SETTLEMENT-SUBSISTENCE IN THE RIVER OF NO RETURN WILDERNESS AREA: DEVELOPING A MODEL FOR PREHISTORIC SURVIVAL

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The cultural resources overview for the River of No Return Wilderness Area (Wildeson 1982) indicates the potential for archaeological research largely by emphasizing what is not known. There are a surprising number of archaeological sites along the major rivers but excavations have been so limited that the best that can be said at the moment is that people have been inhabitants of this mountainous part of Idaho for a very long time and that they apparently survived successfully.

What we propose to do is establish an initial framework for understanding the prehistory of the Wilderness area. At the moment, no such framework exists. Several approaches are possible. Perhaps the most desirable, or at least the most conventional, would be a culture historical model. That, however, would require extensive excavation at appropriate sites and sufficient funding for such is not presently available. An alternative is to begin by developing a settlement-subsistence model for the late prehistoric period, a model generally applicable for the past thousand to two thousand years. This would have the advantage of providing a basis for integrating sites in diverse environments within the mountains and could be accomplished with limited excavation and a well designed survey. As work in the wilderness area expands the settlement-subsistence model could be incorporated into a historical model as the basis for interpreting settlement and subsistence dynamics through time.

With the notion that a settlement-subsistence model is a useful initial interpretative tool we have selected a small part of the wilderness area to serve as a representation for the entire area. This sample universe is an area of approximately 113 square miles, 8 miles wide and variously 13 to 15 miles long, extending from Big Creek northward to Lower Meadow (Fig. 1). Inspection of maps and limited personal experience indicates that most of

Fig. 1. Research area.

the kinds of resource areas likely to have been exploited by prehistoric inhabitants of the area occur within the sample universe. There is a major stream and there are canyon slopes, tributary canyons, xeric ridges, marshes, meadows, forested hillsides, and cirque lakes within the area. Most of the resources probably utilized by prehistoric people occur within the sample universe. By developing a model for this sample universe we should have a model applicable to the entire wilderness area. The approach is potentially elegant and, from a pragmatic standpoint, economical.

Geology and Geomorphology

The study area is in the central Idaho portion of the Northern Rocky Mountain physiographic province. The area is characterized by

> ...rugged terrain of sharp ridges with crestal altitudes of 7,000-9,000 feet and narrow canyons 3,000-4,000 feet deep. ...(M)ost canyons are v-shaped. Slopes are steep and range from nearly bare to heavily timbered, and most canyon bottoms are choked by brush [Cater and others 1973:6].

The Salmon River Mountains are distinquished from the classic western mountain range because

> ...The separation of mountains into distinct ranges is indefinite. ...Most of the mountains are not arranged in lines, hence have no trend and no dominating crest, only a multitude of minor crests running in all directions between the streams of a mature drainage system [Fenneman 1981:183].

The Bighorn Crags constitute the highest, most rugged portion of the area, and contain cirque lakes at and above 8000 ft. elevation. In contrast, relief in Chamberlain Basin is low and rolling, and contains alluvium-filled valley, marshes, and open meadows (Wildeson 1982:6).

Larson and Lovely (1972) divided the Idaho Primitive Area portion of the Salmon River Mountains into seven physiographic areas by combining 49 land types into larger categories based on similarities of substrate, topography, drainage and vegetation (Fig. 2).

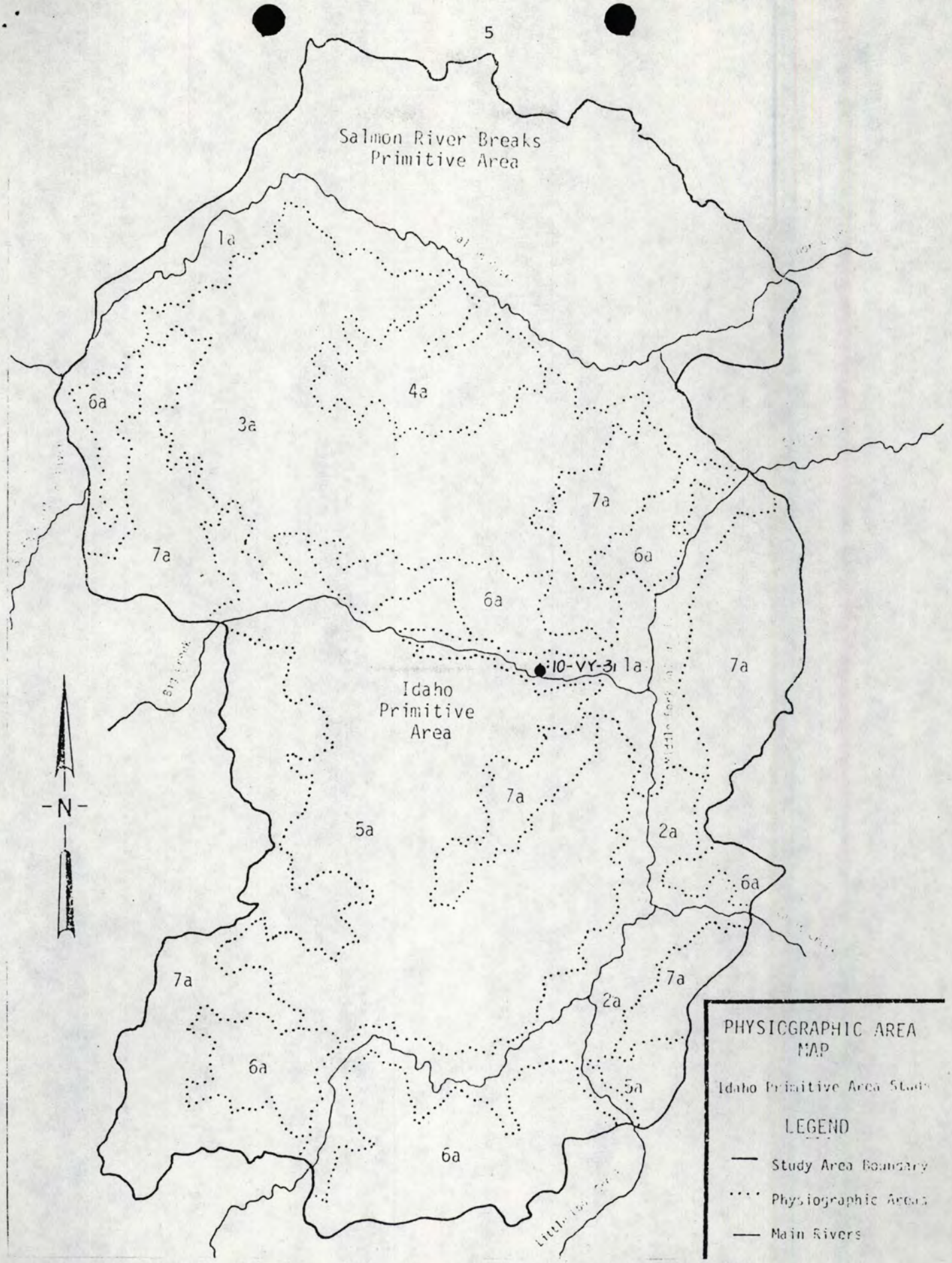

Fig. 2. Physiographic area map (Larson and Lovely 1972).

Hydrology

The Middle Fork of the Salmon River drains an area of approximately 7325 km^2 (2830 $mi.^2$) (Mallet 1961:1). The river falls from 1980 m (6500 ft.) elevation at the head of Marsh Creek near Sheepeater Battleground to approximately 915 m (3000 ft.) at its confluence with the main Salmon River. Although its average gradient is 2.8 m/km (15 ft./mi.), it falls over 8.5 m /km (50 ft./mi.) in its upper drainage and less than the average in its lower section (Mallet 1961:2).

Stream flow is highly variable seasonally. About 80% of the annual stream flow is derived from snow melt between April and July (Larson and Lovely 1972:21). Large floods are rare, but "flash peak flows of short duration and small volume can cause significant damage in small, localized areas" (Larson and Lovely 1972:21).

Swanson (1958b:1) states that terraces along the Middle Fork are frequently wide and well preserved. It has been estimated that the Middle Fork valley contains over 14.8 km^2 (5.7 $mi.^2$) of terraces potentially suitable for human occupation (Knudson and others 1982:70). Leonhardy's (1983:personal communication) recent geoarchaeological survey of the Middle Fork between Loon Creek and Big Creek and the lower portion of Big Creek revealed terraces regularly appearing at 1, 3, 10, 30, and 60 m above high water and less frequently at 7, 20, 50, and 120 m above river level. These terraces are very tentatively dated. Preliminary estimates are that the 1 m terrace dates to 1000 BP; the 3 m terrace dates to 3500 BP and the 10 m terrace dates to 9000 BP.

Present Climate

Contemporary climate in central Idaho varies with altitude and position relative to the westerly Pacific storm tract. Seasonal temperatures along the Middle Fork range from -35°C (-30°F) on the upper river in winter to over 38°C (100°F) on the lower river in summer (Platts 1972:32). Big Creek weather station has recorded an average maximum July temperature of 27°C (80°F) and an average January minimum of -15°C (5°F) with a mean annual precipitation of 64.9 cm (25.5 in.) (Pacific Northwest River Basin Commission 1969). The area is marked by higher precipitation from November to March, with most falling as snow, and lower precipitation in July and August.

Past Climate

Higher parts of the Middle Fork Basin were undoubtedly glaciated during the Pleistocene; however, the glaciation in this area remains unstudied. Dort (1965:29) shows that the Wisconsin glaciation was limited to valleys around 7000 ft. elevation, whereas earlier glacial episodes reached as low as 5000 ft. Therefore, a considerable portion of the Salmon River Mountains was probably effected by glacial ice during some portion of the Pleistocene.

Information regarding past environmental trends has been provided by palynological investigations. Lost Trail Pass Bog, located 60 km (37.2 mi.) north of Salmon, Idaho, contains over 6 m of sediment spanning the last 12,000 years. Pollen studies have defined a sequence of vegetation (and inferred climatic) changes covering this period (Mehringer and others 1977).

The sequence begins with cold steppe vegetation just after deglaciation, followed by in influx of white bark and lodgepole pine (Pinus albicaulis and P. contorta), implying moisture, but still cool conditions from around 11,500 to 7000 years ago. This vegetation community gives way to one dominated by Douglas fir (Pseudotsauga menzesii) and larch (Larix occidentalis) between 7000 and 5000 years ago, indicating a warmer climate. From 5000 to 4000 years ago the proportion of pines (Pinus sp.) and Spruce (Picea sp.) increases, while Douglas fir and larch decrease, indicating a cooling period. From 4000 years ago to the present, the vegetation (and by implication, the climate) was more or less stable, and more or less like that of today (Mehringer and others 1977:363-364).

Other studies of natural vegetation changes in the Northern Rocky Mountains and southern Idaho have discovered sequences similar in broad outline to the one described above, though they differ in detail. Many of these studies are reviewed by Knudson and others (1982:24-25) in detail, so they will not be repeated here.

Biology

Flora

The distribution of plant species and the composition of plant communities is important because certain plants were a major part of subsistence; others provided food for game animals hunted by Native Americans. A general description of the vegetation in the study area is difficult because of the variety of micro-environments conditioned by climate, slope, aspect, altitude and substrate. Because of this the following description is rarely site specific, but discusses general patterns.

The vegetation of the study area is assigned to the Northern Rocky Mountain floral association. Dubenmire (1943) divides this flora into three broad zones: 1) alpine tundra at the highest elevations; 2) coniferous forests at middle elevations; and 3) grassland or desert at the base of the mountains.

The forest vegetation is divided into six zones, which are roughly elevational, and are usually sequential from the top to bottom of mountain slopes. At the highest elevations is the Alpine Tundra zone, which, due to the variable topography of the mountains, is rarely continuous, but occurs as isolated "islands in a sea of forest" (Daubenmire 1943:331). Typical plants of the alpine tundra that are important to humans or game animals include Carex (sedge), Poa, and Festuca (grasses). The next zone is subalpine fir/spruce, which is composed of Abies Lasiocarpa, with mountain hemlock (Tusga mertensiana) in some areas. Huckelberry (Vaccinium sp.) is a characteristic ground cover. The Douglas fir zone is next lower on the mountain slope, but it is mixed with Grand fir (Abies grandis) on west facing slopes. The ponderosa pine (P. ponderosa) zone is a fire resistant community below the Douglas fir zone. It is often invaded by brush species after disturbance by fire. Aspen (Populus tremuloides), cottonwood (Populus sp.) and elder (Sambucus sp.) occur in the moisture areas of this zone. Lower on the mountain slope are scattered juniper communities associated with limber pine (P. flexilis). This zone often appears as a woodland savannah, with grasses such as Agropyron, Poa, and Stipa, and shrubs such as snow brush and Artemisia interspersed among the trees (Wildeson 1982:15).

In the ranges of the Northern Rockies, these vegetation zones are often interfingered with lower zone plants growing higher on the slopes and higher zone plants growing lower in canyons. Vegetational zones are commonly found at higher elevations on the xeric south-facing slopes than on the mesic north-facing slopes. Grass and shrub communities dominate south- and west-facing slopes, while north-and east-facing slopes are more heavily forested.

Fauna

Big Game

The study area today supports a varied fauna, with over 190 species of large and small mammals, reptiles, amphibians and birds (U.S.D.A.-Forest Service 1978). This discussion focuses on the species used as major sources of food, tools, and clothing.

Phillips (1972) maps deer (Odocileus sp.) and elk (Cervus sp.) winter range along the entire Middle Fork, Big Creek, and the south bank of the main Salmon River. He maps bighorn sheep (Ovis canadensis) winter range along the Middle Fork, and on the lower reaches of Big Creek. Thus the study area is located in the winter range for all three big game animals.

Of the large animals native to the study area, mountain sheep may be the most significant ethnographically (Wildeson 1982:24). Their range is more restricted than that of either deer or elk; their skins and horns were highly prized as clothing and trade goods; they played a large role in the diet of the "sheepeater Indians" who occupied the Salmon River Mountains; and finally they were relatively easy prey for hunters because of the regularity of their movements (Smith 1954; Buechner 1960). Short-term

regularities include travel to water holes and salt licks; long term movements include the seasonal migration of ram and ewe bands between home ranges which occur on a regular and predictable schedule (Wright and Miller 1976).

Bighorn sheep may be the most spectacular big game animal in central Idaho, but deer and elk are more plentiful and probably provided a mainstay in the diet of aboriginal populations. Stelfox (1976:14) describes the relationship between sheep, elk, and deer seasonal round as:

> In general, sheep summer about 2100 m. They may pass briefly through the winter range on their way to low-elevation natural licks or for water. During the summer, elk and mule deer move upwards from valley bottoms and may utilize the sheep winter ranges extensively from June to October.
>
> As the September and October snows and cold temperatures freeze and partially cover the alpine forage, about two-thirds of the sheep drift downward onto the winter grasslands below 2100 m. ...At this time, elk and deer generally migrate to the valley floor or lower mountain slopes. For all three species, there is a general constriction of range use towards the milder temperatures along the valley bottoms and grasslands.
>
> Mule deer use the mixed deciduous-coniferous forests extensively year-round and forage predominately on browse species. They do, however, use a considerable amount of grasses throughout the year. ...Elk use both deciduous and coniferous forests extensively year-round for shelter and some winter forage, although they generally forage on grasslands. Sheep remain almost exclusively on grasslands and rocky escarpments throughout the year, where they forage on a variety of grasses, forbs, and small shrubs.

Antelope (Antilocapra americana) are not present today in the study area, but they occur in the lower-elevation broad valleys to the southeast, and were once widespread on the Columbia Plateau (Idaho Almanac 1977). With proper climatic and vegetation factors, antelope may have been found closer to or within the study area at some times in the past. Even today they are accessible to hunters from the study area without an extraordinary journey (Wildeson 1982:24).

Similarly bison (Bison bison) are not reported for the study area, but they are included here because of the persistent reports in explorer's journals. Bison observed in wooded or mountanous areas were often called Bison athabascae. Bison remains occur in archaeological deposits throughout the prehistoric period in Oregon, Idaho, Washington, and Wyoming. "The former range of the bison probably embraced the whole of Idaho" (Hornaday 1887:383).

Other species such as mountain goat, black bear, coyote, moose, and mountain lion are found in the area today. Grizzlies and even mountain caribou (Johnson 1967; Wellner and Johnson 1974:96) have been reported there historically. However, these species are present only in small numbers and were probably not major resources in the subsistence pattern of the aboriginal inhabitants.

Fish

Three species of anadromous fish are found in the major streams and rivers of the River of No Return Wilderness Area; 13 species of fish are resident in the study area (Platts 1972). Four of the resident species are considered "abundant;" the rest of the resident species, and all of the anadromous species, are "common" at best (Platts 1972:2).

Dolly Varden (Salvelinus malma) winter in lower streams throughout the area, and spawn and rear in major tributaries. They are reported to "school in great numbers" along lower Big Creek in the fall (Platts 1972:27). Cutthroat trout (Salmo clarki) spawn in tributaries of the upper Middle Fork and winter in the lower Middle Fork and main Salmon River. They are abundant in Big Creek as well as Pistol, Marble, and Indian Creeks (Platts

1972:23, 27, 32). Cutthroat trout occur along with rainbow trout (Salmo gairdneri) in over 60% of the alpine lakes among the Bighorn Crags (Platts 1972:40). Little other information is available about the rest of the resident fish populations.

More attention has been paid to anadromous fish. The Middle Fork supports runs of spring Chinook Salmon (Oncorhynchus tshawytscha) in June and July, and summer runs from late July to early September (Platts 1972). Both spring and summer Chinook use the upper Big Creek gravels for spawning (Platts 1972:38).

A summer run of steelhead trout (Salmo sp.) arrives on the main Salmon River from June to mid-August. They winter there and in the spring move up river to spawn. At this time steelhead trout are common in Chamberlain Creek, Big Creek, and the Middle Fork (Platts 1972:11-12, 17, 23). Sockeye salmon (O. nerka) are now rare in central Idaho, but formerly they traveled through the study area on their way to their spawning grounds at Redfish Lake (Platts 1972:13).

CULTURAL ENVIRONMENT

Central Idaho is at the interface between the Sahaptin speaking Nez Perce and the Numic speaking Shoshoni. Sahaptin speakers occupied a wedge of land from the Cascades of Washington east through the Columbia Plateau to the Rocky Mountains. Numic speakers occupied the greater part of the desert west from the Oregon Cascades to the Rockies and south to the Gulf of California. The earliest historical records of the aboriginal people living in the Middle Fork basin are from the 1860s when the miners moved in. They called the Native American inhabitants "Sheepeaters," but their linguistic/ethnic affiliation is unknown. It was not until the middle part of the twentieth century that formal ethnographic studies were conducted on the Nez Perce and Shoshoni, both of whom claim to have utilized the Salmon River Mountains.

Nez Perce

Walker (1978:25-26) gives a concise, general description of the Plateau cultural pattern characteristic of the Nez Perce. This includes 1) an adaption to a riverine environment with elaborate fishing technology which provided about half the food base (Fig. 3). Remaining food was secured from large game animals and tuberous roots. 2) Intensive interaction between local groups. 3) Band and composite band political organization. 4) Primarily patrilocal residence, local communities rarely larger than 100

Scientific/Common names	Season of Use
Onchorhynchus kisutch, silver salmon	no data given
Salmo gairdneri, steelhead trout	Feb.-Apr., mid-Sept.-Nov.
O.nerka, blueback salmon	June, July, August
*O. tschawytscha, chinook salmon	June-September
Entosphenus tridentatus, lamprey eel	June, July, August
Catostomus sp., ocean sucker	June, July, August
Prosopium williamoni, whitefish	January, February
Acrocheilus alutaceus, chiselmouth	January-March
Catostomus spp., local suckers	April-June
Salmo clarki, cutthroat trout	March-June
Salvelinus malma, Dolly Varden trout	March-June
Acipenser transmontanus, sturgeon	no data given
Lomatium dissectum, lomatium	January-March
L. salmoniflorum, lomatium	February-early March
*Lomatium canbyi, lomatium	February-April
Fritillaria pudica, yellowbell	no data given
Balsamorhiza sagittata, balsamroot	April-June
Celtis douglasii, hackberry	May-early June
Amelanchier alnifolia, serviceberry	March-July
Ribes aureum, golden currant	April-July
Brodiaea douglasii, wild hyacinth	April-September (?)
Sambucus cerula, elderberry	June-October
*Lomatium cous, cous, biscuitroot	late May-Early July
Lomatium sp., also "cous," but rare delicacy	late May-early July
Allium spp., wild onion	late May-July
Lomatium triternatum, lomatium	late May-June
Frasera fastigiata, frasera	June-July
Ribes, spp., gooseberry	July-August
Prunus virginiana, chokecherry	July-August
Cirsium scariosum, elk thistle	late July-August
Calochortus ewiycarpus, Mariposa lily	June-August
Lomatium sp. lomatium	June
Claytonia lanceolata, spring beauty	late June-July
*Camassia quamash, camas	July-September
Balsamorhiza incana, sunflower	July
*Perideridia gairdneri, yampa, wild carrot	July
Rosa nutkana, wild rose	late July-early August
Rubus parviflorus, thimbleberry	August-September
*Amelanchier utahensis, serviceberry	June-September
Sambucus racemosa, mountain elderberry	August-September
*Vaccinium globulare, huckleberry	August-September
V. scoparium, fireberry, grouseberry	August-September
Alectoria jubata, pinemoss	June-August
Crataegus spp., hawthorn	July-September (?)

Fig. 3. Nez Perce foodstuffs with major season of use. Preferred species marked with * (Marshall 1977).

individuals, and winter residence in major river valleys in semisubterranean for the highlands to gather roots, hunt, and fish. During the fall hunting and salmon fishing occurred at gradually lower elevations. By winter, all retired to a main village along a river.

Both Spinden (1908) and Schwede (1970) show that Nez Perce settlements were associated with subsistence resources. Marshall (1977:134) states:

> Villages were located in zones where people could survive most easily during the least resource-rich time of year and where access to spring resources was easiest. Thus they were in the canyon bottoms. ...Locations...within the canyons were determined by a calculus of 1) floodplain activity, and 2) the occurrence of springs, and 3) the occurrence of a number of flat ridgetops nearby.

Villages were situated on the larger stream, upstream of the tributary mouth, because the larger stream tended to form aggradational bars which were less frequently flooded yet caught driftwood easily. Tributary streams tended to have resident (year-round) fish resources; nearby ridges often contained Lomatium species which provided the earliest spring vegetable foods (Marshall 1977).

Upland hunting camps often were in rugged terrain. Such camps were used from year to year by the same people. A typical "hunting itinerary" is given by Marshall (1977:71); the hunters would:

> enter the mountains following a major ridge system, then cross to another system to come back out. Camps are about 6 to 10 miles apart. Each camp heads a drainage basin which is hunted for 2 to 8 days. Hunters moved on quickly if the hunting was poor. If it was good, the roughly 8 days were required to prepare the game for storage and packing it [home].

Shoshoni

The Northern Shoshoni groups of central and southern Idaho shared many of the cultural patterns of the Great Basin area. A concise description of the characteristic features of this Great Basin pattern is: 1) adaption to

a desert environment with intensive exploitation of nuts, seeds, roots, cactus, insects, small game animals, birds, and occasional large game; there is frequent movement in search of food; 2) limited interaction with other groups except immediate neighbors; 3) band level political organization, local communities rarely larger than 30 individuals with residence near water resources in oases and at higher elevations (Walker 1978:89).

Use of Biotic Resources

The natural resources of the Numic-speaking Indians of central Idaho were more like those of their Sahaptin neighbors to the north than like those of the arid Great Basin farther south (Liljeblad 1957:13). Hence Northern Shoshoni subsistence was also based on fish, roots, and occasional big game.

Salmon was a major staple food in areas where it was available. Hewes (1947:227) gives a consumption figure of 50 pounds per person/year. The main salmon fishing season was in August and September. Other fish taken were sturgeon, chub, suckers, minnows, trout, whitefish and lamprey (Lowie 1909:185; Steward 1938:190; Hewes 1947:117).

Big game hunted for food included deer, elk, mountain sheep, moose, and antelope. Antelope were hunted in winter snows (Irving 1961:353-354). Bison were hunted from August to May in the Bear, Lehmi and Salmon River valleys in historic times (Rich 1950; Spaulding 1956; Irving 1961; Haines 1971; Franzen 1978; Townsend 1978). Boys hunted rabbits and groundhogs with their dogs. Birding was an important activity (Walker 1978:90), but magpies, crows, and eagles were not taken because they provided feathers, and hence were considered "friends" (Lowie 1909:232).

Camas was a dietary staple. Big Camas Prairie was a major meeting place. Other plant food eaten included bitterroot, yampa, wild rose, chokecherry, and service-berry as well as the nuts of the whitepine (Steward 1938:190).

Settlement and Subsistence Patterns

The settlement pattern of the Northern Shoshoni is described as being closely tied to the seasonal subsistence round, but the specific locations of the various communities at different times of the year are difficult to determine from the literature (Wildeson 1982:49). Perhaps as Franzen (1978:17-19) suggests, this is because the variety of simultaneously exploitable food resources resulted in extremely complex decision-making and scheduling for subsistence activities. Early Euroamericans explorers found Shoshoni almost everywhere they went, at all times of the year.

Winter villages were small, averaging two or three lodges (Murphy and Murphy 1960:322). The largest winter village reported by Steward (1938:188) consisted of 20 families. The winter village was the largest single community gathering; camas gathering areas supported multi-community, and in some cases multilingual, groups. Like the Nez Perce, Shoshoni winter villages:

> seem to be associated with good fishing locations. Water, wood for fuel and building material, access to stored foods, and mild winter temperatures were major factors in selecting winter village locations [Wildeson 1982:50].

Indians of the Salmon River Mountains

The "tukudeka" or "mountain sheep eaters" are alleged to have inhabited the mountainous terrain of central Idaho. The "tribe" or "ethnic group" has been the subject of speculation since the publication of the description of the "Broken Moccasin" Indians (Coues 1893:523). Some authors assert that

they were a distinctive ethnic group, with distinctive settlement and subsistence patterns and distinctive technologies (Hobel 1938:410; Liljeblad 1957; Dominick 1964). Other authors assert that the "tukudeka" simply were seasonal manifestations of other Shoshoni groups and were virtually indistinguishable from other Shoshoni groups (Steward 1938:186; Liljeblad 1959, 1972).

The Salmon River Mountains were apparently occupied by both the Shoshoni (Steward 1938:188-189) and the Nez Perce (Ray 1939; Walker 1967, 1968; Chalfant 1974:375; Marshall 1977). The boundary between the two territories is unclear, and in fact the territories appear to overlap. Liljeblad (1957:26) highlights one aspect of Indian settlement pattern in central Idaho that may be germaine to this issue. He states that "territories were mutually respected, though they were nowhere actually delimited, since only certain localities were inhabited, leaving large tracts of neutral ground." Thus it was possible for both linguistic/ethnic groups to simultaneously exploit resources in the same region.

The question "who lived in the Salmon River Mountains?" is really a non-question because it probably cannot be answered archaeologically. What is really important is the question of which ethnographic pattern, if either of them, is the more appropriate for predicting or explaining the nature and distribution of archaeological materials in the Middle Fork basin. Whatever the linguistic or social relationships among the aboriginal inhabitants of the Salmon River Mountains may have been, their subsistence and settlement patterns were closely related to the land and its resources. Since the Salmon River Mountains served as "a homeland for peoples rather than as a barrier between them" (Swanson 1972:24), it seems likely that they had a unique settlement and subsistence pattern distinct from both the regions to the north or south.

Features common to both the Nez Perce and Northern Shoshoni seem likely to have been present among the Indians of the Salmon River. These would include winter settlements in canyons, storage of food for winter, perhaps congregation of people during winter months, and the heavy utilization of aquatic resources. But, because the Salmon River Mountains constitute an area distinct from both the common Nez Perce territory to the north and the Shoshoni homeland to the south one should not expect the culture pattern to be "Plateau" or "Basin." It will be what it is: Salmon River Mountain. Once that culture pattern has been established then there will be a basis for comparison and extra areal affinities can be determined.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Earl H. Swanson, Jr., was the first to enter the study area for the express purpose of identifying remains of past human settlement and use. In the unpublished report of his brief float trip down the Middle Fork, he called the area "an archaeologist's paradise," and stated the sites he found possesses "a freshness" and "a clarity" unique in central Idaho (Swanson 1958b:1 [quoted in Wildeson 1982:107]). The impression is still valid.

Most of the archaeological research has been confined to the lands adjacent to major drainages: the main Salmon River (Harrison 1972a, 1972b; Swisher 1973); the Middle Fork (Pavesic 1978; Knudson and others 1982); and Big Creek (Dahlstrom 1972). Clearance surveys conducted by the Forest Service in the late 1970s include some upland areas, and Dahlstrom (1972) reports finding a few archaeological sites along trails and near lake outlets in Bighorn Crags (Clay 1977; Gallagher and Rossillon 1977; Prince 1977; Wylie 1977, 1978a, 1978b, 1979; Hackenberger 1978; McDaniel 1978a, 1978b, 1978c, 1978d; Anderson 1979a, 1979b, 1979c; Anderson and Vagstad 1979; Bennett 1980).

Survey

Harrison (1972a) attempted to locate all archaeological resources along the main Salmon River, rather than spot check or sample. He located 241 sites and documented a difference in site density in each of the four "zones" of the river corridor. He also noted differences in site density between the north and south banks.

As part of a series of studies on the Idaho Primitive Area, Dahlstrom (1972) located 70 archaeological sites in four areas: Big Creek, Bighorn Crags, Middle Fork Salmon River and "back country." Site types include camps, villages, caves/rock shelters, pictographs, "kill sites," and hunting blinds. Big Creek is the only area with all site types represented.

Recent survey work along the Middle Fork (Knudson and others 1982) recorded 63 sites, bringing the total to 119 sites recorded for the Middle Fork corridor. Of these 75 may have subsurface deposits; 30 had some record of housepits; 40 are caves or rock shelters. Twelve sites have at least 30 cm of depth as determined by visual inspection of cut banks or auger borings. As part of the 1978 Middle Fork Survey, Hackenberger (1978) conducted a survey of a proposed bridge construction site over Sulfer Creek. He located two historic sites and one prehistoric camp containing lithic material. Subsequent to the work of Knudson and others (1982) the Forest Service has continued surveys, but reports are not yet available.

Test Excavation

Excavations at Boundary Creek Campground on the Middle Fork were report by DeBloois (1976, 1977). Lithic material was found on three terraces, with obsidian making up 25% of the flakes. He suggests that tools were manufactured elsewhere and only maintenance activities occurred at this site, because most of the lithic debris consisted of small, "retouch" flakes (DeBloois 1977:15).

In 1981, Forest Service crews conducted test excavations at Big Creek Cave (10-VY-67) and an open housepit site on Waterfall Creek (10-SL-267), just across the Middle Fork (Wylie and others 1981). At the present time none of the artifacts from these two excavations have been analyzed except

for projectile points and these are only classified using very gross morphological categories (Wylie and others 1981:3). Deposits extended at least 110 cm below the surface, but the bottom was not reached. Four 1 x 1 m test pits at Big Creek Cave yielded approximately 50 diagnostic projectile points. From the bottom to the top of the test pits there is a general shift from stemmed, indented base points (Pinto?) to large cornernotched points (Elko) to small notched points (Wylie and others 1981:12). The oldest sediments reached dated to 3900±90 years BP (Beta-Analytic Sample number 3397 [Wylie and others 1981:6]).

Also of interest are 11 undecorated brown/grey pottery sherds which were found in the top 20 cm of sediments. There were also several shell/bone beads (eight are illustrated), two of which may be Olivella shell from the Pacific coast (Wylie and others 1981:4). Overall, the assemblage "appears to be more Great Basin than Plateau" (Wylie and others 1981:4).

At Waterfall Village (10-SL-267), most of one quadrant of a suspected pithouse depression was excavated using 6 1 x 1 m test pits. The test pits extend down over 1 m deep, yet the actual occupation floor was not reached. Upper levels contained desert side-notched/small triangular Late Prehistoric projectile points, while house fill itself contained Middle to Late Archaic materials. No ceramics were found. The lithics tended to be obsidian or ignimbrite in the upper levels and cherts or quartzites in lower units (Wylie and others 1981:5).

Faunal analysis of material recovered from Big Creek Cave determined the minimum number of individuals for the entire deposit as 27. Of the 27 individuals; 8 were mountain sheep and 2 were mule deer. The remaining 17 individuals represented the presence of elk, antelope, yellow-bellied

marmot, ground squirrel, jack rabbit, chinook salmon, mountain whitefish, and squawfish (Manion 1981:2). The four chinook salmon were a 20 lb salmon measuring 80 cm long; a 30 lb. salmon; a 28 lb. salmon 1 m long, and a 5 lb. salmon.

Discussion

Except for the main Salmon River and the Middle Fork, archaeological surveys have been limited to examining "likely places" or locations of potential land use conflicts, neither of which results in comprehensive coverage of large area. Little is known about the nature and distribution of archaeological resources away from the major water courses.

Excavations in the area have been minimal. In the wilderness area itself only 10 m^2 of test pits in two sites have been excavated (the Boundary creek site is located just out of the wilderness area). With this small a sample it is difficult to even begin to talk about such basic archaeological concepts as types and chronologies. Analyses of the material culture have only been on the most gross level and are not near completion. Before any complex questions can be answered more sites must be excavated and a chronology must be established.

RESEARCH DESIGN

Excavations at Big Creek Cave establish human habitation in the area at least 3900 years ago (Wylie and others 1981:6). Swanson's excavations at Shoop Rock shelter in the nearby Clearwater Mountains indicate habitation in mountainous areas of central Idaho may have ben much more long term, perhaps 7500-8000 years ago (Swanson and Sneed 1966:12-13).

Throughout this period of human habitation the Salmon River Mountains have been a unique conglomeration of micro-environments with a unique set of limitations and potentials. Excavations at 10-VY-31 and survey of a contiguous area will be geared toward providing baseline data for examining the successful adaptation to these limitations and potentials.

This proposal is broadly based upon settlement-subsistence theory. Settlement is dependent upon such environmental factors as land form and the distribution of flora and fauna but can be modified by the cultural factor of technology.

Ideally, a formal model of settlement and subsistence for the Salmon River Mountains would be formulated, but because there is no adequate specific anthropological, archaeological, or environmental information this would be difficult. However, using a set of assumptions formed from what is known about the Salmon River Mountains and general knowledge it is possible to formulate a set of questions that may be investigated. The recovery of information from the project should provide enough data to formulate a formal model.

Assumptions and Questions

The following are necessary assumptions which govern the research design:

1. The Salmon River mountains contain sufficient resources to sustain a permanent population of some unspecified size.
2. Prehistoric inhabitants were hunters and gathers with specific survival strategies which may have changed through time.
3. Different resources utilized occur over a comparatively large area and varied both seasonally and geographically.
4. People scheduled their economic activities to availability of resources and moved to where resources were available when they were available.
5. People optimized their behavior by concentrating on foods which provided the greatest energy returns for effort expended.
6. Winter survival required storage of resources.
7. Winter settlement was in protected places and required suitable structures.

Granted these initial assumptions an initial series of questions follow:

1. What are the resources available for exploitation?
2. Where do these resources occur in time and space?
3. Are there archaeological sites associated with places where resources occur or
4. What are the resources in reasonable proximity to the archaeological sites?
5. What is the relationship between the observed settlement pattern and a seasonal economic round?

6. What are the artifact assemblages associated with different sites in different places?

7. Can the seasonality of site occupation be determined?

The 1983 field program is intended to provide information which will at least begin to answer these initial question. Excavations at 10-VY-31 will attempt to define the structure of an assumed winter settlement. The site contains several small depressions which are likely the remnants of small structures and at least one large house pit depression. It will be necessary to determine if the two kinds of structure are contemporary or if they are from different time periods. A survey will attempt to delineate resource areas and associated archaeological sites.

10-VY-31 is located in a very rich local environment. Bighorn sheep, elk, and deer all have winter range nearby. Resident fish spawn and winter in Big Creek. Anadromous fish are plentiful during the spring and summer as they migrate to their spawning grounds.

Plants commonly used by the Nez Perce and Shoshoni as food source are also found near 10-VY-31. Camas (Camassia quamash), hackberry (Celtis douglasii), huckleberry (Vaccinium globulare), and elderberry (Sambucus cerula) are all found along the stream banks near Big Creek. On the nearby mountain slopes, yampa (Carum gairdneri), bitterroot (Lewisia rediviva), biscuitroot (Lomatium cous) and other types of lomatium, as well as chokecherry (Prunus virginiana) are found.

As well as being near rich resource areas, the relatively low elevation of 10-VY-31 (approximately 3840 ft.) means relatively little snowfall and comparative warm temperatures in the winters.

Given assumptions 5 and 6 above and given evidence for structures in a sheltered place we offer several hypotheses and a series of expectations (formally called "test implications") of what we might find to substantiate the hypothesis. The first hypothesis is that 10-VY-31 represents a winter habitation site. The expectations are 1) evidence for storage facilities should be present. This should include such things as storage pits, post holes from drying racks, and concentrations of floral and faunal remains within and between structures. 2) Structures should be present. These structures should be well constructed to withstand winter conditions. Evidence for this should include regular patterns of post holes and packed living floors in and around the depressions. 3) There should be a wide range of faunal and floral remains. The remains should come from plants and animals that were commonly preserved aboriginally. The remains should be limited to the portions of the plants and animals that were preserved (i.e., there should be a paucity of skulls and other non-meaty portions and a higher proportion of hind and forequarters in the faunal remains).

A second hypothesis is that 10-VY-31 represents a congregation of people. It is hypothesized that the site represents a single (or at the most a few) contemporaneous occupations rather than a series of reoccupations. The expectations are: 1) radiocarbon age determinations should be similar for at least several of the structures. 2) Obsidian hydration age determinations should be similar for at least several of the structures. 3) Time sensitive artifacts, such as projectile point types, should give similar age determinations. 4) Controlling for social differences, artifact assemblages should be similar for several of the structures, 5) controlling for social differences, construction of the structures should be similar.

In addition to evaluating these hypotheses excavations at 10-VY-31 can also provide information on several other research questions. At the most general level, the excavation can show what the range of an assemblage in this area should be. Very few sites in the area have been excavated, and it is still unknown what kind of tool forms are present in the area. Excavations at 10-VY-31 may clarify this problem. Additionally the excavation may show what the range of resources being exploited in this area was. It is presently unknown what kinds and how many different types of plants and animals were utilized. Finally, 10-VY-31 can show what kind of housing structures and other facilities were used at least one point in time in the Salmon River Mountains. It can show how they were constructed and utilized (i.e., internal specialization such as food preparation areas, manufacturing areas, etc.). Finally, it should be possible to clarify the relationship between the two forms of house depressions found throughout the area.

Methodology

Excavations in the house depressions, in interstructural areas, and in the trash deposits should reveal cultural assemblages pertaining to a wide range of economic and domestic activities.

Excavations

The major excavation unit will be the house depressions, these units will be subdivided into either quadrants or squares, depending on which is more feasible, to give great control on artifact provenience. These units will be excavated by trowel probably in arbitrary levels unless natural stratigraphy is present, and the dirt will be screened. When the living

floors are reached they will be carefully cleaned and excavated to give very precise control of artifact proveniences. In addition a sample will be taken from each unit for flotation.

Areas between the house depression will be excavated to determine what, if any activities occurred in the interstructural area. These excavation units will probably be 2 x 2 m in size and be excavated down to sterile soil or parent material (bedrock or gravel). These will also be excavated in arbitrary levels using a shovel, unless conditions warrant a trowel or more delicate instruments. The dirt will be screened and flotation samples will be taken.

Finally, locations outside the house depression areas will be tested in an attempt to locate any trash dumps. These units will be excavated in the same manner as the interstructural units.

Necessary materials will be on hand for the collection of radiocarbon samples and any plant macrofossils.

All artifacts and faunal remains in suitable condition will be processed (cleaned and catalogued) in the field. All fragile material will be brought back to the Laboratory of Anthropology for processing.

Analysis

All time sensitive artifacts, such as projectile points, will be classified by morphology and compared to the type collection at the Laboratory of Anthropology. These morphological types will be compared to dated material from other sites in the Plateau/Great Basin region.

If financially possible obsidian artifacts will be analyzed to determine source area. A sample will be subjected to hydration tests to make an age determination. This date along with radiocarbon dates and relative dates from the artifacts will be used to date structures at the site.

A sample of the artifacts will be examined for edge wear in an attempt to make functional determinations which would shed light on the activities that occurred at the site. Lithic debris will be analyzed to determine what type of tool manufacturing occurred at the site, and if there are any differences in the different areas of the site.

The patterning of features (such as post holes) and artifacts within structures will be examined to determine what they can tell us about the construction and use of the structures.

Faunal remains will be analyzed using the comparative collection at Washington State University. The assistance of an experienced zooarchaeologist has been promised. Floral remains will be sorted by archaeological laboratory workers and then examined by a consulting botanist.

The Survey

A survey will sample an elevational gradient to locate archaeological sites associated with particular physiographic features which range in elevation from 3500 ft. to just over 8000 ft. The sample area, which extends from Big Creek northward to Cold Meadows, includes the drainages of Cave Creek, Cabin Creek, Cliff Creek, and Cougar Creek. Areas to be checked will include (but will not necessarily be limited to) small stream canyons, xeric ridges, meadows at differing elevations, marshes, and the shorelines of cirque lakes.

Following assumptions 3, 4, and 5 above the initial expectation is that archaeological sites will be found in close proximity to resource areas; that they will contain evidence for occupation with a limited range of activities. Intensity of occupation and varieties of implements should indicate whether a site is a base camp or a special purpose camp. Lacking direct evidence for any resource procurement activity, proximity to a particular kind of resource should be a sufficient basis for determining particular economic activities.

Methodology

The initial sample will be small and a strategy which will maximize available resources must be designed. Concentration on areas which have a high probability for site occurrence will be necessary. Whatever the particular strategy, as many different kinds of resource areas as possible will be checked.

Since "resource area" is the controlling concept, these will have to be defined. Without field work this cannot be done except in very gross terms. At the moment these are places where plants, animals, or fish can be procured. The staff of the University of Idaho Wilderness Research Center is creating an herbarium collection for the research area. By working in cooperation with the staff we will be able to begin an inventory of food plants. Information about fish and game will be dependent on accumulated fisheries and game management data. A point of considerable importance is that because the environmental system is largely undisturbed by agriculture or logging a quantification of the resource base will be possible.

Additional Research

A knowledge of the environmental history of the area is essential, even for a synchronically oriented project. Toward this end research on the Quaternary geology of the area will continue with an emphasis on the hydrology and landform chronology of the Big Creek basin. Descriptions of various landforms will also be necessary. In order to further knowledge of vegetation dynamics suitable localities for pollen preservation will be sought and at least one will be sampled.

Summary

Because the prehistory of the River of No Return Wilderness area is so poorly known we submit that an appropriate research strategy is to develop an initial model for integrating presently available information and for directing future research. Because of limitations in present funding an economic model of subsistence-settlement seems potentially more fruitful than a culture historical model. By concentrating on a limited part of the wilderness area, one which seems representative of the entire area, a model at least generally applicable to the entire area is feasible.

It would be criminally over optimistic to pretend that a complete model can be devised on the basis of information gathered in a single short season with a small crew of field school students. The information to be obtained however, should be sufficient for a preliminary model which will be part empirical and part supposition. This will provide a basis for modification of the research strategy and a guide for continued research to refine and elaborate to the point where an adequate explanation of human survival in this particular environment can be offered.

Field work schedule, 14 June to 26 July 1983

Excavation at 10-VY-31 (120 person days minimum)

Excavate two to four small depressions

Excavation most of one large depression

Sample inter-depression area

Search for trash deposits

Archaeological Survey (60 person days minimum)

Carefully search selected meadows, marshes, ridgetops, lake shores, and tributary canyons for evidence of prehistoric human utilization; record occurrence of major food plants.

Geologic Reconnaissance (30 person days minimum)

Refine late Quaternary land form chronology of Big Creek Canyon; provide basis for correlating to glacial chronology and generalized Middle Fork chronology; search for localities with pollen preservation; describe landforms associated with resource areas.

The field work will be conducted by students enrolled in a University of Idaho Archaeology Field School to be directed by the senior author who will be assisted by the junior author. At least two of the participants presently intend to use recovered information as the basis for their master's thesis.

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