

Chapter 7

THE DEMOGRAPHY OF PREHISTORIC FISHING/HUNTING PEOPLE: A CASE STUDY OF THE UPPER COLUMBIA AREA

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Abstract: The calibrated radiocarbon evidence reveals a bimodal distribution indicating aggregated and dispersed occupations in the Upper Columbia region of North America. Through examining changes in settlement and subsistence in conjunction with dating sequences, we propose a model of population dynamics and their changing amplitude through time. The correlated lines of evidence suggest that population levels show a relationship to changing economic systems as well as social structures. In this paper we map these changes from forager to collector type economic systems as well as generalized to more complex forms of hunter-gatherer socio-systems

INTRODUCTION

A number of recent reflections on the field of paleodemography (Bocquet-Appel and Masset, 1982, 1996; Meindl and Russell 1998) have pointed out that while issues of mortality and fertility of archaeological populations continues to be a central area of concentration in paleodemography, alternative research has focused on methodological developments, as well as topical subjects such as the migration, distribution, density and age composition of prehistoric peoples. One important methodological challenge relates to how researchers reconstruct paleodemography in prehistoric cases where there is a paucity or absence of burial evidence.

Documenting prehistoric population shifts within the Plateau region of western North America are critical for understanding the emergence of pre-contact social complexity, patterns of population growth and migration in the past, and the impact of Old World illnesses during the historic period. This

research has proven highly complex as prehistoric burial practices generally occurred off site, and as such, there is a scarcity of human remains for archaeologists to reconstruct human health or develop a detailed understanding of demographic changes at the settlement or regional level. Drawing upon radiocarbon dating and site history from several case studies, this paper reflects an exploration of population dynamics from the Upper Columbia area of the Canadian Plateau between 4000 and 500 years ago. We illustrate how the identification of long-term population histories can be accomplished using archaeological research methods to reconstruct the occupational history of residential structures, changing settlement and subsistence strategies, and periods of regional population growth and abandonment.

Results of this study offer interesting implications for our understanding of the relationship between population growth and culture change. Most fundamentally we address the long debated issue (e.g. Cohen, 1981; Croes and Hackenberger 1988; Rosenberg, 1998) of whether population growth, in a sense, forces change in fundamental subsistence strategies and consequently in other elements of culture. Our results suggest that some simplistic notions need to be reconsidered.

THE UPPER COLUMBIA AREA OF THE CANADIAN PLATEAU: REGIONAL BACKGROUND

The Upper Columbia River drainage extends from Kettle Falls in the south to the Upper Arrow Lake in the North. This includes the Lower Kootenai and Slocan River drainages (Figure 1). The Upper Columbia drainage contrasts significantly with that of the Middle and Lower Columbia in several ways. First, from an environmental standpoint, this landscape features substantially forested contexts including a substantial interior rainforest. Second, human adaptations in this area were often quite different from those in nearby regions of the Plateau. Ethnographic research documents a complex hunter-gatherer society (Lakes Salish or Sinixt) whose primary subsistence resources included not just salmon and roots, but a high investment in larger game including mountain goat, bighorn sheep, and elk. No other Eastern Plateau society exhibited the same degree of cultural complexity as that of the Sinixt. As this study demonstrates, densely aggregated communities appear to have emerged in this area more than once implying cycles of aggregation and possible socio-economic complexity. The following analysis seeks to review current cultural chronologies developed for the Kettle Falls, Arrow Lakes, and Slocan areas and then



Figure 1: Map of the Upper Columbia area, British Columbia Canada and the Northwest US

to develop a comprehensive understanding of demographic change for the region based upon archaeological data primarily reflecting settlement and subsistence behavior, but also considering limited indicators of variability in social organization.

Archaeological research in the Kettle Falls area provides a relatively well-understood cultural sequence for the prehistoric past (Chance and

Chance 1977, 1979, 1982, 1985). Other research has resulted in an understanding of the cultural historical framework for the Upper Columbia Drainage and Arrow Lakes area (Turnbull, 1977; Mohs, 1982; Rousseau, 1982, 2004; Eldridge, 1984; Goodale et al., 2004). Cultural historic frameworks for the area have been constructed based on stylistic changes in artifacts, pithouse morphologies and their arrangement on the landscape. This section presents the Arrow Lakes chronology from Turnbull (1977), the Slocan Valley variants of Mohs (1982), Rousseau (1982), and Eldridge (1984), and recent additions by Prentiss et al. (2001) and Goodale (2001).

The first substantial evidence of settlement in the Arrow Lakes Region has been assigned the Deer Park phase (Turnbull, 1977) or the Winlaw phase (Mohs, 1982; Eldridge, 1984) and dates to 3500–2450 BP. This represents the first period in the area when people started to live in semi-subterranean dwellings known as pithouses. These houses were built by excavating a circular area, building a support framework of large and small timbers, and eventually covering it with smaller timbers radiating from the center. Lastly, the builders covered the wood sections with soil, hides and matting (Figure 2). The housepits contained in this phase follow a distinct distribution along the immediate river and lake-shores in a linear fashion. The housepits excavated by Turnbull and Mohs assigned to this phase are small in size ranging from 7–10 meters in diameter. However, the Slocan Narrows Site (DkQi 1) has revealed two large houses that measure 16 meters and 22 meters in diameter which date to this time period (Prentiss et al., 2001).

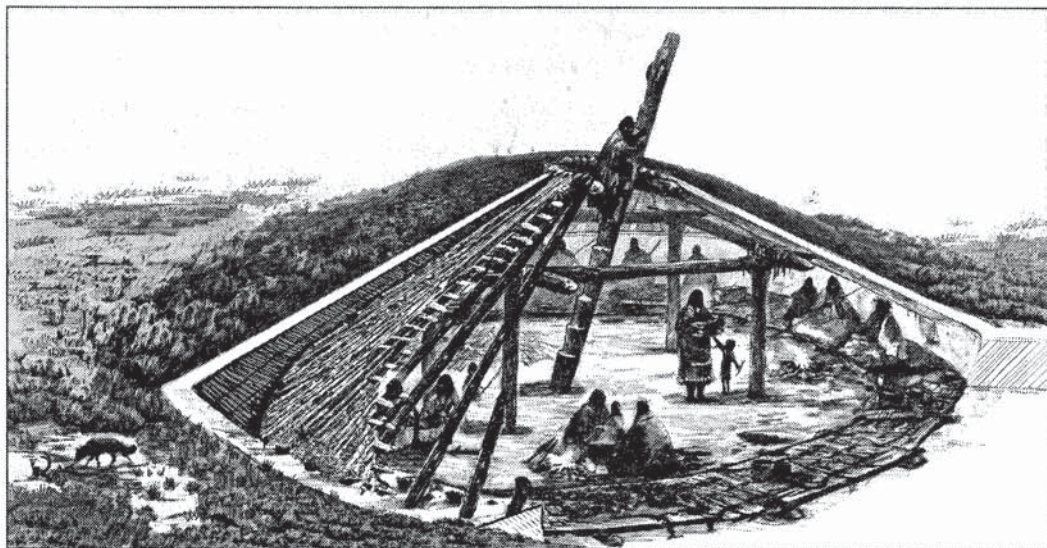


Figure 2: Artist reconstruction of a plan view of pithouse

The housepits found in the Upper Columbia dating to this time period are circular to oval in plan and Mohs (1982) describes them lacking raised earth rims. This may only be a characteristic of small sized housepits because the large house at DkQi 1 has an obvious raised rim. Mohs (1982) also notes that the Deer Park/Winlaw cultural phase is not well represented at the Vallican site. As is outlined later, the early occupation at the Slocan Narrows site provides the best example of pithouse architecture from this early phase. The Slocan Narrows site contains over 40 housepits, featuring two clusters of exceptionally large houses, many of which could date to this early time frame.

The lithic tool assemblage of the Deer Park/Winlaw phase is marked by the presence of medium-sized stemmed and shouldered projectile points that are similar to Shuswap horizon points of the Fraser-Thompson Plateau area (Richards and Rousseau 1987; Rousseau, 2004). The most frequently recovered raw materials include Kootenay argillaceous chert, siltstone, schistose, mica-quartzite, and basalt. The lithic assemblage at the Slocan Narrows site associated with this cultural phase is very limited. Faunal remains are limited to unidentifiable mammal with fish and shell completely absent. This is primarily due to acidic soils.

The next cultural phase in the Upper Columbia region is the Vallican phase dating to 2450–1250 BP. Housepits average 11 meters in diameter from the Vallican site (Mohs, 1982). No housepits associated with this time period have been discovered at the Slocan Narrows site or in the Turnbull (1977) excavations. Diagnostic lithic artifacts include corner and basal notched points and crescent or key-shaped scrapers/perforators. This stylistic variation in the lithic technology is similar to the later Takumakst and early Sinaikst periods at Kettle Falls, the Okanagan Chiliwist phase (Grabert, 1974), and the Plateau horizon of the Fraser-Thompson region (Richards and Rousseau 1987; Rousseau, 2004). Vallican phase artifacts differ from the Takumakst in quality of stone working. The Takumakst period in the Kettle Falls Region contains hastily made lithic tools whereas the Vallican phase features high quality tools and exotic goods such as nephrite adzes. Although no housepits dating to this time period were found at the Slocan Narrows site, numerous (relative to the lithic assemblage size) Plateau horizon style projectile points were recovered in addition to one key-shaped scraper. Faunal remains are rare for reasons discussed previously. However, when they are recovered, assemblages include mammal bones and the shells of freshwater mussels (Mohs, 1982).

The final cultural phase that was defined by Mohs (1982) and Turnbull (1977) is termed the Slocan Phase and dates from 1250 BP to

Contact. The housepits that date to this time period have been excavated at the Slocan Narrows and Vallican sites. The houses excavated at the Vallican site average 8.7 meters in diameter. However, there is variability with medium and small sized pithouses occurring together. This average was determined by the data set provided by Mohs (1982) and only includes those cultural depressions with a diameter greater than 5.0 meters. The second occupational phase of Housepit 1 at the Slocan Narrows site (DkQi 1) dates to this time period suggesting that very large houses (e.g. 16 meters in diameter) do date to this phase. This phase employs a wide variety of pithouse styles including circular, oval, and rectangular outlines with top and side entrances. Cache pits are also used during this time and are external to the housepits along with extramural hearths and activity areas.

Lithic artifacts of the Slocan phase include small side-notched points, occasional Columbia corner-notched points, and frequent groundstone items (Eldridge, 1984; Mohs, 1982; Rousseau, 1982). These points are characteristic of the Kamloops horizon on the Canadian Plateau (Rousseau this volume). However, the Kamloops multi-notched variety has remained undiscovered in the Slocan Valley and Upper Columbia Region. The material culture during this time also closely resembles materials recovered in the Kettle Falls area.

METHODS FOR TRACING PREHISTORIC REGIONAL DEMOGRAPHY: CONSIDERING ADAPTIVE PATTERNS

Expanding upon existing regional chronologies, in this section we consider how a detailed consideration of broader adaptive patterns helps researchers understand regional and local demographic cycles. The following analysis provides a first step towards defining temporal variability in human adaptations in the Upper Columbia, similar to that undertaken by Chatters (1995) for the middle and lower portions of the Columbia and Snake River basins. The data used in this analysis are derived from 116 ¹⁴C dates from the published and unpublished literature for the area (see Goodale, 2001; Goodale et al., 2004 for more detailed consideration). These dates are representative of pithouse occupations, root processing ovens, cultural earthworks, storage features, hearths associated with non-residential sites, and dated faunal assemblages. Each date was calibrated via CALIB 5.0.1 and then plotted with respect to the date's mean age by a series of graphs presented below. A strict review of provenience was conducted in order to assess which dates were appropriate for this data set. Dates that

were not used either lacked adequate provenience data or were considered to be associated with other unrelated cultural or non-cultural events (i.e. rim dates from pithouses). As originally defined by Stryd (1973:76), we grouped pithouses based on size where small houses are < 10m, medium houses are > 10–< 15m, and large houses are > 15m in diameter.

We employ the calibrated dates to examine changes in patterns of socio-economic change and demographic cycles of the prehistoric inhabitants of the Upper Columbia. Needless to say, any reconstructions of paleodemography balance fine-grained analysis aimed at investigating local and regional variation in the tempo of life-ways (see Crombé and Van Strydonck 2004; Gkiasta et al., 2003; Steele et al., 2004 for one example of this debate). Depending upon the interests of researchers, attention is often split between consideration of demographic tempos vs. the methods employed in reconstructing them. In this essay we look at the distribution of ¹⁴C dates from multiple site and feature contexts and we have developed preliminary proxy measurements of settlement and subsistence behavior and population densities. This analysis helps us trace regional processes of population growth, aggregation, and dispersal through six distinct phases.

DATA PATTERNS

Pithouses (N = 24)

In the Upper Columbia Region the first housepits appear ca. 3400–3200 cal BP. (Figure 3). The early houses, dating between 3400 and 1800 cal BP, range in size from small to large. The Slocan Narrows site contains 16 and 22 meter diameter houses, dating prior to 2700 cal BP, which are the largest housepits recorded on the Plateau at this early date. Between 1200 and 200 cal BP the greatest concentration of occupations occur as small, medium, and large housepits. In this region, small housepits occur between 3400 and 600 cal BP, medium housepits occur between 3400 and 200 cal BP, and large housepits occur between 2800 and 600 cal BP.

Root processing (N = 65)

In the Upper Columbia Region the root processing record begins at ca. 6200 cal BP. The dated root processing ovens were obtained entirely from sites in the southern part of the study area at Kettle Falls and in the Calispell Valley (see Andrefsky et al., 2000). The interval from 6200 to 3800 cal BP

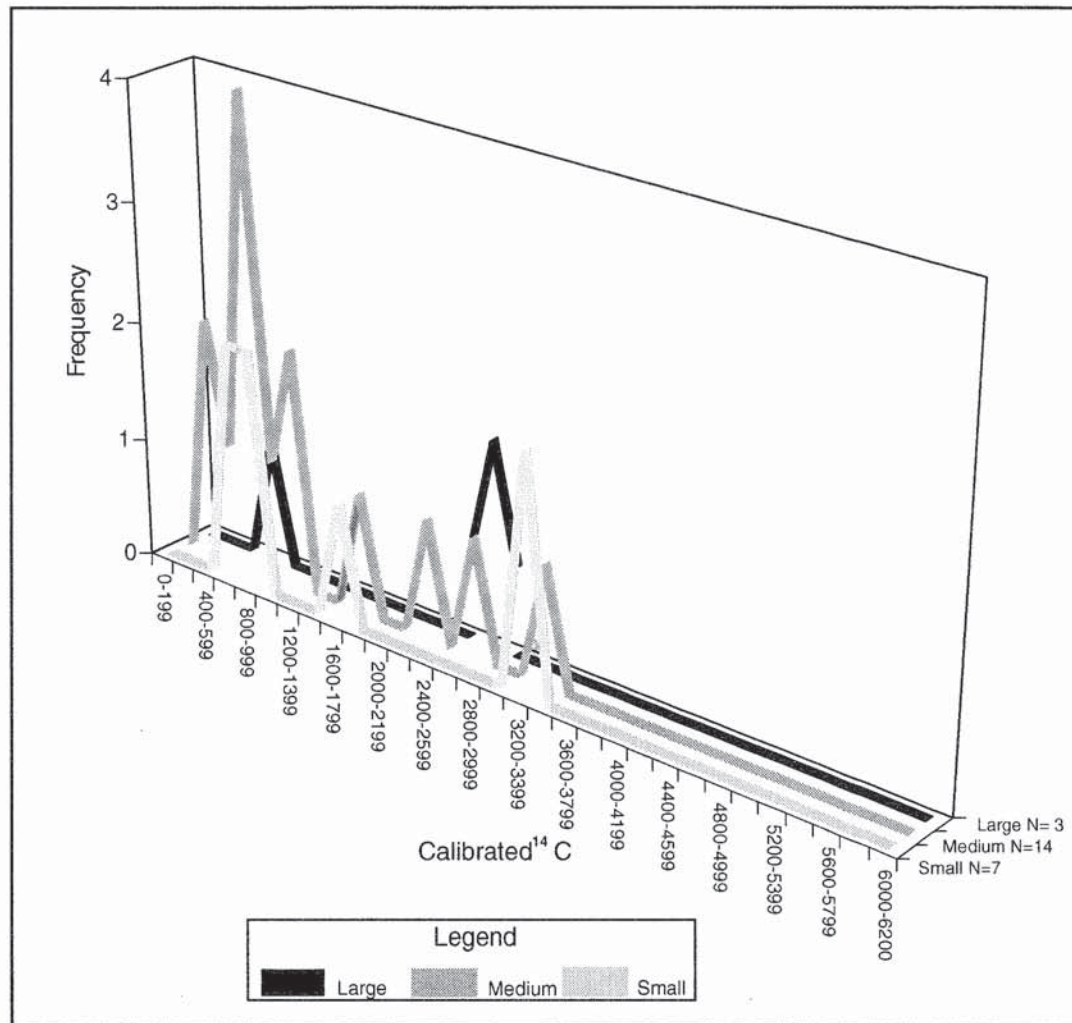


Figure 3: Pithouse occupation by mean of calibrated date

is characterized by limited use of root processing ovens (Figure 4). Two periods of intense root processing appear to correlate with increasing use of pithouses after ca. 3800 cal BP. The first peak in oven frequencies occurs at ca. 3800 cal BP and continues until 2400 cal BP, and the second occurs between 1200 and 600 cal BP.

Storage pits (N = 5)

The calibrated data for the use of storage pits in the Upper Columbia is very limited. The storage pit features that have been dated for this region may have been used for storing edible plants such as camas, but much further research is needed to fully understand variability in storage technologies in this area. All

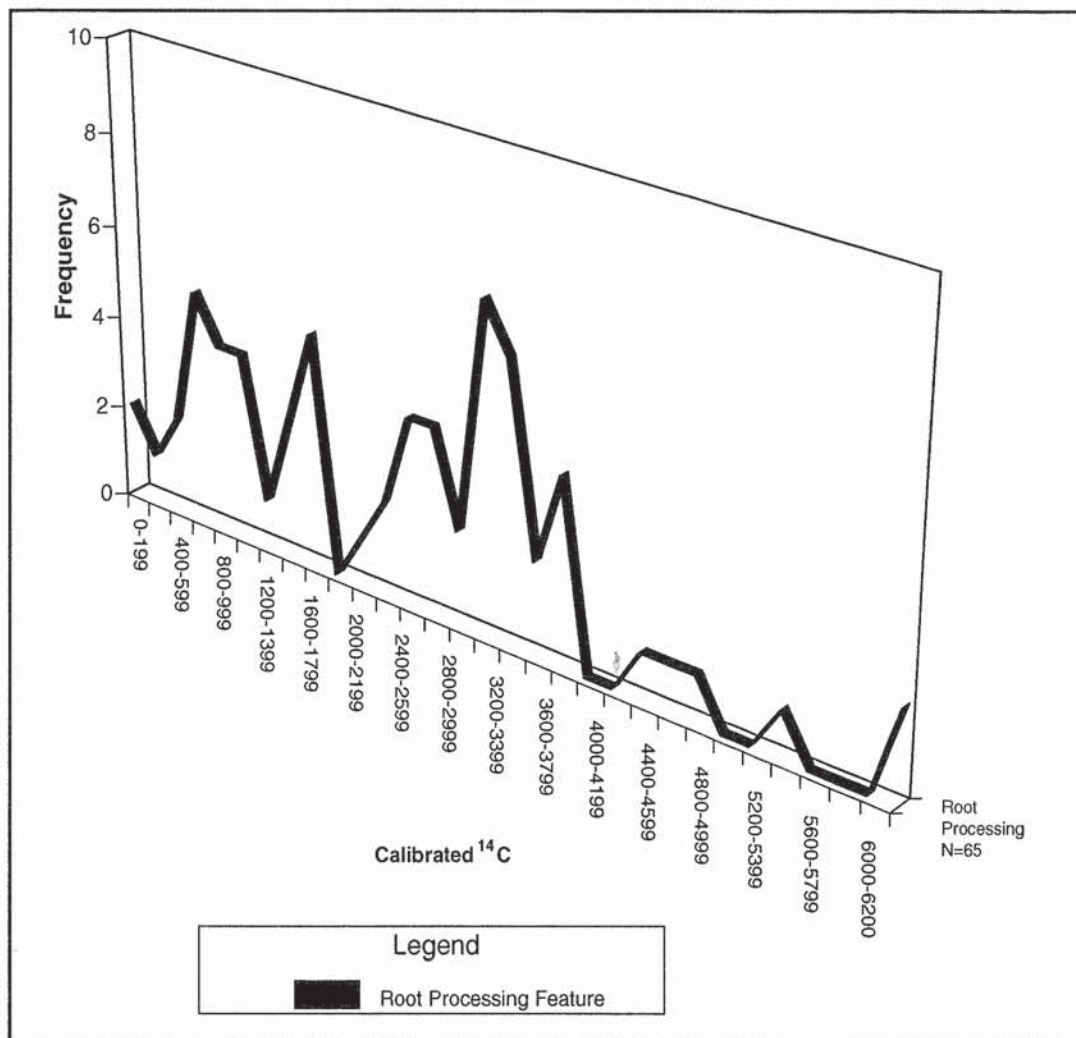


Figure 4: Root processing use by mean of calibrated radiocarbon date

dates come from sites in the Kettle Falls and Calispell Valley areas. Storage pit features occur during the same intervals as that of the most frequent indicators of root processing. Pit features contain a variety of stone tool artifacts, mammal bone and some camas root remains (Andrefsky et al., 2000).

Cultural earthworks

Cultural earthworks have been identified at the Slocan Narrows and Vallican sites in southeastern British Columbia ($N = 4$). Cultural earthworks appear in the late prehistoric during 800 to 0 cal BP. These dates bracket the earliest and latest times for possible construction of these features. Earthwork functions are not well understood. A 60 m earthwork at the Slocan Narrows

site (Prentiss et al., 2001) may have been used for defensive purposes. Platforms at the Vallican site may have had defensive functions as well, though other functions, such as house platforms, are also possible. It should be noted that the appearance of these features corresponds with changes in aspects of environment and behavior corresponding to onset of the “Little Ice Age” and a decline in root processing activity.

Non-residential sites (N = 17)

The dates of hearths from contexts inferred to be non-residential (not from pithouse sites) in nature show a bimodal distribution (Figure 5). The first peak occurs between 3600 and 2200 cal BP and the second occurs

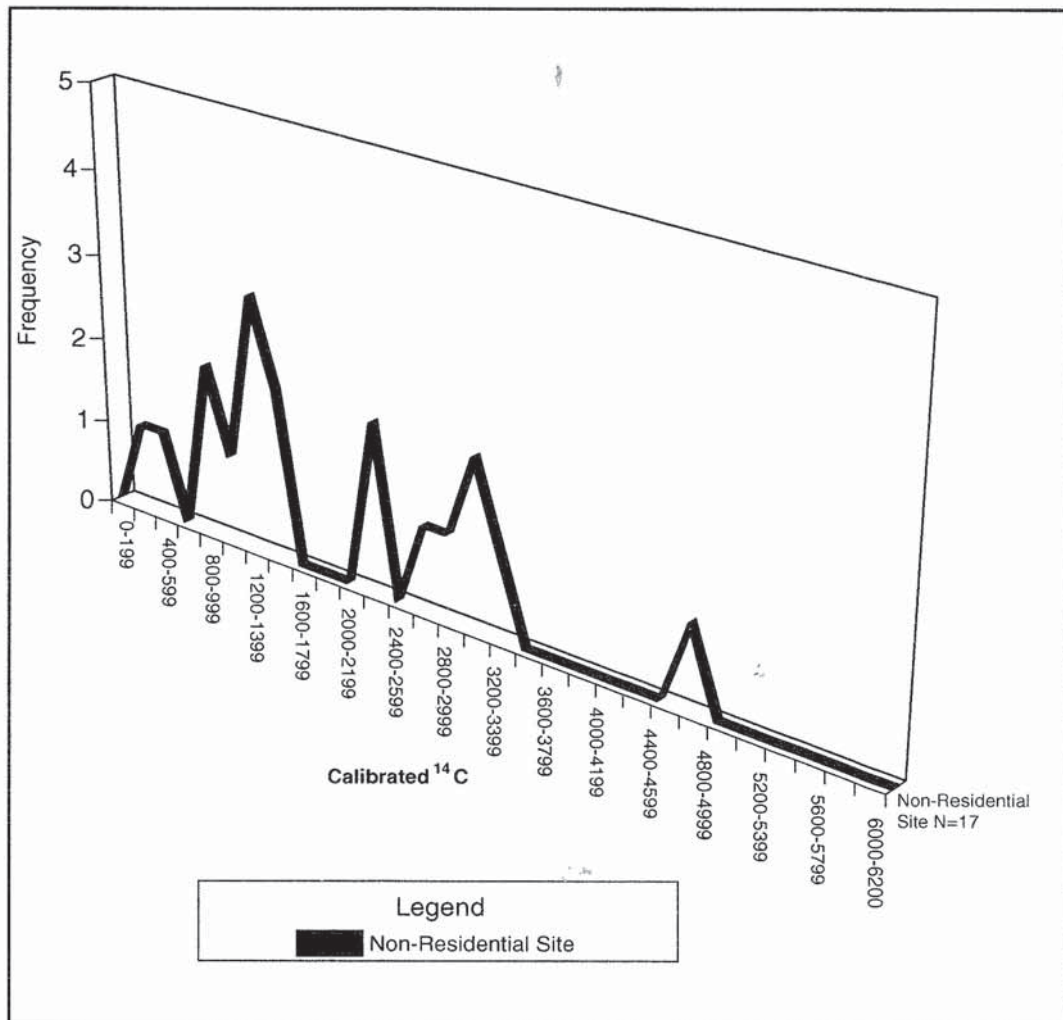


Figure 5: Non-residential site use by mean of calibrated radiocarbon date

between 1600 and 0 cal BP. These intervals correspond to a temporal peak in pithouses, storage pits, and root processing ovens.

PREHISTORIC DEMOGRAPHIC CYCLES IN THE UPPER COLUMBIA

The calibrated evidence provides evidence for shifting paleodemographic patterns among prehistoric hunter-gatherer-fisher groups living in the Upper Columbia Region. Six intervals appear to be evident during the past 6200 years of occupation (Figures 6 and 7, Table 1). Most obvious

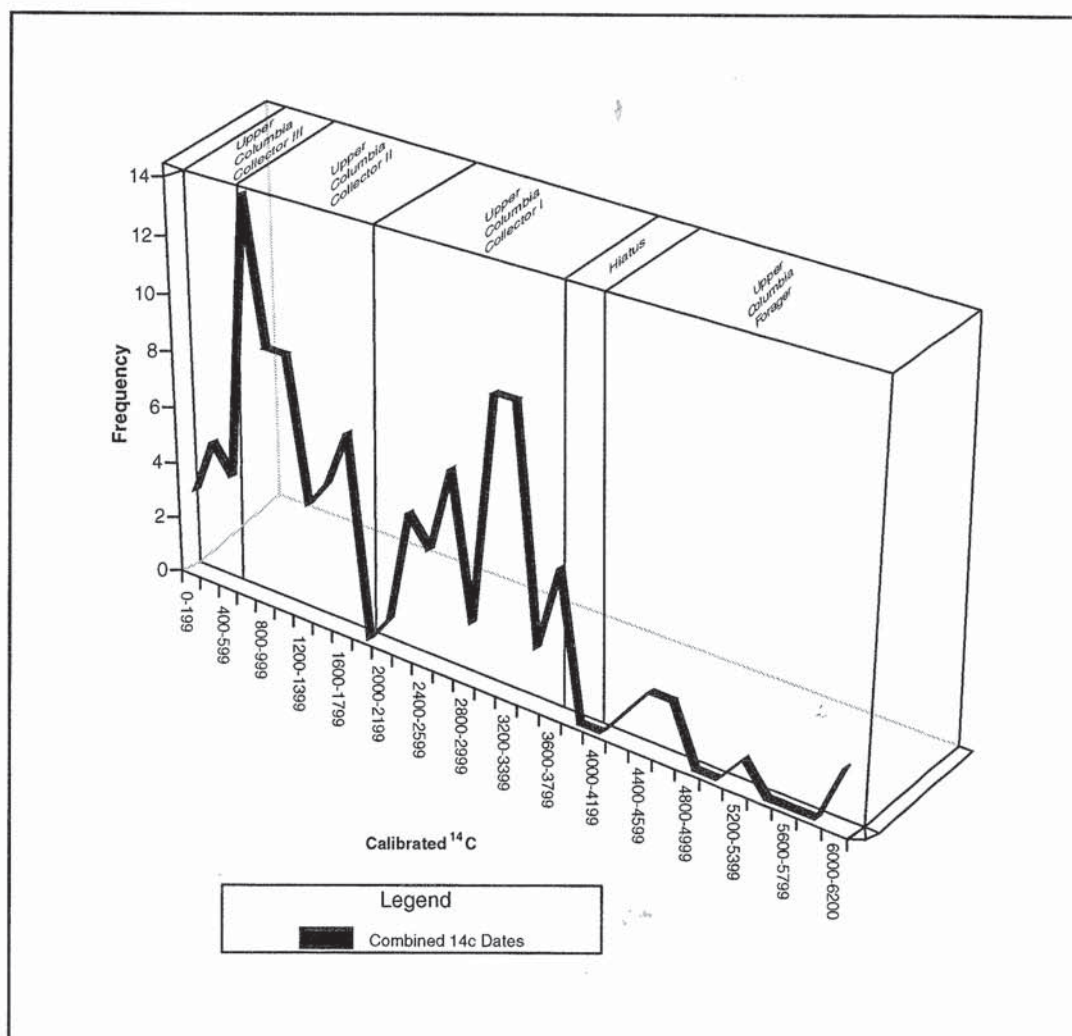


Figure 6: Combined calibrated radiocarbon data incorporating housepits, root roasting features, non-residential sites, storage pits and cultural earthworks

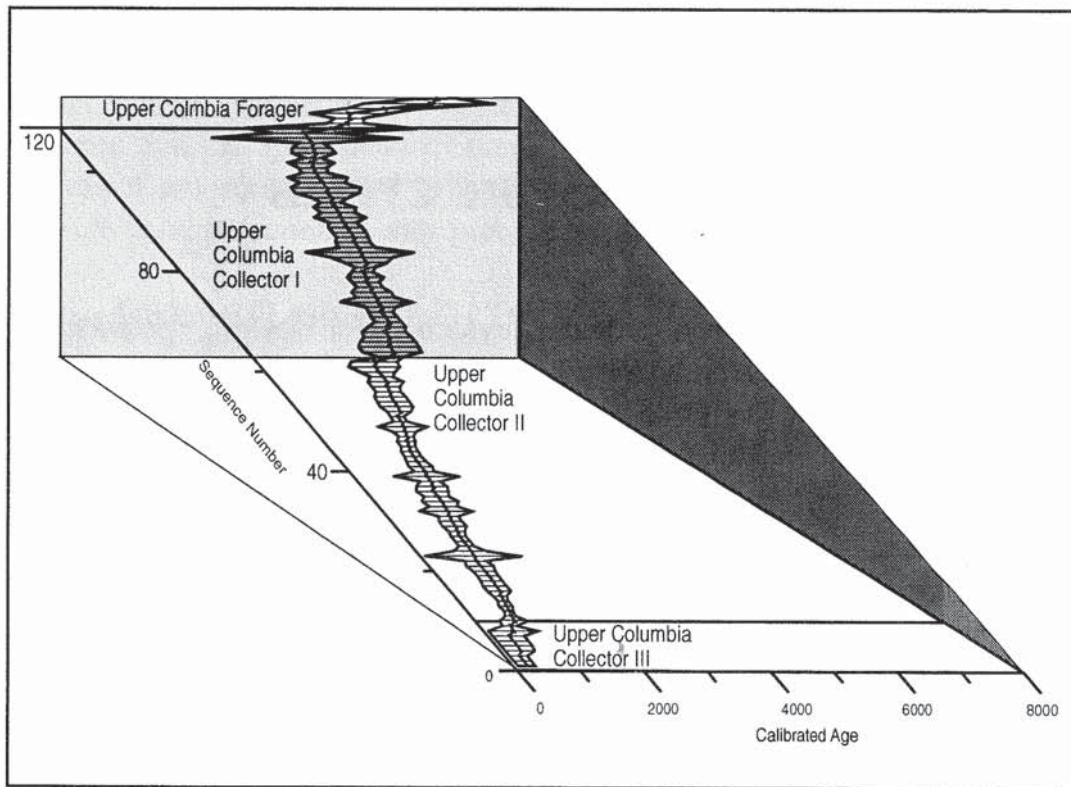


Figure 7: Dates by calibrated means for the Upper Columbia sequence. Each Date is represented by a mean (black dot) with the two sigma range (line). Note the comparison to Figure 6 where the start and end of each phase is also highlighted in this graph by large deviations of the means with breaks between Forager to Collector I, Collector I to Collector II and Collector II to Collector III

are the two periods of increased sedentism and population growth, illustrated by increased pithouse construction and root intensification (see also Thoms, 1989), followed in each case by indicators of population dispersal and possible subsistence extensification (e.g. Morrison, 1994).

Table 1: Adaptive interval and site density in the Upper Columbia

Adaptation	Total Time in Years	# of Sites	% of Sites	Site:Year
Forager	2000	4	9.5%	1:500
Hiatus	400	0	0%	0
Collector I	2000	15	35.7%	1:133.3
Collector II	1200	15	35.7%	1:93.3
Collector III	500	8	19.0%	1:62.5
Total	6100	42	100%	42:6100

In describing these processes, we employ Binford's (1980) terminology (collectors and foragers) throughout this discussion as a means of conveying our understanding of the most likely and frequent mobility and subsistence strategies employed by hunter-gatherers of each phase. Briefly, foragers harvest a broad range of food for immediate use but employ very little to no food storage. In most ethnographic cases their residential groups are small and movements on the landscape are frequent. Archaeological indicators include small camps with impermanent residences and resource procurement locations (hunting/butchering sites for example). The Pithouse I phase on the Mid-Columbia, however, is an exception to the high mobility assumption since they appear to have been sedentary foragers using small pithouses (Chatters, 1995; Chatters and Prentiss 2005). In contrast, collectors target specific species of plants and animals (e.g. salmon) for mass harvest and rely heavily on food storage. They tend to be less residentially mobile, but often employ high degrees of logistical mobility or special task group movement associated with targeted resources. Their archaeological signatures include camps and villages that are occupied for longer periods (e.g. winter villages on the Plateau), logistical camps, caches, and resource procurement locations.

Prentiss et al. (2006) have argued that a variant of the collector strategy, termed "complex collectors," developed exceptionally large houses co-residentially occupied by multiple family units (corporate groups per Hayden and Cannon 1982). This strategy, originating on the central Northwest Coast and perhaps elsewhere, may have offered advantages to larger human groups in areas of very patchily abundant food resources (e.g. Kettle Falls, Slocan Narrows) via the ability of house groups to simultaneously harvest multiple food resources while guarding access to those most critical such as fishing sites. It is within the complex collector strategy that we see the highest degrees of socio-economic complexity across the Pacific Northwest region.

Initial peopling and adaptation—the upper Columbia Forager (6200–4200 cal BP)

The Upper Columbia Forager represents a high mobility forager adaptation that is suggested by the lack of evidence for any permanent residential structures. This period contains dates for the first use of root processing in the Upper Columbia Region and is represented by six dates in the Calispell Valley: five dates from 45PO139 and one date from 45PO141. Roots seem to have been a fairly stable resource base during this time and were probably used in a limited manner. The Upper Columbia Forager

period also contains one date from the Fishery site in the Kettle Falls area that is in association with a non-residential site. This period represents a “forager” adaptation similar to the Middle Holocene Nesikep tradition of the Canadian Plateau and the Cascade phase in the Columbia Plateau (Chatters, 1995; Prentiss and Chatters 2003a; Stryd and Rousseau 1996).

Regional and local abandonment—“Hiatus” (4199–3800 cal BP)

Available radiocarbon evidence indicates that there was a brief occupational gap between earlier forager and later collector adaptations. This hiatus temporally corresponds to a similar pattern throughout the Canadian and Columbia Plateaus (Chatters, 1995; Prentiss and Kuijt 2004; Rousseau, 2004). While some of this can be partially explained by the presence of a “flat place” on the radiocarbon curve at 3950–4050 cal BP (Stuiver et al., 1998), the abandonment period is spread across a wider time span and the pattern is seen across the entire Plateau region. Thus, it appears that there was an occupational hiatus of several hundred years shortly after ca. 4200 cal BP.

Renewed population growth and sedentism—the upper Columbia Collector I (3799–2000 cal BP)

The Upper Columbia Collector I represents the first of two peak occupational horizons and the advent of the collector-type system in the Upper Columbia. The first semi-subterranean pithouses were established and occupied during this interval and vary in size from small to large. Housepits dating to this time are found in single or low density clusters in the Upper Columbia landscape and is generally representative of a dispersed collector adaptation. The Slocan Narrows site may provide an exception to this pattern since it contains two clusters of extremely large houses, two of which now date to this time frame (Prentiss et al., 2001). Further research could demonstrate an early aggregated community in this context. The first indicators of intensified camas root processing occur in conjunction with an expansion in the frequency of storage pits. Faunal and floral data are still lacking at this point, but given the presence of dispersed and possibly occasional aggregated pithouse communities in optimal fishing locations, evidence for camas intensification, and the use of storage tactics, this period likely marks the beginning of the dispersed generalized collector adaptation in the Upper Columbia. It is, moreover, concurrent to similar behaviors at

the advent of Pithouse II (Chatters, 1995, 2004) and the Shuswap horizon (Richards and Rousseau 1987; Rousseau, 2004).

Shifting systems—“Hiatus” or transition?

Between the Collector I and Collector II adaptations there is a decline in frequencies of radiocarbon dates. Although this could be explained, at least in part, by sampling bias, a similar pattern has been recognized by Chatters (1995) for the entire Columbia Plateau. This suggests the possibility of short-term population decline and/or significant alteration of basic residential mobility patterns reducing group visibility in the region prior to the advent of the next broad adaptive period. Clearly further research is required into this important but little understood period.

Aggregate villages and social complexity—the upper Columbia Collector II (1999–600 cal BP)

The Upper Columbia Collector II corresponds to a second high-density occupation of the Upper Columbia. Archaeological evidence exists for the emergence of aggregated housepit villages by ca. 1200–600 cal BP. Large sites, such as Vallican, Slocan Narrows, and Ilthkoyape, feature the highest density clusters of houses in all size ranges. Unusually large houses within large villages may reflect the appearance of the complex collector strategy. This period also corresponds to the late peak in root processing and storage pits. Hearths associated with non-residential sites also peak at this time. Some of these could be the consequence of logistical or task group mobility strategies. Specialized sites such as the Fishery at Kettle Falls (45ST94) clearly reflect specialized resource harvesting strategies, typical of collectors (Chance and Chance 1977). Intensified harvesting of shellfish is also known from the Vallican site (Mohs, 1982). Faunal remains from 45PO137 in the Calispell Valley, demonstrate continuous use of both fish and mammalian resources during this time with a relatively more intensive use of mammals over fish.

Dispersal and decline—the upper Columbia Collector III (599–100 Cal BP)

The beginning of this interval corresponds to the start of the Little Ice Age (Pielou, 1991) and marks the expansion of glaciers in high altitude contexts of the Rocky Mountains and Cascade Range. This interval is characterized

by a decline in the frequency of radiocarbon dates. Housepit occupations are, however, still present and medium sized structures dominate the record. The use of root processing ovens appears to decline and may be consequent to the onset of the “Little Ice Age” and the associated effects on the availability of resources in some areas (Prentiss and Kuijt, 2004). During this time, cultural earthworks appear in the archaeological record. If these features do reflect heightened attention to territorial defense it could be linked to an increasingly patchy environment brought on by cooler conditions. Interestingly, warfare increases in many other areas of western North America during the final several hundred years of the prehistoric period and into historic times (Chatters, 2004). Burials from the Vallican site highlight the distinct presence of complex social organization. Burial two for example, included an infant and a fetus, wrapped in animal skins, interred with 2102 glass trade beads, 138 rolled copper tube beads, 595 dentalia shell beads and pendants, 59 drilled elk-tooth pendants, 16 perforated copper slate pendants, 9 copper alloy buttons, 3 copper alloy rings, one iron pendant, one coiled copper tube bead, and various other small items (Mohs, 1982). Clearly this reflects a high degree of material investment in the status of children. Overall, these data highlight a generally reduced or at least more dispersed population, yet increased attention to marking of territory and social status, particularly during the early historic period.

PALEODEMOGRAPHIC CYCLES OF THE PLATEAU: TESTING THE DEMOGRAPHIC MODEL

In conjunction with other synthetic studies from other regions (most notably Andrefsky, 2004; Chatters, 1995; Rousseau, 2004) the data presented above have allowed us to reconstruct cycles of demographic change. First, populations appear to have strongly increased and declined twice in the past 4000 years. This pattern appears to correlate with the emergence and decline of aggregated pithouse communities and various markers of socio-economic complexity. It must be made clear, however, that the radiocarbon record may reflect actual population dynamics as well as a sampling bias due to researchers focusing on the most archaeologically visible sites. If the data do reflect population dynamics, then this has some interesting implications for our explanations of cultural variability as well as corresponding changes in socioeconomic systems. Second, it is now clear that at some periods select local and regional areas were abandoned. Chatters (1995), Prentiss and Chatters (2003a), and Prentiss and Kuijt (2004)

assert that near to total abandonment of many parts of the Plateau occurred at ca. 4000 cal BP. These researchers argue that abandonment was associated with climate change and cultural maladaptation and may have opened the region to an influx of populations from the Northwest Coast with new adaptations (namely the collector system). Data presented in this study support arguments for abandonment at this period and, to a lesser degree, ca. 1800–2000 cal BP as a period of low population. We test these ideas with three additional analyses now emphasizing site frequencies, patterning in 2 sigma calibrated radiocarbon date ranges, and growth of a specific village.

Population dynamics

The percentage of radiocarbon dated sites is roughly equal to the percentage of sites occupied for each given adaptive interval. We assume, based on evidence presented in Goodale (2001), that higher site frequency reflect higher population densities. The highest density of occupied sites is seen with the Upper Columbia Collector I and II, with relatively lower densities during the Collector III adaptation, and even lower during the Forager adaptation. Interestingly the site density for the Collector I and II are roughly the same. However, merely counting the frequencies of sites in each interval is an insufficient test. A more accurate approach is to consider the relationship between total time span in each interval and frequencies of sites (Table 1). The data from this analysis suggest generally low populations during the Forager and Collector I periods, followed by a substantial increase during Collector II and III. Further, despite seemingly reduced frequencies of aggregated pithouse villages and root-roasting and storage pits, these data suggest that Collector III may have not have featured significant population reduction, but merely a more even pattern of dispersal on the landscape.

Abandonment and change in the Upper Columbia: Analysis of calibrated dates

Another way to understand regional demographic changes is to assess patterning in calibrated dates at two-sigma (95% confidence interval) error ranges. Points where major adaptive change occurred which were accompanied by breaks in occupation sequences should be recognizable as significant disjunctions in the radiocarbon record. Figure 7 illustrates the full range of calibrated dates ($N = 116$), plotted and coded by cultural interval. This picture reveals a fairly continuous distribution spanning 7,200 to 0 cal

BP. This is especially evident during the Collector I, II and III intervals where the centroids (means) overlap in many instances. A couple of exceptions occur. First, between the Forager and Collector I adaptations, the high two-sigma range of the youngest Forager date and oldest Collector I date explain the overlap. Although this may be partially explained by variability in the calibrated radiocarbon curve, comparisons with data from others areas of the Plateau (Chatters, 1995; Prentiss and Kuijt 2004) still support the possibility that a significant population reduction or even full abandonment occurred during the period of 4,200–3,800 cal BP. Second, there is another break during the transition from Collector I to Collector II. This would be a major disjunction if not for the presence of a single date from a root-roasting pit considered for purposes of this study to be the final event in the Collector I sequence. The time period from 2,200 to 1,800 cal BP appears to represent some form of cultural transition, perhaps associated with a brief population dispersal. However, the radiocarbon record does not appear to reflect abandonment. Chatters (1995) recognizes a similar pattern on the Middle Columbia and Lower Snake. Finally, there is a continuous overlap of dates associated with the transition from Collector II to Collector III. This supports the argument that no major population disjunction occurred between Collector II and III. It appears likely that there was little cultural change between these intervals other than in the scale and frequency of large group aggregation in pithouse communities.

Aggregate villages: scale of communities as seen at Slocan Narrows

To really understand paleodemographic patterns on the Canadian Plateau, as well develop insights into the process behind these changes, it is important to consider the settlement and cultural context within which the radiocarbon data were recovered. This is especially important in understanding the emergence and reuse of large aggregate villages at select points of prehistory. To contextualize the radiocarbon analysis results we want to briefly turn to excavation data from the Slocan Narrows site, located in south-central British Columbia, Canada. While there is considerable regional variation, the broad demographic pattern observed at this site is generally representative of other local sequences, and provides insight into regional shifts.

The Slocan Narrows site represents the largest and most northern aggregate pithouse village site in southeastern British Columbia (Figure 8). There are over 40 pithouses located in a spatially restricted area. Excavations conducted in 2000 on multiple pithouses along the Slocan Narrows illustrates

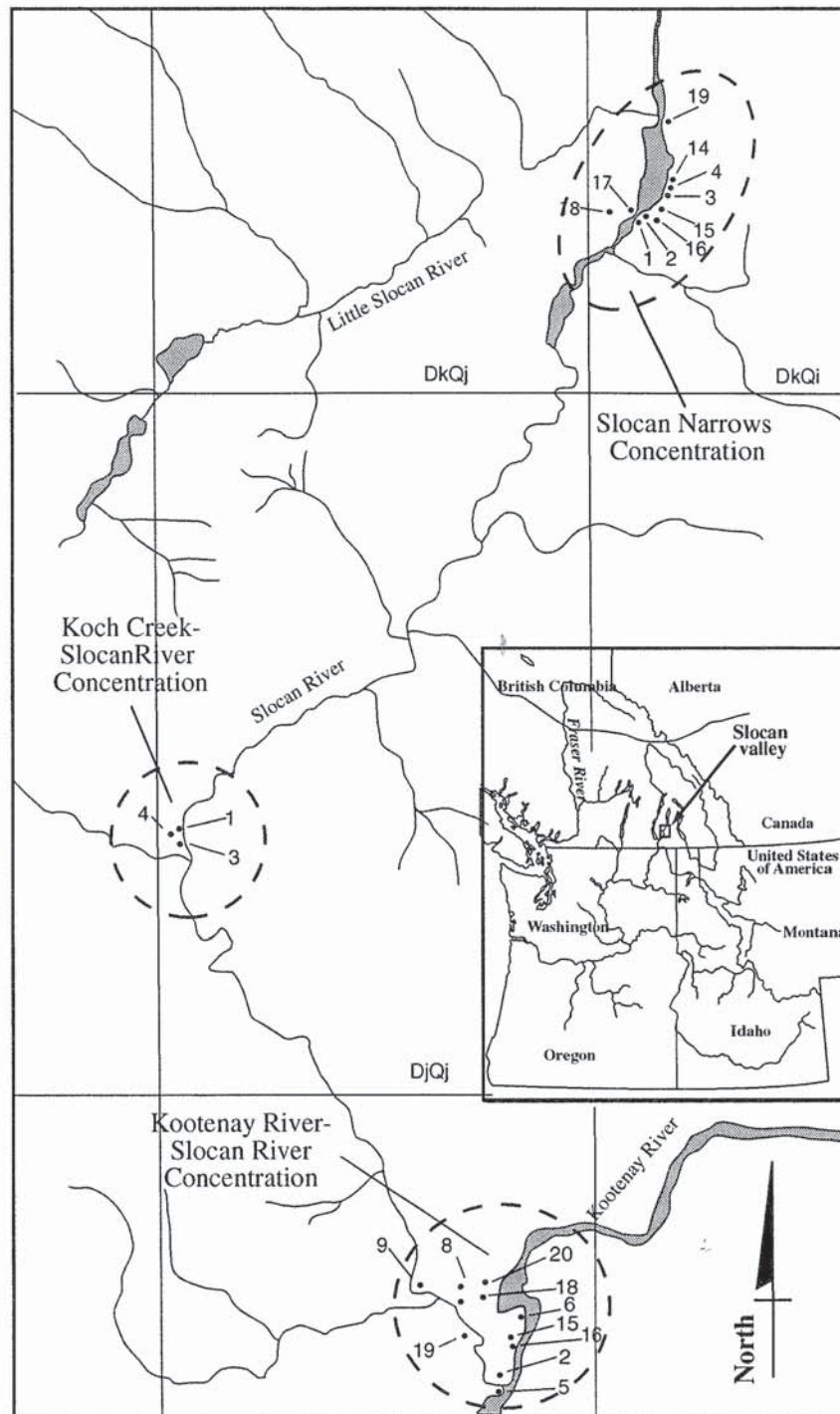


Figure 8: Map of Slokan Valley and clustering of known archaeological sites at select choke points

that this area was among the earliest hunter-gatherer-fishing occupations of the Canadian Plateau (Prentiss et al., 2001; Goodale et al., 2004). Radiocarbon and stratigraphic evidence, moreover, illustrates that the site was occupied in multiple prehistoric periods. For example, Housepit 1, a large pithouse on the southern edge of the site was originally constructed and occupied at 2,650+/-70. Similarly, a radiocarbon date for the Housepit 2 floor of 2,724+/-48 indicates that this large pithouse was occupied at approximately the same period. If representative of the entire site, this suggests that the first occupation at Slocan Narrows consisted of large pithouses, and by extension, required considerable labor of large social groups. It appears that many of the pithouses were then reoccupied at later points. While broader sampling is needed to understand the details of the regional sequence, preliminary results indicate that between 700–850 years ago there was a second phase of significant population aggregation in this area. For example, the upper cultural B horizon of Housepit 1 is dated to 710+/-70. Housepit 2 and 5 contain a complex sequence of sediments, which includes the cultural B horizon within Housepit 5, redeposited terrace material within the Housepit 5 rim, floor materials within both houses and sub floor terrace gravels and sand. A burned post from the floor of Housepit 5 was dated to 830+/-70, providing further evidence for the reuse of these pithouses and settlement location.

It is when one considers local and regional archaeological patterning, and when one adopts a landscape approach, that we gain a real understanding of the pulses of prehistoric demographic change over the last three thousand years. First, it appears that the transition to winter sedentary villages was focused on select key fishing/resource locations. This is seen in the clustering of residential sites near Slocan Lake, mid way down the Slocan River, and at the confluence of the Slocan River and Kooeteney River (Figure 9). While there are a few isolated pithouses between these locations, these are quite rare and usually smaller. Thus, we can see a clear and deliberate focus on specific landscape locations, those that served as fishing check-points along major transportation corridors.

The control of these locations must have been of considerable importance to families and communities, and suggests that ownership and access to seasonal salmon runs must have become a critical issues with the emergence of larger pithouse villages. In the case of Slocan Narrows, the pithouses were located at a critical location where the river became constricted so as to facilitate salmon fishing (Figure 10). It is also the last area before the river becomes quite broad, with seasonal flooding, and at the same time, the first accessible area that would allow for people to build pithouses near the

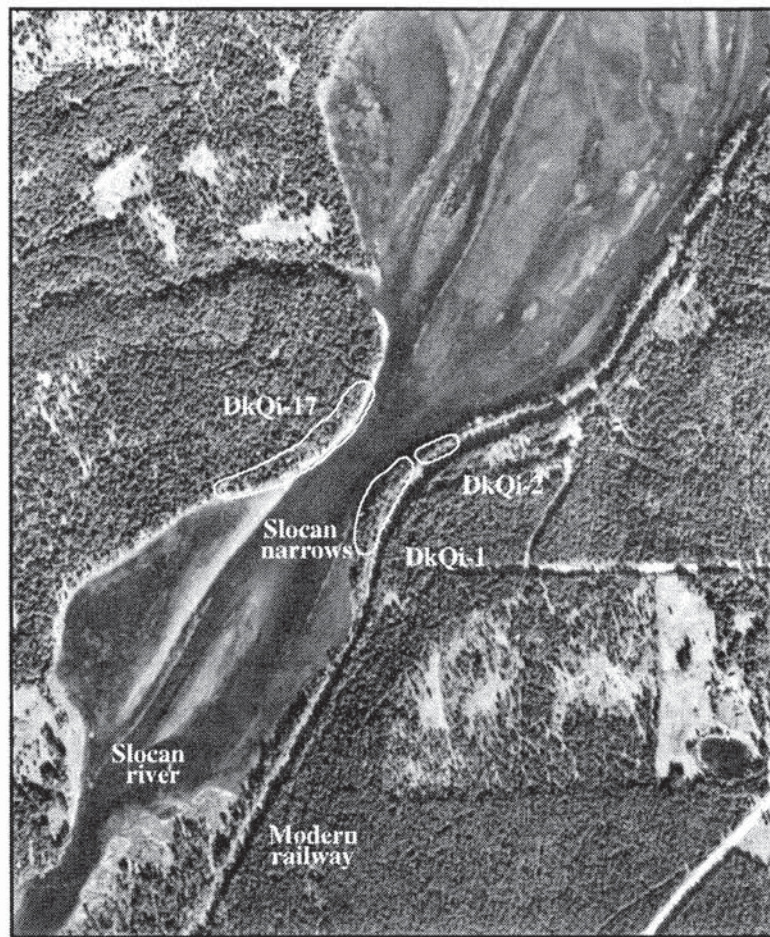


Figure 9: Air photograph of Slocan Narrows area of the Slocan River. Note the clustering of winter aggregation pithouse villages along the two sides of the river. Community members living at these settlements would have been able to control access by people living further to the south, as well as utilize this location to catch salmon migrating up stream for spawning in the fall

river. Presumably those families, households and clans that were successful in controlling such fishing rights in the long-term were able to out compete other local groups and consolidate fishing rights and access to key fishing areas through marriage and conflict.

While it is tempting to assume that the different occupations at the Slocan Narrows site represents new levels of sedentism and population growth, it is probably more accurate to view this as regional shifts in settlement systems and population aggregation. In light of the sporadic and discontinuous occupational history at the site, we believe that the Slocan Narrows site reflects the movement of people into this region from other areas. These villages would have been seasonally occupied, with the highest population levels being seen in winter and with people being dispersed across the landscape

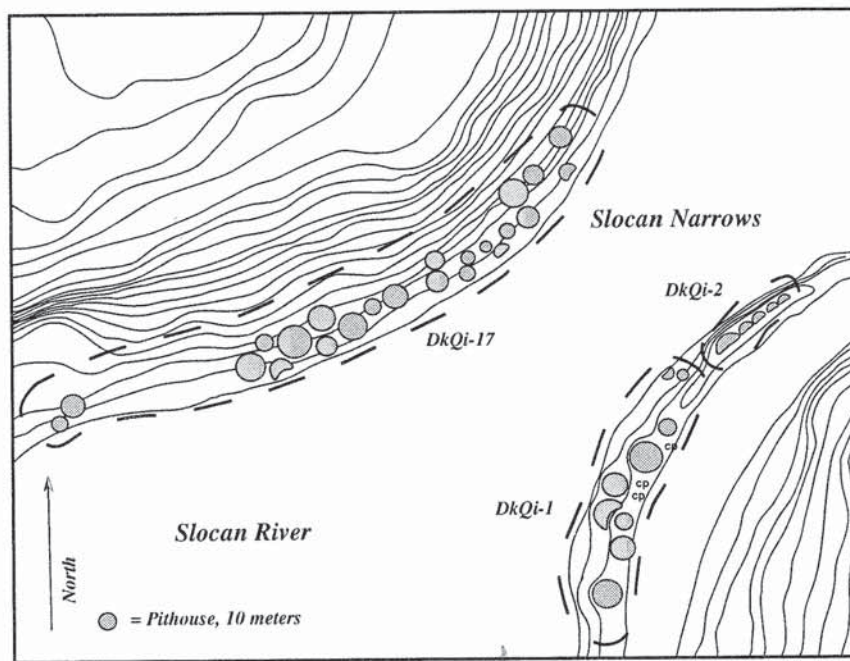


Figure 10: Location of pithouses in archaeological sites DkQi-1, 2 and 17, Slocan River, British Columbia, Canada. As with other aggregate pithouse villages, the construction of many of these structures would have required considerable effort, and were likely to have been reused several times

in other seasonal task groups to collect a range of plant and animal food resources. The existence of similar earlier pithouse occupations to the south (ca. 3500–3000 and 1000–1300 cal BP), and absence of such large pithouse villages to the north, illustrates that Slocan Narrows represents at least two demographic pulses of people into the Upper Columbia River area. This was at least partially related to the fact that the Slocan Narrows site is situated very close to the end of salmon spawning areas. It is not clear why this demographic expansion occurred when it did, nor why these villages were abandoned at later points. Researchers have yet to determine, moreover, if these patterns represent repeated transitions from local general hunter-gatherer adaptations to specialized fishing economies, and back again, or if we are witnessing episodes of human movement into underutilized areas at select points of the past.

DISCUSSION

This research presents a number of implications for understanding the demographic change among the complex hunter-gatherer-fishing societies of the Upper Columbia. First, this research provides another indicator of dramatic cultural change and population growth after ca. 4200–3800 cal

BP (Figure 11). A small-scale mobile society appears to have existed in the Upper Columbia prior to the onset of the full Neoglacial climatic period. Rapid cooling at 4200 cal BP and vegetative changes may have prompted population reduction until at least 3800 cal BP, after which point people with collector and fishing adaptations moved into this area. We argue that this process was not one of simple social change, but a whole-scale transformation of the basic socio-economy. Similarly, Prentiss and Chatters (2003a,b) propose that the interior Plateau collector system emerged on the Northwest Coast at a much earlier date, spreading into the former region after the climate change had largely emptied the area.

Second, it would appear that aggregated pithouse communities emerged and declined twice in portions of the Upper Columbia. The village at Slocan Narrows featured the largest early pithouses on the entire Canadian Plateau (Prentiss et al., 2001). Although only two of the large houses have been radiocarbon dated, it is likely that the two clusters of these houses will reveal numerous other early dates. These houses are equivalent in size to the largest houses found at sites such as Keatley Creek in the Mid-Fraser Canyon (Hayden, 1997). They are large enough to have housed groups potentially as large as 30 to 40 people per house (cf. Hayden et al., 1996). Management of groups this large may have necessitated at least some form of achievement-based ranking (Ames, 1985; Binford, 2001). Researchers now need to look for additional data to explore this issue and to ask how and why this occurred. The radiocarbon record suggests a rapid and relatively short-lived process of aggregation in this locale. This probably started elsewhere with small houses, but very quickly was replaced by construction of the unusually large houses at Slocan Narrows. The larger scale process of aggregation occurred late in the Collector II period, producing major villages at Slocan Narrows, Vallican, Ilthkoyape, and probably, many other locations now destroyed by development.

Even if some details of subsistence strategies remain to be defined, data from the Upper Columbia region appear to have strong implications understanding population and culture relations. A number of Pacific Northwest archaeologists have argued that it was steadily rising population since 4000 B.P. that affected the rise of new forms of subsistence and gradually, large villages and even socio-economic inequality (Cohen, 1981; Croes and Hackenberger 1988; Lohse and Sammons-Lohse 1986). Examining data from the Lower Snake and Middle Columbia Valleys, Chatters (1995) in contrast, argued that the major changes in Plateau cultures appear to have come about in times of exceptionally low human numbers. The Upper Columbia data demonstrate similar patterns to those suggested by Chatters.

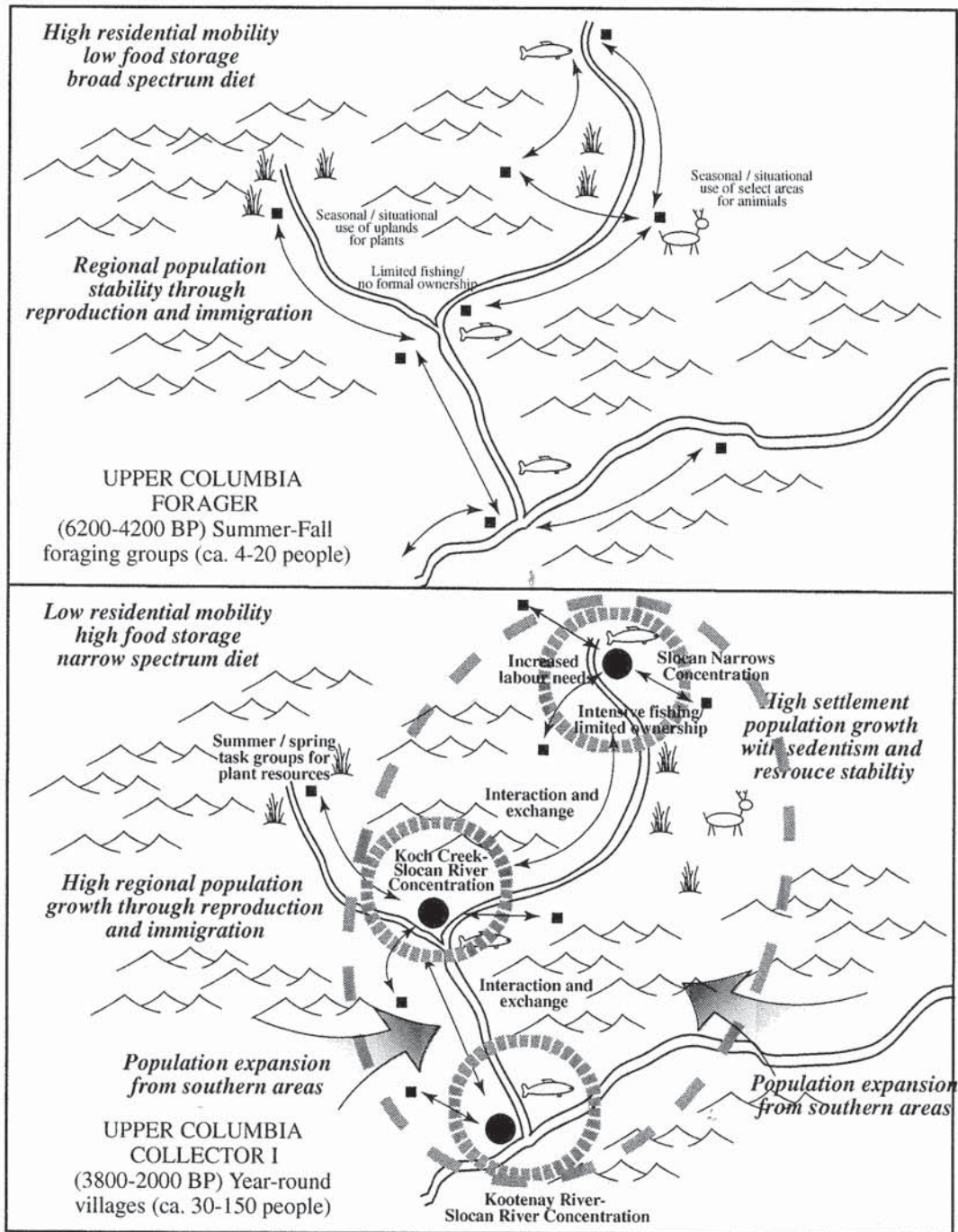


Figure 11: Demographic, settlement and subsistence changes from the Upper Columbia Forager system (ca. 6,200 to 4,200 BP) to the Upper Columbia Collector I system (ca. 3,800 to 2,000 BP)

Two major changes occurred in middle to later Holocene prehistory. The collector strategy appeared shortly after ca. 3800–4200 cal BP and the complex collectors after ca. 1400–2200 cal BP. In both cases, populations were at regional lows suggesting that radical changes in socio-economic organization could only occur under low population conditions (e.g. Prentiss and Chatters 2003b). Populations only rose after the advent of the new strategies, later to decline and be replaced by new variants. The ultimate implication is that the traditional population pressure models (e.g. Boserup, 1966; Malthus, 1976) employed by archaeologists are not valid for understanding major transformations in the organization of settlement, social relations and food acquisition and processing. It is more likely however, that these types of models are useful in understanding cycles of subsistence intensification, particularly those that result in maladaptive declines in labor efficiency (Broughton, 1994).

This study also has implications for understanding the process of community decline and abandonment on the Plateau. Debate between Hayden and Ryder (1991) and Kuijt (2001) have directed new attention to the processes and scale of demographic collapse and reorganization of large-scale interior Plateau communities. Local factors such as landslides and temporary damming, as well as larger scale processes including climatic change and regionally altered resource conditions, need to be considered. Decline of the Slocan Narrows and Vallican site villages coincides with similar processes in the Fraser-Thompson drainages (Hayden and Ryder 1991; Kuijt, 2001) and to the south on the Middle Columbia and lower Snake Rivers (Chatters, 2004). These studies support Kuijt's (2001) argument that there was a regional reduction in population at this point, and that such wide-scale abandonment was probably related to paleoclimatic changes and subsistence resource shifts.

ACKNOWLEDGMENTS

This research draws on many years of fieldwork on the Canadian Plateau in general, and most specifically our shared field work at the Slocan Narrows Village in the summer of 2000. These excavations were supported by The University of Montana (UM) Archaeological Field School program administered through UM Continuing Education (A. Prentiss) and by grants from the Social Science and Humanities Research Council of Canada, Chinook Research Summer Award from the University of Lethbridge, and a grant from the Alberta Learning Research Excellence Envelope (I. Kuijt). Field

labor was provided by University of Montana and University of Lethbridge field school students: Nicole Schmoll, William Winslow, Kevin Russwurm, Tova Wickenson, Noah Honch, Barb Facklemeyer, Arron Bird, Meredith Chesson, Rory Lindsey, Job Kuijt, and Jack Cowley. Their careful work significantly contributed towards the success of this project. Tom Foor provided significant input in the development of our demographic analytical strategy. A special thanks goes out to the folks at Kootney West Heritage for the beer, advice, and endless hospitality. We sincerely thank Marilyn James and the Sinixt people for the opportunity to conduct these investigations on their ancestral land. We also thank the West Bank Okanagan and Kinbasket Tunaxa for their permission to conduct these excavations. We would also like to thank Eric Carlson for illustrating how a pithouse would have looked when being constructed. Finally, we would like to thank Jean-Pierre Bocquet-Appel for the invitation to participate in this publication, as well as his comments and those of several anonymous reviewers.

REFERENCES

- Ames, K.M., 1985. Hierarchies, Stress, and Logistical Strategies Among Hunter-Gatherers in Northwestern North America. In: Douglas Price, T., Brown, J.A. (Eds.), *Prehistoric Hunter-Gatherers: The Emergence of Cultural Complexity*. Academic Press, Orlando, Florida, pp. 155–180.
- Andrefsky, W. Jr., 2004. Materials and Contexts for a Culture History of the Columbia Plateau. In: Prentiss, W.C., Kuijt, I. (Eds.), *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*. University of Utah Press, Salt Lake City, Utah, pp. 23–35.
- Andrefsky, W. Jr., Burtchard, G.C., Presler, K.M., Samuels, S.R., Sanders, P.H., Thoms, A., 2000. *The Calispell Valley Archaeological Project Final Report*. Center for Northwest Anthropology, Project Report No. 16.
- Binford, L.R., 1980. Willow Smoke on Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1), 4–20.
- Binford, L.R., 2001. *Constructing Frames of Reference: An Analytical Method for Archaeological Theory Building Using Ethnographic and Environmental Data Sets*. University of California Press, Los Angeles California.
- Bocquet-Appel, J.-P., Masset, C., 1982. Farewell to Paleodemography. *Journal of Human Evolution* 11, 321–333.
- Bocquet-Appel, J.-P., Masset, C., 1996. Paleodemography: Expectancy and False Hope. *American Journal of Physical Anthropology* 99, 571–583.
- Boserup, E., 1966. *The Conditions of Agricultural Growth*. Aldine de Gruyter, New York.
- Broughton, J.M., 1994. Late Holocene Resource Intensification in the Sacramento Valley, California: The Vertebrate Evidence. *Journal of Archaeological Science* 21, 501–514.

- Chance, D., Chance, J.V., 1977. Kettle Falls: 1976. University of Idaho Anthropological Research Manuscript Series, No. 39, Department of Sociology/Anthropology, University of Idaho, Moscow.
- Chance, D., Chance J.V., 1979. Kettle Falls: 1977. Salvage Archaeology in Lake Roosevelt. University of Idaho Research Manuscript Series No. 53. Laboratory of Anthropology, University of Idaho, Moscow.
- Chance, D., Chance J.V., 1982. Kettle Falls: 1971/1974. University of Idaho Anthropological Research Manuscript Series, No. 69. Laboratory of Anthropology, University of Idaho, Moscow
- Chance, D., Chance J.V., 1985. Kettle Falls: 1978. Further Archaeological Excavations in Lake Roosevelt. University of Idaho, Anthropology Reports. No 84. Alfred W. Bowers Laboratory on Anthropology, University of Idaho, Moscow.
- Chatters, J.C., 1995. Population Growth, Climatic Cooling, and the Development of Collector Strategies on the Southern Plateau, Western North America. *Journal of World Archaeology* 9, 341–400.
- Chatters, J.C., 2004. Safety in Numbers: The Influence of the Bow and Arrow on Village Formation on the Columbia Plateau. In: Prentiss, W., Kuijt, I. (Eds.), *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*. University of Utah Press, Salt Lake City, pp. 67–83.
- Chatters, J.C., Prentiss, W.C., 2005. A Darwinian Macroevolutionary Perspective on the Development of Hunter-Gatherer Systems in Northwest North America. *World Archaeology* 37, 46–65.
- Cohen, N., 1981. Pacific Coast Foragers: Affluent or Overcrowded. *Senri Ethnological Studies* 9, 275–295.
- Croes, D., Hackenberger, S. 1988. Hoko Rier Archaeological Complex: Modeling Prehistoric Northwest Coast Economic Evolution. In: Issac B.L. (Ed.), *Prehistoric Economies of the Pacific Northwest Coast*, Research in Economic Anthropology Supplement 3. JAI Press, Greenwich, pp. 19–85.
- Crombé, P., Van Strydonck, M., 2004. The Neolithic Transition and European Population History. *Antiquity*, 78, 708–710.
- Eldridge, M., 1984. Vallican Archaeological Site (DjQi 1): A Synthesis and Management Report. Unpublished manuscript on file at the B.C. Heritage Conservation Branch, Victoria, B.C.
- Goodale, N.B., 2001. Evolution of Hunter-Gatherer Socioeconomic Systems During the Middle to Late Holocene in the Upper Columbia and Interior Northwest. M.A. Thesis, Department of Anthropology, The University of Montana, Missoula Montana.
- Goodale, N. B., Prentiss W.C., Kuijt, I., 2004. Cultural Complexity: A Case Study from the Upper Columbia Region of the Northwest. In: Prentiss, W.C., Kuijt, I. (Eds.), *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*. University of Utah Press, Salt Lake City, Utah, pp 36–48.
- Grabert, G.F., 1974. Okanagan Archaeology: 1966–1967. *Syesis* 7 (Suppl. 2).
- Gkiasta, M., Russell, T., Shennan, S., Steele, J., 2003. The Neolithic Transition in Europe: The Radiocarbon Record Revisited. *Antiquity* 77, 45–62.
- Hayden, B., 1997. *The Pithouses of Keatley Creek*. Harcourt Brace College Publishers, Fort Worth.

- Hayden, B., Bakewell, E., Gargett, R., 1996. World's Longest Lived Corporate Group: Lithic Analysis reveals Prehistoric Social Organization Near Lillooet, British Columbia. *American Antiquity* 61(2), 341–356.
- Hayden, B., Cannon, A., 1982. Corporate Group as an Archaeological Unit. *Journal of Anthropological Archaeology* 1, 132–158.
- Hayden, B., Ryder, J.M., 1991. Prehistoric Cultural Collapse in the Lillooet Area. *American Antiquity* 56(1), 50–65.
- Kuijt, I., 2001. Reconstructing the “Cause” of Cultural Collapse in the Lillooet Area of British Columbia, Canada: A Geoarchaeological Perspective. *American Antiquity* 66(4), 692–703.
- Lohse, E.S., Sammons-Lohse, D., 1986. Sedentism on the Columbia Plateau: A Matter of Degree related to Easy and Efficient Procurement of Resources. *Northwest Anthropological Research Notes* 20, 115–136.
- Malthus, T.R., 1976. *An Essay on the Principle of Population*. W.H. Norton and Company, New York.
- Meindl, R.S., Russell, K.F., 1998. Recent Advances in Method and Theory in Paleodemography. *Annual Review of Anthropology* 27, 375–399.
- Mohs, G., 1982. Vallican Archaeological Project, Heritage Site *DjQj 1*. Unpublished Manuscript file at the B.C. Heritage Conservation Branch, Victoria B.C.
- Morrison, K.D., 1994. The Intensification of Production: Archaeological Approaches. *Journal of Archaeological Method and Theory* 1, 111–158.
- Pielou, E.C., 1991. The Measurement of Diversity in Different Biological Collections. *Journal of Theoretical Ecology* 13, 131–144.
- Prentiss, W.C., Chatters, J.C. 2003a. The Evolution of Collector Systems in the Pacific Northwest Region of North America. *Senri Ethnological Studies* 63, 49–82.
- Prentiss, W.C., Chatters, J.C., 2003b. Cultural Diversification and Decimation in the Prehistoric Record. *Current Anthropology* 44, 33–58.
- Prentiss, W.C., Chatters, J.C., Lenert, M., Clarke, D., O'Boyle, R., 2006. The Archaeology of the Plateau of Northwestern North America During the Late Prehistoric Period (3500–200 BP): Evolution of Hunting and Gathering Societies. *Journal of World Prehistory* 19(1), 47–118.
- Prentiss, W.C., Kuijt, I., 2004. *Complex Hunter-Gatherers: Evolution and Organization of Prehistoric Communities on the Plateau of Northwestern North America*. University of Utah Press, Salt Lake City.
- Prentiss, W.C., Kuijt, I., Goodale, N., Burns, M., 2001. Report on the 2000 Excavations at the Slocan Narrows Village (DkQi 1 and DkQi 2). Unpublished Report on File at the British Columbia Heritage Branch, Victoria B.C.
- Richards T.M., Rousseau, M., 1987. Late Prehistoric Cultural Horizons on the Canadian Plateau. Department of Archaeology, Simon Fraser University Publication no. 16.
- Rosenberg, M., 1998. Cheating at Musical Chairs: Territoriality and Sedentism in an Evolutionary Context. *Current Anthropology* 39, 653–684.
- Rousseau, M.K., 1982. Interpretive and Descriptive Analysis of Lithic Artifacts from Site *DjQj1*, Vallican, Slocan Valley, British Columbia. Unpublished report on file Heritage Branch, Victoria, B.C.
- Rousseau, M.K., 2004. A Cultural Historical Synthesis and Changes in Human Mobility, Sedentism, Subsistence, Settlement and Population on the Canadian Plateau, 7,000–200 BP. In: Prentiss, W., Kuijt, I. (Eds.), *Complex Hunter-Gatherers: Evolution and*

- Organization of Prehistoric Communities on the Plateau of Northwestern North America. University of Utah Press, Salt Lake City, pp. 3–22.
- Steele, J., Gkiasta, M., Shennan, S., 2004. The Neolithic Transition and European Population History—a response. *Antiquity* 78, 711–713.
- Stryd, A.H., 1973. The Later Prehistory of the Lillooet Area, British Columbia. Ph.D. Dissertation in Archaeology, University of Calgary, Alberta.
- Stryd, A., Rousseau, M.K., 1996. The Early Prehistory of the Mid-Fraser/Thompson area. In: Carlson, R.L., Luke Dalla Bona (Eds.), *Early Human Occupations in British Columbia*. UBC Press, Vancouver, Canada, pp. 177–204.
- Stuiver, M., Reimer, P.J., Braziunas, T.F., 1998. High Precision Radiocarbon Age Calibration for Terrestrial and Marine Samples. *Radiocarbon* 40, 1127–1151.
- Thoms, A., 1989. The Northern Roots of Hunter-Gatherer Intensification: Camas and the Pacific Northwest. Ph.D. Dissertation for the Department of Anthropology Washington State University, Pullman.
- Turnbull, C., 1977. Archaeology and Ethnohistory in the Arrow Lakes, Southeastern British Columbia. National Museum of Man Mercury Series, Archaeological Survey of Canada, Paper No. 65.

Recent Advances in Palaeodemography

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 Springer

A Library of Congress Control Number: 2008920297

ISBN 978-1-4020-6423-4 (HB)
ISBN 978-1-4020-6424-1 (e-book)

Published by Springer,
P.O. Box 17, 3300 AA Dordrecht, The Netherlands.

www.springer.com

Printed on acid-free paper

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