Windust and Cascade groups were small and highly mobile.

Less frequent and regular shifting of settlement locations is inferred to have developed in the Middle Columbia area and the Plateau region generally by about 5200 years ago when archeological evidence of pit house dwellings is found. The earliest phase of pit house occupation are associated with the Late Cascade and initial Tucannon period (about 5700-3500 years ago) occupations along the lower Snake River on the southeastern Plateau. The initial pit house sites include only a few contemporary houses with no obvious storage features, which suggests periodic occupations with some group movement. The investment of energy and resources in the construction of these more substantial dwellings suggests at least periodic return to such residential sites.

Some researchers (Ames 1988, 1991, Chatters 1995) perceive a substantial decline in or absence of pit houses and resumption of group mobility about 3500 years ago; others (Campbell 1985, Lohse and Sammons-Lohse 1986, Reid *et al.* 1991, Schalk *et al.* 1998, Jaehnig 2000) disagree with this interpretation. Jaehnig (2000) has, for example, argued that the supposed "gap" in pit house construction may simply reflect an artificial break in the suite of radiocarbon dates or a failure to consider upland sites. However, Jaehnig (2000:7) recognized that the limited number of sites (N = 20) at present provides weak support for the argument of a population shift to the uplands.

A widespread reappearance (or continuance) of pit houses, initially in small groups, begins about 3000 years ago and continues into the historic period. Mat lodges appear about 1500 years ago in association with large concentrations of houses and cemeteries. The settlement pattern during this later period reflects a substantial commitment to sedentism, as reflected in the widespread use of storage features. The period ends with the appearance of the horse on the Plateau in the early eighteenth century when some of the historic tribal groups begin to follow a more

mobile settlement system.

The transition to increased sedentism is represented by the more substantial evidence of fixed, formally constructed dwellings, following about 5200 years ago, several thousand years after the death of Kennewick Man. The timing of this cultural development and the pattern of adoption of more-or-less permanent dwellings and villages is a contentious issues in prehistoric studies of the Plateau. Ames (2000:59) observed that the earliest pit house occupations evolved from previous land use patterns, but notes that subsistence patterns after about 6000 years ago differ considerably from earlier ones (Ames 2000:9-10). Most scholars agree that the later period represents a mixture of sedentism and mobility, although disagreement focuses upon the supposed sharp reduction or even disappearance in pit houses about 3500 years ago. Some (Schalk *et al.* 1998) have noted that the pit house "gap" may be an artifact of several gaps in the radiocarbon dating record. Regardless of whether pit houses "reemerged" due to population increase (Ames 1988, 1991) or a cultural adjustment to increasingly seasonal resources (Chatters 1995), sedentism increased and became a dominant aspect of Plateau life after about 3000 years ago. Contemporary pit houses increased in number within larger settlements and were associated with storage pits and cemeteries during the past 1500 years.

Settlement Pattern and Mobility- Summary

Windust and Early Cascade groups, which the Kennewick Man would have been a member of, are widely regarded as small in size and highly mobile. Certain portions of the Plateau, such as the central Columbia Basin immediately north of the Kennewick discovery site, may have been uninhabited or abandoned during this period since no sites of this period have been discovered. The Kennewick man would therefore have been associated with a relatively small social group; possible exchange relationships (see next section, Raw Materials and Trade or Exchange, for further consideration of this topic) probably enlarged the annual cultural and social sphere of the smaller groups. Further, the Kennewick individual moved as a hunter-gatherer over distances, the full scope of which is not completely understood. The small, mobile cultural groups that the Kennewick Man was part of, sometime between 9500 and 8500 years ago, indicate a way of life quite different from the much more sedentary residential pattern associated with the historic tribes prior to the introduction of the horse and the Plateau culture pattern followed in much of the Middle Columbia area for the past 2000-3000 years.

Raw Materials and Trade or Exchange

The 9500-8500 Pattern

The earliest evidence for the movement of raw materials from non-local sources onto the Plateau is found in the presence of obsidian, a volcanic glass stone prized for the hard, very sharp edges that can be made when it is chipped and shaped, during the Windust and early Cascade periods (13,000-7600 years ago). Obsidian present during this period has been identified as originating south of the Plateau in central and southern Oregon, southwestern Idaho, northern California (Galm 1994; Hess 1997).

Evidence of transportation of obsidian over distances greater than 50 km is indicated in the Windust and Early Cascade phases, compared with reductions to less than 50 km after the Mazama ash fall about 7600 years ago. Hess (1997) argued that the presence of obsidian on the Plateau during Early Cascade is indicative of direct procurement at the sources via group movement. He noted that obsidian flakes and points that decrease in size with increasing distance from source areas in central Oregon are indicative of group mobility during the Early Cascade phase. As discussed below, Hess contrasted the use of obsidian during

Early Cascade with that of the late prehistoric.

Olivella biplicata marine shells were found at the Marmes Rockshelter site in pre-Mazama deposits estimated to date to between 9000 and 7600 years ago (Hicks 2000a:4-5; Rice 1969). *Olivella* shells are present today along most of the Pacific Coast, but are much more plentiful along the Oregon and California coasts than further to the north (Erickson 1990). The means by which these shells were procured and transported to the Middle Columbia region during this early period is not known. Until about 3000 years ago, *Olivella* is the only kind of marine shell found in sites on the Plateau (Ames 2000:66; Erickson 1990).

Trade or Exchange and Change Through Time

By 2000 years ago and continuing to the historic period, procurement and utilization patterns for obsidian differ substantially from those of the early Cascade (Hess 1997). Rather than travel to the sources themselves and procure the raw material, obsidian seems to have been obtained through exchange or trade among groups.

Olivella marine shells are virtually the only Pacific coast species found in archeological sites on the Plateau until about 3000 years ago. *Dentalium* shells increase after that time, as well as marine mollusks and a greater variety of shaped objects. Since *dentalia* are found along the western coast of Vancouver Island, a shift of exchange patterns to the northwest, or the development of new patterns, is indicated. *Dentalia* remain dominant until about 650-250 years ago when the number and diversity of marine shell objects increase (Ames 2000:66).

Continuity in the appearance of *olivella* shells is indicated from the early Cascade period until the late prehistoric period; the *Olivella* shells present at the Marmes Rockshelter have been interpreted as grave goods (Breschini 1979; Rice 1969). Whether these shells were obtained directly by individuals traveling to the coast, or through specialized trade with middlemen is unclear. A shift in shell procurement, probably indicative of changing exchange patterns, is marked by the appearance of *Dentalium pretosium* shells within the past 3000 years. After its appearance, *Dentalium* becomes the prevalent marine shell found in archeological assemblages (Ames 2000:66)

By about 2500 years ago, an extensive system of exchange and trade in a wide variety of objects and materials had developed throughout the Columbia Plateau. This pattern continued into the historic period (Hayden and Schulting 1997). The sources and distribution patterns for a wide range of materials and objects has been documented. This pattern emphasizes the changing role of obsidian and other materials in the economic and social life of the Plateau through time:

While obsidian surely had a more practical role in early prehistoric periods when more egalitarian hunter-gatherers foraged over very large ranges, it seems to have acquired more of a status role in Late Prehistoric times [i.e., 2500 to 200 years ago] when band ranges were much more restricted, and many raw materials such as obsidian had to be acquired by exchange. (Hayden and Schulting 1997:58)

This change in the kinds and geographic patterns of raw material and finished artifacts traded indicates a cultural shift in the means by which rare material and prized objects were obtained as well as in the cultural significance they held.

Trade or Exchange—Summary

Obsidian is present on the Plateau at an early date, but procurement patterns shifted from direct acquisition via group mobility to indirect procurement through some form of economic or social exchange. The evidence for procurement of

obsidian during the period about 9500 years ago reinforces the earlier discussion on the substantial mobility of groups during the life span of the Kennewick man. Procurement and exchange of obsidian became associated with a more socially complex form of exchange or trade later in prehistory as groups became more sedentary (Hayden and Schulting 1997).

The presence of Olivella shells from the Pacific Coast may indicate the existence of an even larger mobility pattern if direct procurement of these items was undertaken, however, this has not been investigated. Patterns of marine shell acquisition shifted to Dentalia and a wider range of marine shell during the late prehistoric period. In addition, many other raw materials and finished artifacts began to be exchanged among the sedentary groups throughout the Plateau around 3000 years ago. This pattern seems to have no parallel during the earlier period when Kennewick Man lived.

Technology

Technology is a broad category. For this evaluation, two types of technology are available for analysis: the kinds of stone tools and the kinds of structures manufactured and used. Information is available for the early period and through time into the historic period for these two kinds of cultural items.

The 9500-8500 Pattern

Stone tools: The Cascade point, a lanceolate or foliate biface with a pointed or rounded base, is recognized as the predominant point during the Early Cascade phase (Ames *et al.* 1998:106). However, Ames indicated that Cascade points were found to be contemporary with Windust occupation at the Hatwai site on the lower Snake River. The stemmed and unstemmed Windust points have been described as variable in shape, possibly due to extensive reworking. Most of the Windust and Cascade points are regarded as having served as tips for darts that were probably propelled by atlatls (Ames *et al.* 1998:104). Points made on basalt appear during the Early Cascade phase, which may indicate an increasing utilization of plateau uplands. Other aspects of food gathering technology may be reflected in rare net weights for fishing and edge ground cobbles, presumably for grinding plant foods.

Types and patterns of dwellings: The earliest archeological evidence of a structure constructed by humans in the Columbia Plateau region is roughly contemporary with the Kennewick remains, dating to about 10,000-9400 years ago. The dwelling, located at the Paulina Lake site in Oregon, is interpreted as a small hut or windbreak, part of a residential camp (Connolly 1999; Ames 2000:55). There are several features on the upper Columbia River interpreted as structures dated to about 7500 years ago. These are small (less than 11 square meters) circles of stones with trampled interiors (Ames *et al.* 1998:106).

Patterns in Technology, 7000 to 3500

Stone tools: Cascade points extend into the late Cascade phase and are found in association with various side notched forms such as Northern and Cold Springs. Indeed, the appearance of these notched forms was the primary means that Leonhardy and Rice (1970) employed in defining the very last part of the Cascade phase (Ames 2000:47). Leonhardy and Rice (1970) thought that the varied point forms found in the late Cascade represented different cultural traditions. Cressman (1977) also noted this cultural discontinuity represented by a clear shift in projectile point technological style. The side-notched points that begin to appear in the late Cascade become the dominant type in the next phases which also sees the beginning of house pit settlements. Ames (2000:60) notes that most of the early Holocene points do not appear after the early pit house occupations. Although foliate points do continue as late as 4000 years ago, it is unclear how these forms

relate to earlier Cascade points (Ames 2000:47).

Chipped stone technology in Phase II Tucannon assemblages has been described as less skilled than in earlier times. Such changes in lithic technology may indicate raw material or time constraints related to the variable level of sedentary occupations reflected in the early pit house sites. The edge ground cobbles become increasingly rare, being replaced by mortars and pestles for processing of plant foods.

Types and patterns of dwellings: The oldest pit houses appear on the southern Plateau by about 6000 years ago and shortly afterward at various sites. The appearance of this kind of structure, which eventually becomes prevalent throughout the riverine portions of the Plateau, comes at least 1500 years following the period when Kennewick man lived. A gap in construction of pit houses has been identified about 3800 years ago, although the existence of this gap is debated.

Technology—3500 to the Historic Period

Stone tools: Small projectile points that appear about 2500 years ago suggest the use of bow and arrow projectile technology. Increasing changes in the diversity of projectile point forms are noted during Period III, possibly reflecting an expansion of forms due to restricted mobility and less familiarity with neighboring point styles. Net weight stones become common during Period III, indicative of the greatly enhanced importance of salmon exploitation (Ames *et al.* 1998:111; Chatters 1998:47-48).

Types and pattern of dwellings: Pit houses reemerge or continue across the Plateau after 3000 years ago. The size of groupings of houses, in association with cemeteries, increases after about 1500 years ago. Another kind of dwelling also begins to be constructed and inhabited at about this time, mat-covered lodges.

Technology—Summary

Hicks (2000a:3) and Jaehnig (2000:18) have argued that the temporal overlaps of projectile point styles represent a strong argument for continuity of human occupation on the Plateau. Galm (1994) suggested that the presence of Northern side notched and Cold Springs side notched points during the Late Cascade phase may indicate population movement or exchange links between the middle Columbia-lower Snake region and areas to the south. Ames (2000:46) addressed the question of projectile point typology, noting that the meaning of variability in the Plateau region is a poorly understood. Generally, the cultural significance of changing artifact forms has been a controversial topic in the field of archeology. Detailed studies of various cases have shown that some variability in form was functional, some reflected reworking of broken or worn points, while some had cultural significance and marked cultural boundaries between groups and cultures using stylistic manifestations.

Simms (1994:77) cited a relevant study by Sinopoli (1991) on 172 arrows from a nineteenth-century Great Basin ethnographic collection. The stone points had virtually no stylistic or cultural relevance. In this case, arrow shaft decorations rather than point shape marked social group boundaries, but such perishable organic material usually does not survive in the ground to be recovered by archeologists. Simms (1994) and Hughes (1994) both argued that social or linguistic boundaries do not conform to the typological categories created by archeologists to classify artifacts. Hughes (1994:67) commented that continuity in artifacts is often—and questionably—equated with continuity of ethnolinguistic groups, or that discontinuities in artifacts reflect a replacement of such groups by others. The comments by Hughes, as well as the elaboration of them provided by Ames (2000:23-27), have implications that extend far beyond the realm of projectile point typology.

The kinds of structures built and used varied substantially from the 9500-8500 years ago period to the 3000 years ago period when the Plateau cultural pattern is recognized in the region. Part of the striking difference between these times results from the greater preservation of more recent archeological remains.

Subsistence

Types and Variety of foods—9500-8500

Information about subsistence resources is reflected in paleoenvironmental reconstructions of animal and plant populations available for exploitation, direct evidence of consumption in the form of animal bones and plant remains, and indirect evidence as reflected in artifacts and isotopic chemistry of bones. Data from archeological deposits from the 9500-8500 period suggest a broad based subsistence pattern across the Plateau during the period in which the Kennewick man lived (Ames *et al.* 1998:108), a pattern that would have varied in response to geographic location and environmental opportunity.

Subsistence data are not abundant at archeological sites from this period, but remains of large and small sized mammals, fish, and birds have been found at various sites associated with human activity (Ames 2000:32). Mammals hunted on the grassy steppe of this time period included bison, elk, deer, and pronghorn (Gustafson 1972; Ames 2000:32; Ames *et al.* 1998:104).

Plant exploitation is suggested by edge ground cobbles that would have been used for grinding vegetable foods, but evidence of storage features for plant or animal foods is nonexistent during this period (Ames 2000:8). Marine mammals (seal) were hunted along the Lower Columbia, and birds and small mammals such as rabbits and large rodents were often procured. Salmon bones are present as well as the remains of other fish; the use of nets may be reflected in the occasional presence of possible net weights known as bola stones. Indeed, Taylor *et al.* (1998) cited a bone collagen Delta 13C value of -14.9‰ (parts per mil) to infer that a substantial portion of the Kennewick individual's diet was derived from marine resources, which they inferred to have been salmon. However, Chatters has argued that during this period in the early Holocene the hot summers and a steppe-dominated watershed would suggest "warm, sediment-laden waters and poor salmon productivity (1998:47)." There is no detailed evidence of how much salmon or other marine or riverine resources contributed to the human diet during this early period.

Changing Patterns Through Time

As the local environment began a transition from a grass to shrub-dominated steppe during the period 9000-8000 years ago, the flood potential increased as the ground surface was exposed due to declining vegetation. The continued runoff of warm water with a substantial sediment load would have reduced fish runs considerably—compared with historic periods—as late as about 5500 years ago. An increase in pronghorn relative to elk reflects the emergence and expansion of shrub steppe (Chatters and Hoover 1992:56; Chatters 1998:44, 47).

Regional variation was more pronounced during and following the emergence of pit houses on the Plateau about 6000 years ago (Atwell 1989). The hunting of mammals continued; deer dominate the faunal profiles at Hatwai and Alpawai on the Lower Snake River, with evidence of fish rare. Sites on the Upper Columbia at the modern Wells and Chief Joseph reservoirs show diverse faunal profiles included both fish and land mammals (Ames 2000:62). Mortars and pestles, possibly used for vegetable food preparation, are found in association with pit houses. These new artifact types may serve functions similar to those of the edge ground cobbles that had disappeared at the end of the previous time period. The degree to which subsistence economy focused upon fish and/or roots during Period II is considered

a matter of debate, but Ames argued that "subsistence was significantly different than during earlier periods (2000:8)."

By about 3000 years ago, when pit house dwellings became common, storage pits containing salmon appeared on sites at the modern Wells Reservoir. Faunal assemblages from across the Plateau have, for the first time, substantial numbers of salmon bones during this period (Ames *et al.* 1998:111). An increasing dependence upon salmon and root plants such as camas is indicated in the storage pits that appear in association with pit house groupings and later with villages. A bunchgrass steppe emerged on the southeastern portion of Columbia Basin, including or just to the east of the Kennewick site, after about 2500 years ago. Bison became closely associated this habitat and were common for the first time on the Plateau between 2300 and 1800 years ago (Chatters 1998:46). The pattern of subsistence associated with the Plateau culture and the historic period is seen as emerging by 2000 years ago. This pattern incorporated elements practiced earlier, but in a distinctive manner (Ames 2000; Ames *et al.* 1998:111).

Subsistence—Summary

Ames (2000:65) noted that considerable regional variability may be found in the archaeological record of the Plateau, but that this variability is not well-understood. He further contended that broader inferences are limited by the nature of the existing database and by methodological issues such as varying recovery techniques and the need for seasonality studies.

Ames (2000) and Ames *et al.* (1998) described a broad based subsistence pattern during the time the Kennewick individual lived. Resources consumed or available for consumption would have included a wide range of large mammals, including bison, plants, and marine fishes including salmon.

A shift in emphasis upon subsistence resources was associated with initial sedentary occupations during Period II. Greater indications of sedentism and food storage is found during the more Period III. Regardless of whether the expanded role of salmon during Period III was a function of this sedentism or of environmental opportunity on the Plateau (Chatters 1998:48), the storage of salmon and probably of root crops such as camas seems closely tied to the larger, less mobile groups that occupied pit house groupings and subsequently villages.

Hicks (2000a), Jaehnig (2000), and Lyons (2000) have all asserted that the presence of salmon on Period IB sites is an argument for continuity on the Plateau. However, the consumption of salmon should be considered within the larger context of settlement pattern and the manner of salmon exploitation. The historic pattern of salmon exploitation is one that seems to have emerged only since the Period III occupations, beginning about 3500 years ago.

Burial Patterns

Early Examples of Burial Patterns—9500-8500

The Kennewick human remains were discovered after they eroded out of their depositional context, it is difficult to determine with any certainty whether this individual was buried through human activity or a natural event. Evidence of human burial, resulting from cultural or natural actions, on the Plateau, and in the Pacific Northwest generally, is contemporary with the overall age of the Kennewick individual. However, the numbers of burials and the human remains and funerary objects associated with the earliest occupations of these regions are limited and have been inconsistently investigated.

The earliest evidence of a human burial in the Plateau region is the Paleo-Indian

female recovered from Buhl, Idaho, who was dated to about 10,675 years ago (Green *et al.* 1998). The Buhl burial was not articulated and appears to be from a disturbed context (Green *et al.* 1998:439). There appear to have been some funerary objects interred with the human remains, including a badger baculum and four artifacts: a stemmed stone biface, a bone needle, and two bone ornaments (Green *et al.* 1998:449-451).

A set of human remains from a non-burial context was recovered on a slope at Gore Creek, British Columbia, which dated to 8250 ± 115 (radiocarbon years) years ago (Cybulski *et al.* 1981). The Prospect, Oregon, male has not been radiocarbon dated at this time but was recovered below the Mazama ash layer, a geologic feature that dates to between 7580-7660 years ago (Hackenberger 2000).

The pre-Mazama ash, that is over 7600 year old, deposits in the Marmes Rockshelter and the floodplain in front of it have yielded human remains from general floodplain, non burial contexts (Marmes I-IV) and cremations (Hearth I-IV). These early remains are very fragmentary, mainly cranial pieces (Dixon 1999:122-124; Krantz 1979). Some of these early burials include olivella shells and lithic artifacts; others (Marmes 9A, 9B, and 16, contained red ochre deposits, but chronology may be a problem (Rice 1969; Breschini 1979; Hackenberger 2000; Hicks 2000b). On the whole, there is not much evidence for a distinctive burial pattern during this early period.

Burial and Mortuary Patterns Through Time

The quantities and complexity of funerary objects increase throughout the Plateau during the later stages of prehistory, including the more recent upper levels of Marmes Rockshelter. Hackenberger (2000), however, found temporal gaps in the mortuary record between 7000-5000 years ago, and between 5000-3000 years ago. Human burials have been found during these periods, but they are in limited quantities and restricted in geographic distribution (Hackenberger 2000:4).

The Braden and DeMoss sites, which are located in western Idaho, represent a distinct burial pattern and both have been dated to be approximately 6000 years old (Harten 1975; Green *et al.* 1986). Each site yielded multiple human burials and a number of associated points and bifaces; two cremations and an associated dog burial were also found at the Braden site (Roll and Hackenberger 1998:129; Hackenberger 2000:4). Based on the nature of their burial patterns, both of these sites have been associated with the Western Idaho Burial complex, which fluoresced on a portion of the southeastern Plateau during Period II. This Western Idaho Burial complex included "... secondary inhumations, some cremated, and caches of large, delicately flaked bifaces, projectile points, pipes and beads, often made from exotic materials (Chatters and Pokotylo 1998:75)." This type of burial complex occurred on the Lower Snake River at the Marmes Rockshelter and the Middle Columbia River.

A distinctive pattern of human burials is represented by rock cairns used to cover partially cremated human remains (Hackenberger 2000:4). These rock cairn burials are found near the Dalles area along the Columbia River during the period of 5000-3000 years ago (Hackenberger 2000:4).

Beginning about 1500 years ago, pit house occupations and later villages seems associated with a shift to cemeteries, which contained greater numbers of individual burials (Hackenberger 2000:5-7). Such a burial patterns is consistent with the increased sedentism reflected in the larger villages. Further, the earlier pattern referred to above as the Western Idaho Burial Complex disappeared during this period.

Sprague (1959:46; 2000:8) defined a burial sequence at the Asotin site (45As9) in southeastern Washington that reflects this cultural change from late prehistoric through protohistoric to historic periods on this portion of the Plateau:

1. a late prehistoric pattern of burials oriented in a generally westerly direction with some degree of flexure, placed on the side, and accompanied by grave goods consisting largely of dentalia;
2. a brief period once again interment under rock cairns with associated fire and occasional cedar crypt, increase in grave goods, placement in a flexed position on the back, variable orientation but generally west to south, and a heavy painting of the body with red ochre; and
3. an early historical period of extended burials on the back, oriented east and placed in cedar burial boxes, and inclusion of large numbers of trade items in the grave.

Burial Patterns—Summary

The numbers of human burials associated with the earliest occupations of the Plateau region are limited. An increased quantity and complexity of burial treatments and funerary objects is indicated in the later stages of prehistory. Sprague argued for continuity within Plateau burial practices noting that "when the early examples of burials found at Marmes Rock Shelter and Rabbit Island site... are combined with a total lack of any other early disposal forms... the obvious conclusion is that earth inhumation has a long and continuous history in the Plateau (Sprague 2000:12)." Sprague (2000:8) also admits that the "relative stability" of burial patterns is based partially on an absence of evidence. Hackenberger (2000:4-5) observed major temporal gaps in Plateau human burial patterns between 7000 and 3000 years ago. It is difficult to draw conclusions from the limited data on the earliest burial practices in the Plateau. For example, it is difficult to extend an argument of mortuary-based continuity in this region back to before 7000 years ago.

Biological Evidence

Cranial, Dental, and other Morphological Information

In February, 1999, a team of DOI experts conducted a careful, thorough, physical examination, recording, and analysis of the Kennewick remains (Powell and Rose 1999). to undertake a study of the remains as an element of this cultural affiliation investigation. In April, 2000, DOI conducted a related taphonomic study to evaluate the overall condition of the remains and to select skeletal elements for DNA testing. This taphonomic study was undertaken by Clark Larsen, Joseph Powell and Philip Walker (Walker, Larsen, and Powell 2000). In addition, the initial examination of the remains in 1996 has recently been described by the original investigator (Chatters 2000).

Researchers who have examined and analyzed human remains of this early period (between about 11,000 and 6,000 years ago) agree that the morphological characteristics of the remains differ from most modern populations (Jantz and Owsley 1997; Owsley and Jantz 1999; Powell and Rose 1999; Steele and Powell 1994).

Powell and Rose (1999), using a statistical comparative analysis, conclude that the majority of populations with similar cranial and other morphological characteristics reside currently in Polynesia and east Asia. They emphasize the point that the strongest morphological affinities for the Kennewick remains are with contemporary or historic "populations in Polynesia and southern Asia, and not with American Indians or with Europeans in the reference samples." Other investigators have made

similar observations (Chatters, *et al.* 1999; Steele and Powell 1992, 1994; Jantz and Owsley 1997).

It is important to recognize, however, that even the "strongest" morphological affinities with modern human populations discovered in this and other analyses are not particularly robust:

The Kennewick skeleton can be excluded, on the basis of dental and cranial morphology, from recent American Indians. More importantly, it can be excluded (on the basis of typicality probabilities) from *all* late Holocene human groups. There are indications, however, that the Kennewick cranium is morphologically similar to Archaic populations from the northern Great Basin region, and to large Archaic populations in the eastern woodlands (Powell and Rose 1999).

Although the Kennewick remains do not have a close affinity to any modern group, metric data do suggest an association with the small number of early Holocene human remains, dated from approximately 11,000 to 6,000 years ago, that have been studied (Steele and Powell 1992, 1994, 1999; Jantz and Owsley 1997; Owsley and Jantz 1999).

Steele and Powell (1992, 1994, 1999) suggest that early American remains more closely resemble modern southern Asian and Pacific Rim populations, while modern Native Americans bear closer resemblance to modern northern Asian groups. They contend that the morphological unity among early human remains in the Americas and their dissimilarity when compared with modern Native American groups indicates that early populations entered the New World before the development of modern northern Asian and North American physical characteristics.

Considering another set of remains from the same general time period as the Kennewick remains, Jantz and Owsley (1997) concluded that the Spirit Cave Mummy does not exhibit physical features found in historic or modern populations of northeastern Asia, such as facial flatness and a broad cranial vault (Lahr 1995). The interpretation favored by Jantz and Owsley (1997:82) is that the original ancient source population in northeastern Asia, from which the earliest American populations were descendent, in fact had "few of the features commonly associated with contemporary people of Northeast Asia." These findings were consistent with the general interpretation that the late Pleistocene occupants of eastern Asia were "not morphologically similar" to the populations currently found in that part of Asia (Jantz and Owsley 1997:82). Jantz and Owsley (1998) have evaluated the possibility of multiple populations of early American inhabitants.

Genetic Information

Very active research is underway investigating how ancient genetic patterns can illuminate the settlement of the American continents and subsequent patterns of cultural development and history (e.g., Kaestle 1997; Stone 1999). As one example, Schurr and Wallace (1999:64) have drawn upon mitochondrial DNA data from Native American and Siberian individuals, as well as archaeological evidence, to argue for an immigration prior to the late glacial ice advance about 25,000-15,000 years ago, and a second immigration around 17,000 to 13,000 years ago, although they readily acknowledge that other interpretations must be considered at present.

The DOI attempted to collect and use genetic evidence from the Kennewick remains as part of its investigation of cultural affiliation. Genetic evidence is a kind of biological evidence that may be relevant in determining cultural affiliation. In attempting to collect and analyze ancient DNA from the Kennewick remains, we recognized that many challenges had to be overcome (Tuross and Kolman 2000).

Despite the difficult obstacles, we decided to proceed. Careful steps were taken to collect appropriate bone samples for analysis and three ancient DNA laboratories with internationally recognized experts were selected to undertake the analysis. After thorough, painstaking work, all of the experts and laboratories have reported that they have been unable to detect and analyze ancient DNA from the Kennewick remains (Kaestle 2000; Merriwether 2000; D. Smith 2000). Therefore, ancient DNA evidence is not available for use in this cultural affiliation determination.

Linguistic Evidence

The discipline of linguistics, within the context of anthropology, focuses on the cultural aspect of human language. Linguists analyze a host of behaviors and phenomena related to the development, use, dissemination, and evolution of language. Some of the topics studied include the creation and production of sounds, the formulation of sounds into meaningful language and the structure of language, the relationships between language, thought, environment, and culture, and the origin, modification, or replacement of languages through time and across geography. It is this last kind of linguistic analysis that was used in the investigation of the cultural affiliation of the Kennewick remains.

Linguistic evidence was collected using techniques and observations focusing on information related to the relationship between language and the Plateau environment (geography, flora, and fauna) and the regional changes in language through time and across geography. These linguistic techniques were applied to the languages of the historical bands, groups, and tribes known to have inhabited the Mid-Columbia region in the 19th century, as well as to those languages spoken by present-day Indian tribes (Hunn 2000:3-6).

Hunn (2000) evaluated present-day and historical languages from the Middle Columbia River region. His primary information was gathered from: (1) present-day and historical Plateau languages; (2) a reconstruction of likely changes in the regional language; (3) an investigation of the relationship between these languages and the Plateau environment (geography, flora, and fauna); and (4) an attempt to establish a chronology based upon language change and linguistic based environmental associations.

Reconstructing Plateau Languages and Establishing Chronology

Based upon glottochronology, a statistical technique used by some linguists for dating the divergence of language groups or stocks, Hunn (2000:5, 14, 16, 19-20) argued that Proto-Sahaptin, a "language group" ancestral to present-day Sahaptin (a language composed of related dialects spoken by or known to have been spoken by present-day communities within the Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Reservation, Confederated Tribes and Bands of the Yakama Indian Nation of the Yakama Reservation, and the Wanapum Band), Nez Perce, and possibly Klamath/Modoc, was "most likely" spoken along the lower Columbia River by at least 2000 years ago. Hunn considered an additional extension for Proto-Sahaptin or an immediate predecessor back to 4000 years ago (Hunn 2000:16, 19-20).

Using Greenberg's "controversial claim," which is based upon an application of multilateral comparisons and glottochronology (Greenberg 1987:341-344), that all American Indian languages, with the exception of Na-Dene and Eskimo-Aleut groups, form a single genetic linguistic unit, termed Amerind (Greenberg 1987: 335-336; Ruhlen 1994: 177-188), Hunn noted that Proto-Penutian, a hypothetical early language family of which Proto-Sahaptin is considered a member, could be older than the better-studied Indo-European language family, and if so, would have been spoken on the Plateau by at least 8000 years ago (Hunn 2000:5, 14-17).

Extending a historical chain of Sahaptin to Proto-Sahaptin to Proto-Penutian language usage in the Plateau beyond 2000 to 4000 years ago, however, is a difficult and questionable proposition. For example, the glottochronological and lexicostatistical methods used for assigning an absolute date to the divergence of one language into two or more languages are not widely accepted, even among linguists (Grayson 1994:21). Hunn admits that "the method is highly controversial, though if one controls for the effects of borrowing [words] it is generally conceded that lexicostatistical methods may provide reliable relative ages for linguistic affiliations (Hunn 2000:14)." Furthermore, Grayson (1994:21-23), who claimed that "glottochronology is fatally flawed," reviewed the use of standard glottochronology techniques generally, and in particular focused on their application to the Great Basin, and argued that this historical linguistic technique does not provide a reliable measure of absolute chronology. After recounting a number of inherent problems with the utilization of glottochronology, even Greenberg noted that "the method has been almost completely abandoned for purposes of the dating of times of origin of ancestral languages, though it is still occasionally used for arriving at the subgroupings of a linguistic stock" (Greenberg *et al.* 1986:479).

Further complicating the issue of placing ancestral related Sahaptin language speakers in the Plateau earlier than 2000-4000 BP is that "a systematic attempt to [linguistically] reconstruct Proto-Penutian" has not been undertaken (Hunn 2000:17). The basis of extending present-day Sahaptin and its antecedents in the Plateau back to 8000 years ago and beyond is tied to the existence of Proto-Penutian and its usage within this region. Lacking a reconstruction of Proto-Penutian and an established finding that it was actually spoken around 8000 BP in the Plateau, one must fall back on conjecture to place this proposed language within the region and during this early time period. Hunn (2000:19) speculated that Proto-Penutian may have been spoken in the Plateau region, if so, it would date to 8,000 or more years ago. However, Hunn goes on to note that "... as there is yet no reconstruction of Proto-Penutian we cannot determine with confidence whether Proto-Penutian speakers occupied and exploited an environment like that of the Columbia Plateau (Hunn 2000:19)."

Given the controversial nature of extending a specific language back in deep time through the application of glottochronology, its placement within a defined geographic area, and the lack of a reconstruction for Proto-Penutian, Hunn was unable to confidently project the antecedents of historical and present-day Sahaptin speakers in the Plateau beyond 4000 to 5000 years ago (Hunn 2000:19). Thus, while Hunn believed that there "is a strong possibility that Kennewick Man spoke a Proto-Penutian language," he could not rule out other possibilities (Hunn 2000:19). Commenting on these "other possibilities," Hunn speculated that the group to which the Kennewick human remains belonged may have spoken "a language which was not Penutian – a language now extinct or ancestral to languages spoken outside the present region – and that the Penutian-speaking predecessors of the historic occupants of this region of the Columbia Plateau either displaced this earlier group or arrived after that group had moved elsewhere or had died out (Hunn 2000:19)."

Plateau Language, Environment, and Chronology

"The existence of a name for a plant, animal, or place in a given language may be taken as proof that plant, animal, or place was of cultural significance to people speaking that language (Hunn 2000:9)." Based upon "an examination of contemporary Sahaptin vocabulary for plants and animals and a consideration of the corpus of Sahaptin place names," Hunn inferred that many Sahaptin speakers were intimately familiar with the present and past Plateau environmental features. He interpreted key features of the environment to have been stable during the past 12,000 years (Hunn 2000:9). The environmental reconstruction of this region,

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however, indicates a series of environmental fluctuations occurred, for example, between wet and dry periods, which affected the presence and frequency of different plant and animal species at different times. These fluctuations are described above in the section entitled, "General Environment of the Columbia Basin."

Variations in temperature and amounts of rainfall over time resulted in environmental shifts throughout the Holocene. The Southern Columbia Plateau, for example, experienced a transition from a grass steppe to a shrub steppe between 9000 and 8000 years ago. The plant names that Hunn (2000:10-11) cited as indicative of a Sahaptin continual occupancy of the Plateau, such as those for the genus *Lomatium* or the genus *Salix* (willow), are indeed associated with plants on a shrub steppe (Chatters and Hoover 1992:51-53; Chatters 1998:35-47).

Shrub vegetation, however, did not begin to become fully established on the Plateau until approximately 8000 years ago (Chatters and Hoover 1992:52; Chatters 1998:47). The Kennewick individual, who occupied the region approximately 1500-500 years earlier, would most likely have encountered a predominately open grass steppe, which may have reflected some elements of shrub vegetation. Therefore, this individual could have hunted a range of relatively mobile fauna, including elk, bison, deer, mountain sheep, and pronghorn" (Chatters 1998:43). Terms for animals that would have been present on the grass steppe during the early Holocene, such as pronghorn, various deer species, and mountain sheep, are present in Sahaptin (Hunn 2000:10). These species, nevertheless, continue to exist in the Plateau region today, reflecting varying degrees of habitat tolerance over time (Chatters 1998:37-38, 42-48). Therefore, the entrance of these animal-related terms into the Sahaptin vocabulary does not provide an absolute date, which could then be used to place Sahaptin speaking peoples and their predecessors in the Plateau during a specific time. Additionally, present-day terms for some animals such as bison, which were periodically hunted since the earliest human occupations on the Plateau, are borrowed from other languages.

Hunn noted that the Sahaptin terms for bison are borrowed from Cree (*músmustsin*) and Flathead (*tsúutim*), the Sahaptin vocabulary lacks a term for caribou, and the word for moose (*shashík*) was probably borrowed from Interior Salish through Nez Perce. (Hunn 2000:10). According to Hunn, the lack of these Sahaptin words "... suggests that Sahaptin was not spoken, at least not at all recently, much to the north or east of its historic location" (Hunn 2000:10). Notwithstanding, bison were present in the Plateau region during the early Holocene, by approximately 9000-10000 years ago. Bison remains (*bison antiquus*) were recovered from deposits dated to this early period at the Lind Coulee archeological site (Ames 2000; Chatters 1998:44). Further, bison became common in the archaeological record around 2000 years ago (Chatters 1998:43-44).

The lack of a Sahaptin term for bison may be interpreted as an indication that Sahaptin speaking peoples and their antecedents did not necessarily possess a long-term association with the Plateau environment. In the alternative, Hunn (2000:10) contends that "the prominence and apparent antiquity of terms for rattlesnake (*waxpush*), burrowing owl (*papu*), yellow-bellied marmot (*chikchiknu*), western gray squirrel (*qanqan*), and tick (*ach'pl*) all point to a long-term association of Sahaptin with the semi-arid Plateau environment."

Hunn also notes that "... every salmon species of the Columbia River basin is named" in Sahaptin (Hunn 2000:9). Regarding Plateau place names, Hunn stated that "... those that we can map accurately at this date demonstrate the Sahaptin cultural focus on riverine resources (as well as certain montane environments), as we might expect given the importance of fishing as a subsistence resource for

Plateau peoples documented over the past 10,000 years (Hunn 2000:9)." There is no doubt that the historic Sahaptin speaking peoples of the Plateau heavily relied upon riverine resources, generating names for the available salmon species and place names along local waterways. As described in the section above on subsistence, however, the relative importance of salmon and other riverine resources to the earliest inhabitants of the region may have been substantially different than was the pattern from about 2000 years ago into historical times. The evidence related to environmentally-related terms, however, does not necessarily lead to the conclusion that Sahaptin speaking peoples or their antecedents resided in the Plateau region during the very remote past.

Given his position of recovery on an early Holocene terrace of the Columbia River, the Kennewick individual and his group may well have exploited seasonal salmon runs on the river. During their occupation of the region, however, salmon productivity was limited by hot summers and warm water runoff. An increased salmon presence coincided with a period of maximum productivity on the Southern Plateau, which occurred during the period from 4000 to 2000 years ago (Ames *et al.* 1998:111). Indeed, roughly contemporaneous faunal assemblages dated to these later times from across the Plateau have substantial amounts of salmon bones for the first time (Ames *et al.* 1998:111). The importance of salmon species in the Sahaptin vocabulary, therefore, may reflect this increased period of productivity. This would suggest that linguistic evidence acquired from Plateau related salmon species and riverine landscapes named in the Sahaptin language could at best extend no further than 2000-4000 years ago.

Employing animal, plant, and place names from a language to place a particular people and their potential linguistic predecessors in a defined place through time is a difficult undertaking. It is impossible to provide an absolute date for such a people's entrance into or continued occupation of a specific geographic area using these forms of linguistic information. While Hunn found "... no evidence in Sahaptin environmental vocabulary to support the view that Sahaptin occupation of the Columbia Basin habitat is recent," he did indicate that "it is not possible to state with certainty" that the place names he evaluated demonstrated a "local occupation of the area beyond several hundred years past (Hunn 2000:12)." Furthermore, Hunn stated that "it is possible that the demonstrated close association between Sahaptin vocabulary and local environmental features could have developed in a matter of centuries rather than millennia (Hunn 2000:20)." Hunn went on to declare that this left "... open the possibility that Kennewick Man spoke a non-Penutian language...(Hunn 2000:20)."

Oral Traditions

A substantial amount of oral tradition information was provided by the Colville tribe (2000a) in support of their claim for the Kennewick remains. The Umatilla tribe presented some oral tradition information (Umatilla Cultural Resource Protection Program 2000). Uebelacker (2000) also summarizes some oral traditional evidence in the submission on behalf of the Yakama tribe. Several Colville and Yakama elders also submitted personal statements about their beliefs in the validity of oral traditions. There is no question of the sincerity with which the tribal people believe in their oral traditions. Neither is there any question here that the oral traditions play, and will continue to play, an important role in the culture of the tribes. Sensitivity to and respect for the cultural uses of oral traditions by the Indian tribes are important aspects of the investigations that the DOI has undertaken (e.g., Anyon, *et al.* 1997:82-87). Use of the oral tradition information as sources of historical information is not intended to be disrespectful. It is recognized that traditions may or may not remain stable over long periods of time. Therefore, it is fundamentally necessary "...for scholars to evaluate the historical information in a given oral tradition by

measuring its content, where possible, against other relevant data about the past (Echo-Hawk 2000:272)."

In analyzing the credibility and relevancy of the collected Native American oral traditions, DOI relied on science-based methodology and testable sources of collaborative information when appropriate, while also applying humanistic and qualitative methodologies to investigating the source of the evidence (Anyon et al. 2000:63).

The Colville tribe (2000a:Parts 2A and 2C) identified six published or otherwise recorded oral traditions that they believe demonstrate the presence of their ancestors in the middle Columbia region between 10,000 and 15,000 years ago. These stories include: "Blood Red Lake" (Clark 1953:72), "How Coyote made the Columbia River" (Clark 1953:88), "Legends of Steamboat Rock" (Clark 1953:112), "Origin of the Palouse Falls" (Clark 1953:117; Colville 2000a:Part 2C, recorded by Richard Scheuerman), "The Serpent Monster and Rock Lake" (Colville 2000a:Part 2C, recorded by Richard Scheuerman), "The Animal People's Race and the Palouse Hills" (Colville 2000a:Part 2C, recorded by Richard Scheuerman). They assert the stories describe the immense glacial lakes, floods, and river channels that glacial geologists and geomorphologists have shown through independent evidence to have occurred during this Late Glacial period (e.g., Allen, Burns, and Sargent 1986; Waitt 1980, 1983, 1984). These recorded oral traditions are explanations of modern landscape features in terms of the original creation of these features by mythical animals and other beings. In many of these stories Coyote, a mythical being present throughout the oral traditions, plays an important role.

One example is the story entitled, "The Origin of Palouse Falls", which the Colville Tribe asserts "relates to Missoula Flood era 14,000 years ago (Colville 2000a:Part2)." This is a story about "...four giant brothers and their giant sister..." who were proud of the appearance of their hair and kept it shining with beaver oil (the story itself can be found in Clark 1953:117-118). One day they ran out of oil and went hunting for a giant beaver that lived in the Palouse River. They intend to kill the beaver and use his oil for their hair. The brothers find and attack the beaver, tossing their spears at him. The beaver runs down the river, as he eludes the giant brothers he tears up the river bed creating a series of five small falls, a deep canyon, a series of rapids and another canyon. In the last encounter with the brothers, there is "...the biggest fight of all." In this fight, beaver tears out a big canyon and creates the Palouse Falls as it now exists. In one version of the story, the beaver escapes the brothers, in another, he is killed. This story explains, in the context of the Colville belief in the "Animal People" times, before the creation of the Indian people, how the fluvial and topographic features of the lower Palouse River came to exist. The relationship between this story and the late Glacial geomorphological events is unclear.

Boxberger (2000:46-47) summarizes a similar story about a giant beaver being attacked by brothers and creating the present-day landscape of the Yakima river valley. This story also seems to be set in the time before people since at its very end, after the water that had collected in the river valley behind the beaver's dam was drained and the land dry, the part of the slain beaver were thrown into different regions creating the different present-day Indian tribes.

The oral traditions and individual stories of the present-day tribes are difficult, if not impossible, to place in actual chronological time. In his introduction to a wider collection of oral traditional stories from the region, Jarold Ramsey notes this and attempts to establish a general sense of relative chronology.

...Most of their narratives do seem to be set in one or another of three

loosely defined and overlapping periods—the Myth Age, the Age of Transformation, and the Historical Age. In the earliest of these, the Myth Age, the great primal beginnings took place; there were no human beings yet; the world was peopled with animal-spirits in more or less human form; monsters, freaks, and confusions of nature were abroad, threatening general order. The Myth Age flows into the Age of Transformation, when Coyote or some other transformer went about ordering the world (not necessarily "perfecting"—is it perfect now?), turning animal people into animals *per se* and certain beings into natural landmarks—usually with the unsettling prophecy that "the People" (i.e., the real Indians, like those listening to the story) "are almost here now." The arrival of the People does not seem to mark the end of this crucial period: the stories about Coyote's metamorphosis of the woman-chief Tsagigla'lal into a petroglyph and his oral surgery on the Mouthless People seem in their logic to be set in an age of transformations—unless one assumes that these beings are *not* "the People."

The third age is "historical" only in the sense that its events are not cataclysmic or precedent-setting; transformations still occur but not as a matter of course; the world with its human and animal inhabitants has settled down and pretty much taken on its present reality. Narratives set in this age are really more stories or tales than myths... (Ramsey 1977:xxiv).

The mythical events described in some of the oral tradition stories are set in a time or era that precedes the creation or introduction of Indian people. The stories related to the shape and features of the regional landscape are explanations of how it has come to be so shaped, not descriptions of the actual Late Glacial geological and fluvial events. As described below, large floods and volcanic eruptions have occurred in the region during the last 5000 years. It is possible that the effects of these more recent events were incorporated into the mythical explanations for landscape formations.

Many Indian tribes, and other cultures, have oral traditions or myths about migrations of their ancestors prior to arrival at their historic homeland. Several of the reports and comments on the cultural affiliation investigation state that the tribes of the Mid-Columbia area do not have a migration tradition (Boxberger 2000:40; Moura 2000:3-4; Umatilla Cultural Resource Program 2000:1). This may suggest that the ancestors of the present-day tribes have lived in the region a very long time.

Other cultures, like the Mid-Columbia tribes, have origin stories that do not involve migration. The general origin story of Judaism and Christianity, Adam and Eve in the Garden of Eden, for example, does not involve a migration. Origin stories without migration are not always affirmed by investigations using other independent data. For example, the creation legend of the ancient Greeks described them as the offspring of Hellen, firstborn son of Deucalion and Pyrrha, the parents of all humanity (Drew 1988:3). However, even before archeological investigations showed that the ancestors of the Classical Greeks had migrated into mainland Greece from the north and east between 4000 and 3000 years ago, scholars studying Greek text in the Renaissance inferred a more complex history to the occupation of Greece based upon legendary and linguistic evidence of other peoples who seemed to coexist with the earliest Greeks in the Aegean region (Drew 1988:3-5, 16-45).

Archeological evidence from the Southern Plateau region, at least the archeology that is known today from intact deposits and surface finds, indicates that human occupation there began about 12,000 years ago (Ames *et al.* 1998:103). Cressman (1977:50, 134) suggests some human presence much earlier, about 20,000 years

ago, based upon a single artifact found in gravel deposits on the John Day River associated with glacial Lake Missoula floods. If one accepts the archeological evidence as presently known, there is some actual date at which humans arrived and began to occupy the Southern Plateau region.

The origin stories of the tribes do not provide clear chronological placement for the appearance of Indian people in the region. The tribes are created in different ways. In some stories out of parts of a monster killed and cut up by Coyote and tossed to various parts of the region. In another story, by a supreme being, "Old-One" who has created everything, including the earth itself. The monster and Coyote story has some interesting details that may show how even the origin stories may have been modified in relatively recent times and so be difficult to attribute to ancient events or genesis. The story was cited and summarized by the Umatilla (Umatilla Cultural Resource Program 2000:2-3) and also is printed in Clark (1953:172-175) as "How Coyote Made the Indian Tribes." In the story, Coyote fights and kills the monster, Wishpoosh, after a tremendous fight that stretches from the Cascade Mountains, down the Yakima River, and along the Columbia River to the ocean, modifying the landscape throughout in ways similar to the changes caused by the fight with the giant beaver in the legend of the creation of Palouse Falls summarized above.

After his victory, Coyote cuts up the monster and throws the parts in different directions. The head he threw into what was to become the Nez Perce land and he called, "You shall be skilled horsemen and brave warriors", and during historical times, the Nez Perce showed themselves to be both. However, they only became horsemen in the 1700s, after the reintroduction of the horse into North America by the Spanish. Events mentioned in origin stories may only date back a few centuries or less and such traditions may not remain stable over time (Echo-Hawk 2000:272; Vansina 1985:21-22).

One origin story contains some intriguing, but uncertain references to "people" who already were living on the earth at the time the Indians were created, but were different from them. The story, "Creation of the Animal People" (Clark 1953:83-84), says that these earlier people were "...like the Indians of today except that they were ignorant." In the story, these earlier people do not seem to be the Animal People, who also are described in the story and who lived on the earth at the same time as these other people and also before the Indians were created. In a discussion about this story and these earlier people at the consultation held on 7 July 2000 in Spokane, it was suggested that the reference to these people in the origin story might refer to an actual earlier human population that lived in the Mid-Columbia region before the ancestors of the present-day tribes. In response to this suggestion, Moura (2000:3-4) pointed out that none of the scholars or editors who have assembled collections of these oral tradition stories have suggested that an earlier and different human population lived in the region. However, the reading and analysis of these traditions for historical content also seems not to have been a focus on any previous research. Clark (1953:1-4) had as her goal the collection of authentic and interesting traditional stories; Ramsey (1977:xvii-xxxiii) considered and devised a relative chronology, but his principal interest was in assessing the stories as literature. It may be that a more complete historical evaluation, such as proposed for oral traditions by Echo-Hawk (2000:271-274), based upon the methodology developed by Vansina (1985), would provide a different interpretation.

Linking Oral Traditions to Dated Events

The oral traditions contain references to geologic events such as volcanic eruptions and floods within various river valleys on the Plateau. Such events have occurred with considerable frequency in the Pacific Northwest in more recent millennia, even in recent historical times.

It is widely acknowledged that the Pleistocene terminated with a series of spectacular floods of glacial meltwater from the continental ice sheet and from Glacial Lake Missoula in modern-day western Montana (Allen *et al.* 1986:80, 102). These floods scoured eastern Washington State, creating the Channeled Scabland landscape of coulees and other distinctive topographic features. Forty or more floods are estimated to have moved through the region and along the Columbia River between 15,000 and 12,800 BP (Waitt 1980; Allen *et al.* 1986:103).

The landscape of the Kennewick individual also differed from the modern one, although the differences are certainly less dramatic when compared with the late Pleistocene. Paleoenvironmental research reveals that variations in the timing and amounts of precipitation, coupled with changes in temperature and vegetation cover, have resulted in a cyclical pattern of high and low flood potentials during the Holocene. Flood frequencies in the last 2000 years follow a cyclical, but regular, pattern (Chatters and Hoover 1986:318). For example, virtually every generation that occupied the Plateau during the 400-year period between 980 and 610 years ago experienced a dramatic flood of a magnitude equal to or even greater than the most severe flood of modern times. Large floods have been common experiences during certain periods on the Plateau and it is natural for them to have been incorporated into oral traditions.

Oral traditions that refer to Animal People or other pre-human beings who are described as living in villages (Boxberger 2000:12) are more difficult to interpret. Village settlement pattern did not appear in the region until the development of the Plateau culture pattern, well after the appearance of the earliest human hunters and gatherers. There is no indication of villages 9500-8500 years ago when Kennewick man lived, so these stories would seem to derive from a more recent time.

Summary

This report has summarized and evaluated various kinds of evidence that may be used in evaluations of cultural affiliation under NAGPRA. In particular, this report has examined geographical, biological, archeological, anthropological, linguistic, oral tradition, and historical. The focus in the report is on the kinds of evidence that could be readily found and are relevant for evaluating the cultural affiliation criteria.

The detailed evidence is presented reports prepared by Ames, Boxberger, Hackenberger, and Hunn, and in the additional information submitted by some of the tribes. A number of published sources also have been utilized and are cited and listed in the references section of this report.

In the Kennewick case, the kinds and sources of evidence present various challenges of description and interpretation. The archeological evidence of sites as ancient as the Kennewick remains are relatively rare. A smaller number of sites from very ancient times have been systematically investigated than from later eras. The sites themselves tend to be small and lack dense cultural deposits. The range of artifact types and frequencies of artifacts found is smaller than later time periods. In part, this is a reflection of the cultural adaptation of the human groups living at that time in the area. In part, the pattern observed may be due to destruction of such ancient sites over time and greater decomposition of remains within these sites. Evaluating the historical content and accuracy of oral tradition stories for very ancient times also presents challenges. Use of oral traditions to interpret historical events is not a new approach, but it one that is not as developed in its methods and techniques as some kinds of historical research. Also, the quality of historical information that can be obtained from oral traditions is a matter of debate at present. These qualifications and data problems have been, along with these various kinds of evidence, taken into account in the determination of cultural affiliation for the

Kennewick remains.

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