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TEST EXCAVATIONS AT THREE MID-ELEVATION ROCK ART SITES, WARNER VALLEY, OREGON

By

MICHELLE ANTONIA ROSS

A thesis submitted in partial fulfillment of
the requirements for the degree of

MASTER OF ART IN ANTHROPOLOGY

WASHINGTON STATE UNIVERSITY
Department of Anthropology

May 2000

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TEST EXCAVATIONS AT THREE MID-ELEVATION ROCK ART SITES, WARNER VALLEY, OREGON

ABSTRACT

by Michelle Antonia Ross, M.A.
Washington State University
May 2000

Chair: Peter J. Mehringer Jr.

The Calderwood Rockshelters and Bitterroot Rockshelter occur in east facing basalt rimrock at the south end of Warner Valley, Oregon. The shelters have petroglyphs and also pictograph designs colored red and black. We found few surface artifacts, except the rock art, during several visits to these sites. The question arose as to the function of these mid-elevation sites. The sites lie in the transition area between lowland lake/marsh edge occupation sites and upland root gathering and hunting locales. What association do they have with regional subsistence practices? Test excavation revealed little groundstone, a lithic assemblage represented by late stage tool manufacturing and Rosespring series projectile points, a faunal assemblage dominated by intrusive rodent and rabbit remains, four hearths, and a singed tule textile fragment. Analysis of the excavated material suggest that the Calderwood Rockshelters and Bitterroot Rockshelter served as temporary camps. However, the association of these mid-elevation sites with proposed lowland/upland subsistence models remains uncertain.

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Dedication

I dedicate this thesis to the three most important people in my life, my parents, John and Marian, and Shane Durant. Their love and support saw me through.

CHAPTER 1

INTRODUCTION

Three subsistence and settlement models currently exist for Warner Valley, southeastern, Oregon. In this manuscript, I compare the subsistence and settlement models previously presented by Weide (1968), Fagan (1974), and Ricks (1995). To test these models, I excavated three mid-elevation sites and compare the recovered artifact assemblage with the Weide, Fagan, and Ricks' models.

In the late 1960s, Margaret Weide recorded and surface sampled a total of 32 occupation, lithic, camp, hunting blind, and rock shelter sites from the Warner Valley floor to the adjacent uplands. She focused on discovering settlement patterns and developed a settlement and subsistence model for Warner Valley that revolved around valley floor lakes and marshes. She saw the local inhabitants as tethered to the wetlands, only venturing into the uplands on short excursions for specific resources.

Weide's (1968) subsistence and settlement model (Figure 1) distinguishes between upland and lowland sites. Her upland sites are small with artifact assemblages dominated by task specific implements. Groundstone is rare in the upland sites compared with the greater amounts of flaked tools (e.g., scrapers, flakes, tools, and points) and debitage, especially flake scrapers associated with butchering. Lowland sites show repeated long term occupations through multiple house pit floors, and have abundant groundstone. Weide concluded that lowland sites represent large congregations near permanent water and upland sites represent hunting locations. She further supported her subsistence and settlement model, that she later termed the "North Warner Valley subsistence network", by documenting the distribution of an "indicator material", a single nonperishable material with a single source (Weide 1974:65). Flint Hills aphanitic basalt found on the northwestern boundary of Warner Valley became her indicator material. The presence, absence, and relative abundance of the aphanitic basalt at various sites within the valley helped Weide define a prehistoric band territory (Weide 1974).

In his dissertation, Fagan (1974) attempted to test Bedwell's hypothesis that during the altithermal, a dry and warm climatic period (Antevs 1955), people abandoned basin lowlands. Fagan (1974) test excavated 12 sites in southeastern Oregon, including three sites near springs on the high fault scarp north of Adel in southern Warner Valley. He concluded that people had in fact abandoned the valley floors for more dependable upland perennial springs, during the period 8950 to 6950 B. P., which he correlated with the altithermal.

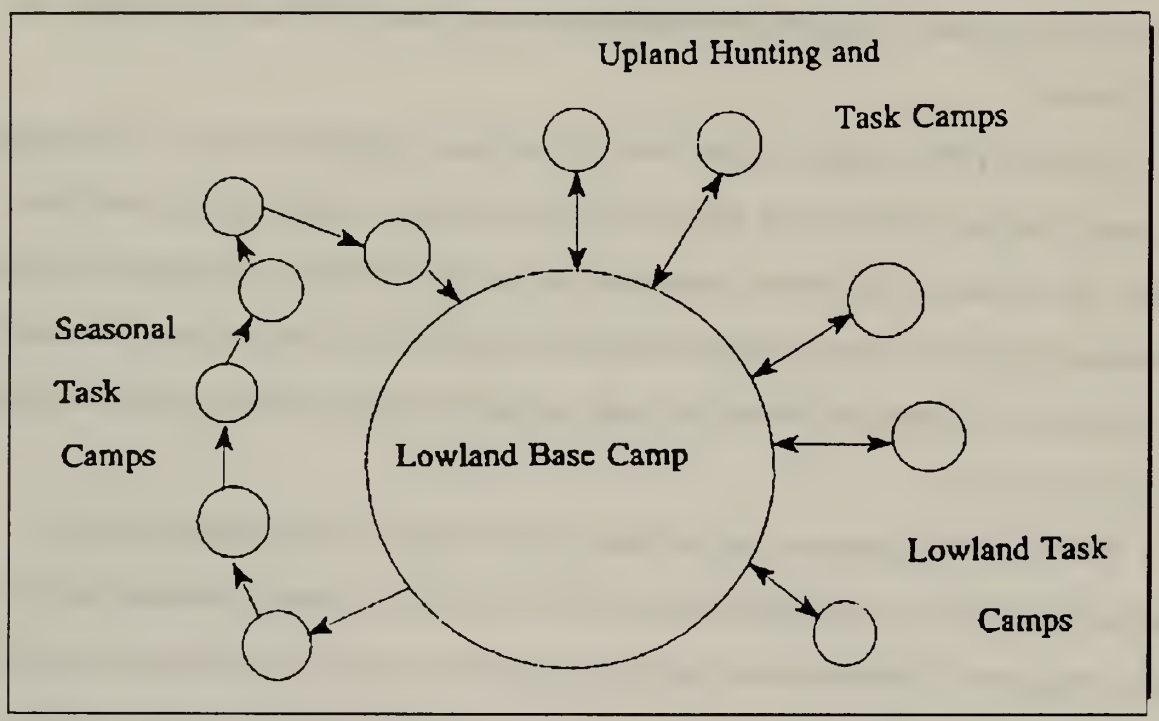


Figure 1. Weide's and Fagan's subsistence and settlement models (from Ricks 1995:22, Fig. 2).

The subsistence and settlement model developed by Fagan follows Weide's model closely, except he divides lowland sites into two categories: lowland occupation sites and lowland temporary sites. Lowland occupation sites exhibit large surface scatters (45 to 275 meters) near permanent water; these possess varied artifacts representing many tasks. They also may have burials, domestic structures, and 15- to 2-meter-deep middens. Lowland temporary camps are smaller than occupation sites; they lack deep middens, possess artifact assemblages dominated by flaked stone, and occur near less reliable water sources. Fagan says that upland tempo-

rary camps lack middens, have artifact assemblages oriented to hunting, and lack food preparation and tool manufacturing implements. In addition, they occur near permanent water sources along upland meadows. Neither Weide nor Fagan address mid-elevation sites as other than mid-elevation upland task locations.

Ricks (1995) used rock art data to challenge Weide and Fagan's traditional notions of the Warner Valley subsistence and settlement systems. Ricks conducted an analysis of 117 rock art sites in Warner Valley and their associated archaeological and environmental factors. Rather than lowland base camps and seasonal upland hunting task camps (Fagan 1974; Weide 1968), Ricks' subsistence and settlement model divides occupation time at base camps between fall and winter in the lowlands and spring and summer in the uplands (Figure 2). If Ricks' model

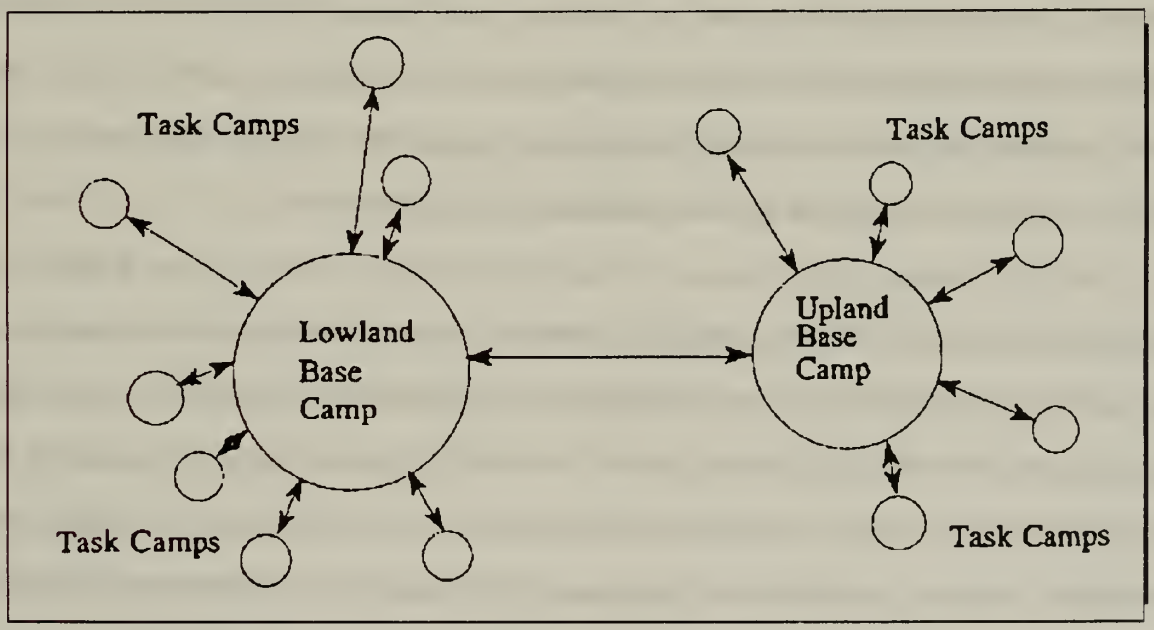


Figure 2. Ricks' (1995:3, Fig. 3) subsistence and settlement model.

holds, then intermediate sites may represent the passage of people between winter and summer base camps. Do mid-elevation rock art sites represent the movement of people between lowland and upland base camps following Ricks' model?

Ricks (1995:132) defined sites according to their elevation, then attempted to find associations between these sites and rock art. According to Ricks, lowland sites in Warner Valley

occur from 4300 to 4750 feet and are associated with rock art found on large boulders at the foot of talus slopes adjacent to the valley floor. Intermediate or mid-elevation rock art sites occur on basalt rims between 4751 and 5600 feet. Upland rock art sites (above 5600 feet), where thin soils support bitterroot and biscuitroot, may be large and near potential plant gathering locales (Cannon et al. 1990:179). Ricks found that the number and variety of rock art elements increased near larger occupation sites. She was, however, unable to discern a relationship between site locations and design types (Ricks 1995:1).

Applying Ricks' notions, sites between the uplands and lowlands should resemble camps. What archaeological evidence would suggest a camp? Binford (1980) defines a camp as a "temporary operational center for a task group." Archaeologically, he expects these sites to show great variability dictated by season and resource target (Binford 1980:12). Gould (1977) defines three types of aboriginal Australian camps: large, small, and men's traveling camps. The first two are determined by the number of people who occupied the campsite. Individual, oval-shaped sleeping depressions mark the latter campsites (Gould 1977:29-42).

Great Basin ethnographic sources note that people living in scattered camps avoided concentrating in one area, to avoid depleting that area's resources. This way they maintained and gained the highest yield from area resources (Fowler and Liljeblad 1986:443). Thus, camps may offer an opportunity to date single components. Steward (1938) wrote that, for convenience, the Shoshoni located camp sites in Reese River Valley, Nevada, between the marshy valley floor and the mountains. Thomas, Pendleton, and Cappannari (1986) describe the Shoshoni subsistence pattern as comprised of small family groups foraging from spring to fall and establishing stable residences in the winter. The seminomadic Northern Paiute followed a similar pattern. Individual households or "camps" were called *nogadi*. A small cluster of nogadi were known as *nanan'ogadi*. Translated, the root "no-" means 'house dwell' as well as 'pack and carry' and 'camp temporarily' (Fowler and Liljeblad 1986:436). Resource localities and harvest time determined group movements (Thomas et al. 1986:266).

My concept of a camp is a briefly (no more than five days) occupied habitation used by

people traveling from one location to another. Preserved characteristics of a camp might include a small hearth (fire cracked rock and/or a thin ash lens), and a few artifacts that display little variation. The artifacts present may be debitage representing late stage manufacture or resharpening of stone tools. Camps would lack groundstone, except perhaps bedrock mortars. Distinctive features, except perhaps a cache, would be absent from such camps. Unless burned, temporary shelters would probably go unrecognized in the archaeological record.

In the following manuscript, I present excavated material from three Warner Valley mid-elevation sites. In consultation with William Cannon, BLM Lakeview District Archaeologist, and Dr. Peter Mehringer, my thesis Chairman, we selected the Calderwood Rockshelters (35LK684/685) and Bitterroot Rockshelter (35LK635). The sites occur in the intermediate zone (between 4751 and 5600 feet) in east facing rim rock. All three shelters have rock art. Because we observed few surface artifacts in or around the shelters, rock art was the prime indicator of human presence. Finally, all the sites lie at some distance (>0.5 miles) from summer water. A more detailed look at the environmental setting and historical background of these sites is provided in chapter 2.

At each site I recorded the rock art, excavated test units, and conducted a surface survey and collection. Excavations were conducted in the deepest deposits with potential for stratigraphic control. My data collecting methods are described in chapter 3, followed by a report of the recovered information in chapter 4. I conclude this manuscript in chapter 5, by hypothesizing whether the excavated material from the sites as a whole represent permanent occupations or camps to test Ricks', Weide's, and Fagan's subsistence and settlement models.

CHAPTER 2

BACKGROUND

Environmental Setting

Physiography and Geology

Warner Valley, southeastern Oregon, exhibits typical Basin and Range topography (Figure 3 and 4) (Hunt 1974). A string of lakes and wetlands stretches approximately 80 miles down the 3- to 9-mile-wide valley. The Warner Mountains border the valley to the west and a series of aligned uplifted fault block ridges of Tertiary volcanic rocks form the eastern boundary. The valley floor averages 4468 feet above sea level (Alt and Hyndman 1978; Fowler et al. 1989).

At the north end of the valley, along the eastern boundary, lie Poker Jim Ridge and Hart Mountain. Hart Mountain, largest of the fault block ranges, rises to 8017 feet at Warner Peak. Going south, fault block ridges fall away from the mountain to make up the eastern boundary of the valley's southern end. Visually, the fault block ranges resemble stylized waves rising gradually out of the valley floor. Their sharply eroded crests expose steep vertical basalt capped ridges ascending 2000 feet above the valley.

Eroded remains of two volcanic domes, Coyote and Rabbit Hills, bound Warner Valley on the northwest (Weide 1968). Traveling south along the western side of the valley, one notices that the Coyote Hills are soon replaced by two towering ridges, Lynch's Rim and South Warner Rim. These rims mark the northeastern margin of the Warner Mountains that rise to 8456 feet at Crane Mountain.

The Warner Valley drains internally, and is within the limits of the hydrographic Great Basin (Figure 5) (D'Azevedo 1986). Ephemeral and perennial creeks feed the lakes and marshes. The Warner Mountain's melting snows and springs sustain Deep Creek and Twentymile Creek that in turn nourish Crump Lake in the southern end of the valley. They also feed Honey Creek that drains into Hart Lake in the north. Hart Lake then drains southward into Crump Lake through a narrow passage (The Narrows) connecting the valley's two sub-basins.

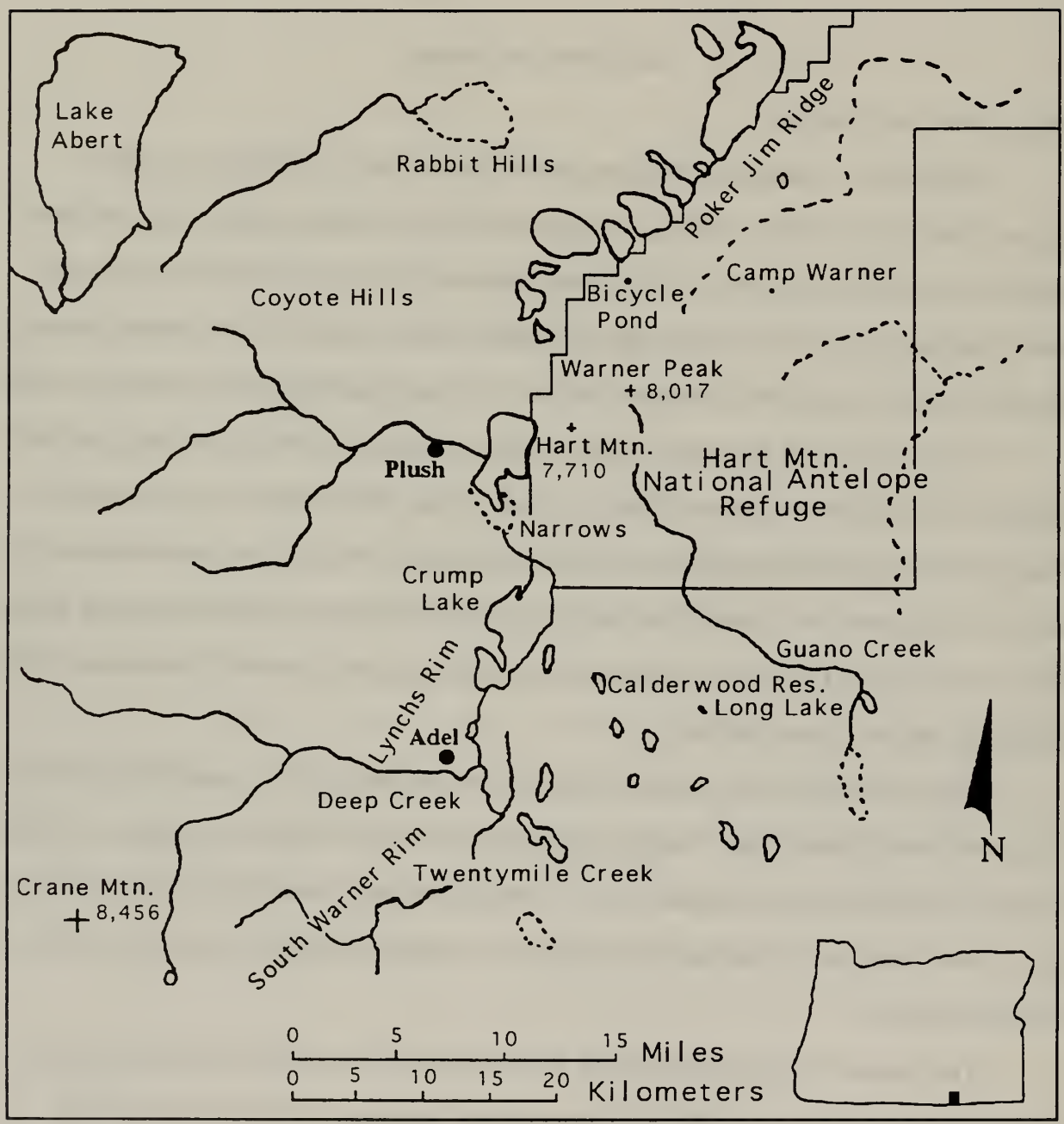


Figure 3. Map of Warner Valley, Oregon, and vicinity.

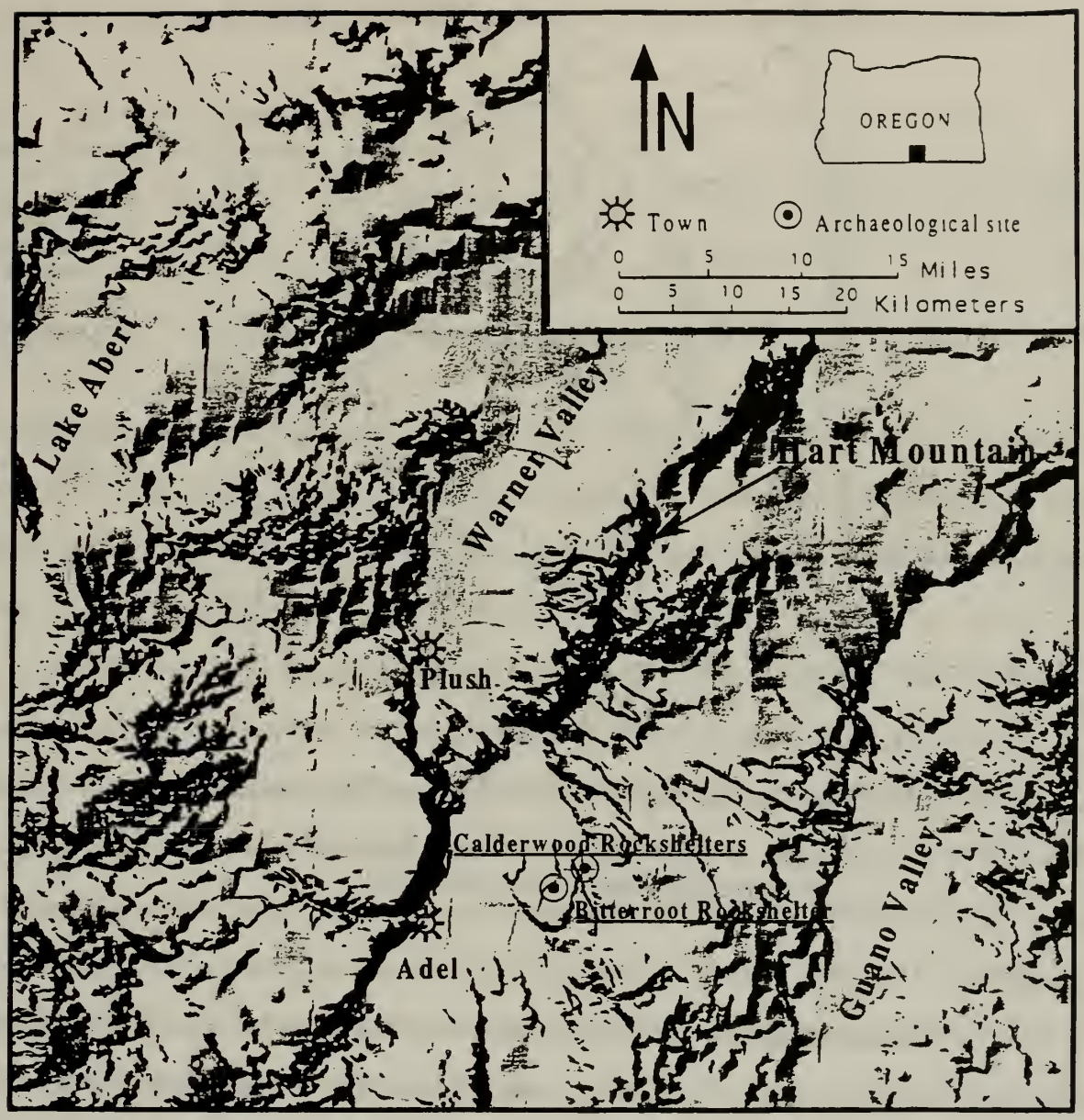


Figure 4. Shaded relief map of Warner Valley region showing location of study sites (Adopted from USGS 1:250,000 Adel and Klamath Falls 1x2 degree DEM's).

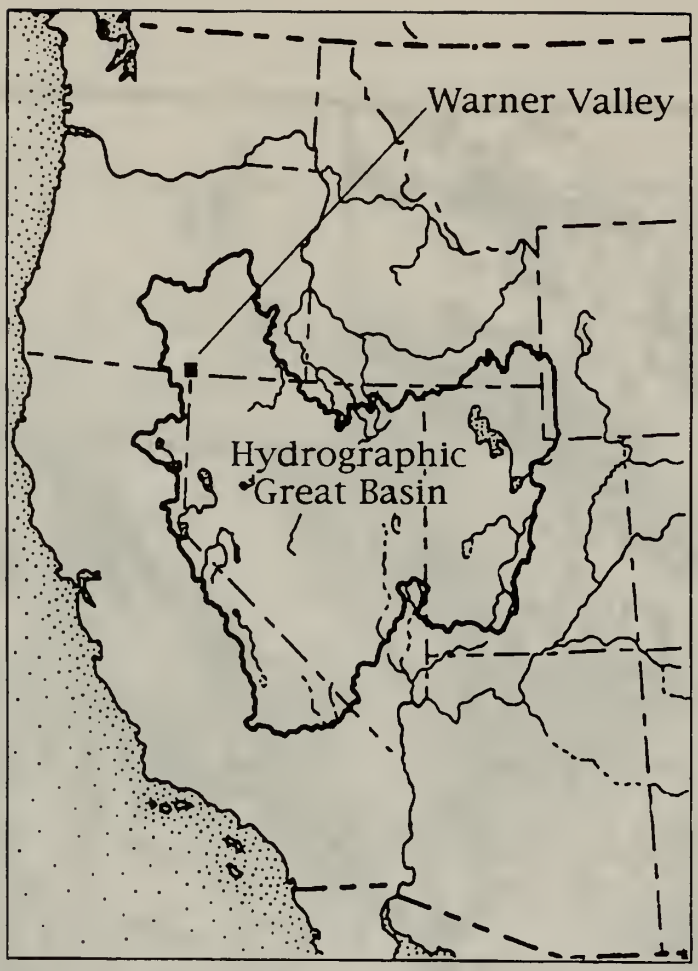


Figure 5. The hydrographic Great Basin and Warner Valley (after D'Azevedo 1986).

Climate

The "Cascade Mountains' rain shadow" falls over Warner Valley. Pacific air masses bring winter and spring precipitation and occasionally summer tropical moist air moves in from the gulf of California. In 1997, these broke a three year drought. From 1961 to 1990, the Adel weather station, located at an elevation of 4500 feet, recorded a mean precipitation of 9.58 inches and a mean temperature of 49.3 ° F (Table 1). Minor et al. (1979:8) characterized the region as having "light precipitation, low relative humidity, rapid evaporation, abundant sunshine, and extreme ranges in temperatures." During the Pleistocene and into the Holocene, Warner Valley experienced continuous climatic fluctuations as evidenced by strandlines and dunes (Mehringer 1986). Today's lakes are ponds compared to Pluvial Lake Warner that once stood 322 feet above

the valley floor and had a surface area of 812 square miles (Fiero 1986; Fowler et al. 1989). Several of the fault block walls in the valley show strandlines carved or deposited by wave

Table 1. 1961-1990 Temperature and Prescription Monthly Means from the Adel Weather Station, Oregon, as Reported by the Oregon Climate Service.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temerature (F)												
Maximum	41.9	46.6	52.3	59.3	69.9	78.4	87.9	86.2	77.8	67.1	50.2	42.1
Minimum	21.8	24.3	27.8	31.6	39.1	46.6	52.1	50.1	42	34	27.7	21.5
Precipitation (in)	1.11	0.98	0.93	0.87	0.82	1.01	0.42	0.59	0.58	0.46	1.13	1.09

action. Holocene ephemeral lakes of both sub-basins, especially in the north, sport arcuate clay-silt dunes. During dry episodes, these dunes developed when "sand sized aggregates of silt-clay particles stripped from dry crusts formed on desiccated lake floors, rolled into pellets, and deposited on the downwind side of the lake" (D. Weide 1975:198).

Pollen records from Bicycle Pond on the west slope of Hart Mountain, Diamond Pond, near Malheur Lake, and two lakes on Steens Mountain, give evidence of varying Holocene climates. According to fossil algae, pollen and seeds, Diamond Pond experienced shallow waters, suggesting a dry-warm period between 6000 and 5400 B. P. By 4000 B. P., water tables rose indicating a cooler and/or moist interval lasting until 2000 B. P. At Diamond Craters, packrat middens chronicle expansion of juniper in these times of ample moisture (Mehringer and Wigand 1990; Wigand 1987). Less effective moisture again dominated the region after 2000 B. P. and periodic droughts marked the last 1200 years. Overall, effective moisture has increased in the last 400 years. The pollen record from Bicycle Pond extends back to 2000 B. P. and testifies to the climatic pattern indicated at Diamond Pond.

Flora

Vegetation of Warner Valley is influenced by elevation, soil characteristics, climate, and currently, by cattle and agriculture. Tight saline soils that support shadscale vegetation with greasewood (*Sarcobatus vermiculatus*), hopsage (*Atriplex spinosa*), and rabbitbrush

(*Chrysothamnus viscidiflorus*), surround lowland wetlands dominated by tule (*Scirpus* spp.) and cattail (*Typha* spp.). Two upland biotic communities lie above the greasewood zone. The first is big-sage (*Artemisia tridentata*)/bunchgrass interspersed with occasional junipers (*Juniperus occidentalis*). The second is the low sage (*Artemisia rigida*)/bunchgrass. Both zones support ethnographically known edible and medicinal plants such as camas (*Camassia quamash*) that is common in wet meadows at all elevations, Indian ricegrass (*Stipa hymenoides*) that occupies sandy substrates, wild onion (*Allium* spp.), biscuitroot (*Lomatium macrocarpum*), and bitterroot (*Lewisia rediviva*) that grow on shallow rocky soils (Couture et al. 1986; Cronquist et al. 1972; Brown et al. 1958; Fowler 1993; Taylor 1992).

Recent pollen analysis in Warner Valley from the excavations of the Peninsula Site (35LK1279) has provided some insight into the local past environment and human exploitations of that environment. Pollen from structure 1 at the site, reflects a "shrub community on the dry transition between a sagebrush steppe and shadscale shrub community" near a small marsh (Eiselt 1998:33). Further analysis showed abundant algae (*Spirogyra* and *Botryococcus*) indicating that humans used mud from the marsh as roof daub (Eiselt 1998:33).

Fauna

Warner Valley's rich wildlife includes large and small animals known to have been important to the native people. Large game include antelope (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and bighorn sheep (*Ovis canadensis*). Though bighorn sheep were exterminated in 1886, a new population was introduced from British Columbia in 1954 (Weide 1968:141). Today bighorn sheep and antelope find protection within the boundaries of Hart Mountain National Wildlife Refuge, established in 1936.

Ethnographically important small game includes the black tailed jack rabbit (*Lepus californicus*), cottontail rabbits (*Sylvilagus Nuttallii*), sagebrush rabbits (*S. idahoensis*) ground squirrels (*Spermophilus* spp.), and badgers (*Taxidea taxus*). Human predators competed with coyotes (*Canis latrans*), bobcats (*Lynx rufus*), and mountain lions (*Felis concolor*). In addition,

Warner Valley is home to amphibians and reptiles, such as the sagebrush lizard (*Sceloporus graciosus*) and western rattlesnake (*Crotalus viridis*), that the natives represented in their rock art (Csuti et al. 1997).

In the spring and fall, the sky is thick with migrating birds. The Pacific Flyway brought in pelicans (*Pelecanus erythrorhynches*), grebes (*Aechmophorus* spp.), Canada geese (*Branta canadensis*), and other waterfowl enjoyed by the people (Csuti et al. 1997).

Best of all, the people feasted on four endemic species of fresh water fish and various minnows that thrive in the valley's lakes and marshes. These species are redband trout (*Oncorhynchus mykiss*), Warner sucker (*Catostomus warnerenosculas*), tui chub (*Gila bicolor*), and speckled dace (*Rhinichthys osculas*). Ten University of Nevada Reno (UNR) excavated sites in Warner Valley yielded sucker and chub remains. Cannon (1993:86) notes that the largest amounts of fish remains appear associated with lake shore and long term occupation sites. Interestingly, net weights - thin pieces of basalt spall with two to four opposing, bifacially flaked notches along the edges - are the only artifactual evidence of fishing within the region.

Along with fish, the people relied on shellfish. The fresh water mussel, *Anodonta oregonensis*, resides in the valley's lakes. Although Kelly (1932) doesn't mention historic utilization of shellfish, eight UNR excavated sites in Warner Valley produced shellfish remains. (Fowler et al. 1993; Weide 1968:139).

Cultural Setting

Historic

Peter Ogden, the first Euro-American to view Warner Valley, camped at the south end of the valley on May 21, 1827 (Weide 1968:144). Later, in 1832, John Work's expedition for the Hudson's Bay Company entered the valley. Next, came Colonel J. J. Abert, a U. S. Army engineer hired to make a map of the Oregon country in 1838. He noted the Warner Lakes on his maps. Five years later, Captain John C. Fremont's famous second expedition celebrated Christmas along the shore of what is today known as Hart Lake. At the time, he christened the lake Lake Christmas (Bach 1990 ; Hatton 1988; Phillips 1977).

The name "Hart", from which Hart Mountain and Hart Lake are derived, stems from the use of a heart-shaped cattle brand by a local ranch. "Hart" is a misspelling (McArthur 1974:344). The valley and southwestern mountain range take their names from Captain William H. Warner, a U. S. Topographical Engineer, sent to the area in 1849. Captain Warner sought to find and map an immigrant and military road, as well as a railroad following Oregon's southern boundary. He died in Surprise Valley during an Indian ambush (Bach 1990:4; Weide 1968:147-148).

In 1866, to counter growing Indian aggression, the army established the Hart Mountain Military Camp, known as Camp Warner, only to rebuild it one year later at Honey Creek. To enforce the Klamath-Modoc-Yahuskin Treaty, in 1864 many of the peaceful Paiutes were removed from the Warner-Surprise valley region to the Klamath reservation near Chiloquin, Oregon (Bach 1990).

As time passed, Anglo-European immigrants settled in Warner Valley. The first white child was born in 1869, near Plush. Legal authority of the region transferred from Grant county to Lake County in 1885. In 1933, The Civilian Conservation Corps (CCC) built roads, irrigation works, fences, and telephone lines (Bach 1990; Hatton 1988). Today the Bureau of Land Management, Lakeview District, manages most of the valley.

Ethnographic

Of the early expeditions, only Ogden experienced contact with the natives of Warner Valley; and then, only because they raided his horses. Though he never saw an Indian in the area, Fremont followed a well beaten path and noted fresh tracks. His first contact came as he traveled south to Surprise Valley (Weide 1968). Although the first observations of the natives are sketchy, early ethnographic work gives some insights.

Warner Valley falls within the territory of the Northern Paiute. Their territory extended from the foot of the Sierra Nevada in the west to the Reese and Owyhee rivers in the east, and from the John Day River headwaters in the north to Mono Lake in the south (Figure 6). Many

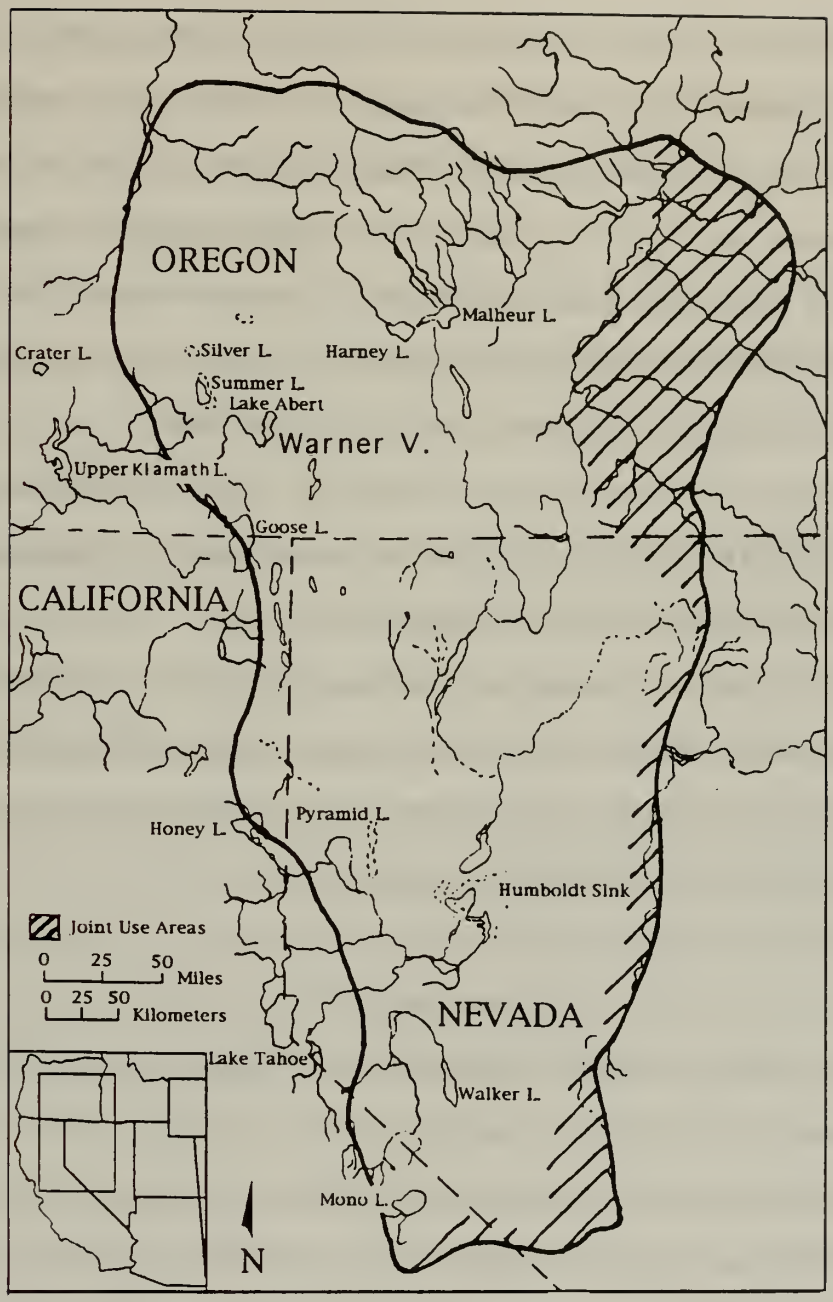


Figure 6. Northern Paiute Territory (after Fowler and Liljeblad 1986:437).

groups of people linked together by their Western Numic language, a branch of the Uto-Aztecan language family, constituted the Northern Paiute (Fowler and Liljeblad 1986).

Northern Paiutes called *Gidü'tikadü* or groundhog-eaters occupied Warner Valley, whereas the name *Saibütikadü* or Tule-Eaters identified only those camped near Adel. Group

names were commonly associated with local foods (Fowler and Liljeblad 1986:436; Kelly 1932).

These semi-nomadic peoples lived in communities of "semi-annually united clusters of individual families" who recognized a headman. Headmen, influential camp advisors, never inherited their position; rather, individuals achieved the honor through group consensus (Fowler and Liljeblad 1986). Although they use the term loosely, Steward (1939) and Kelly (1932) describe the Northern Paiute sociopolitical organization as a band. Kelly's informants included two Paiutes, Piudy and Daisy (Limpy) Brown, born in Adel and Plush.

The headman was not the only position of leadership. Other individuals were chosen as hunting bosses or leaders for activities such as antelope and rabbit drives. Shamans gave supernatural guidance (Fowler and Liljeblad 1986; Kelly 1932).

The material culture and technology of the Warner Valley Northern Paiutes was marsh oriented. Wetlands provided cattails and tule used to make cordage, duck decoys, basketry, matting, clothing, sandals, shelters, and boats (Wheat 1967). Hunted or driven mammals, fish, roots, seeds and gathered berries formed the subsistence base.

Archaeological Research

Professor Luther S. Cressman, the Father of Oregon Archaeology, conducted the first archaeological research in Warner Valley and adjacent areas. He began in 1932 by surveying Oregon petroglyph sites. His research expanded in the following years to include a survey of Guano Valley in 1934 and a series of rockshelter excavations from 1935 to 1938. Of these excavations, Fort Rock Cave became his most famous because textiles and other artifacts occurred both above and below Mazama tephra (Cressman 1936, Cressman et al. 1940). Fort Rock Cave is located approximately 90 miles to the north-northwest. After the development of ^{14}C dating methods, a Fort Rock Cave pre-Mazama sagebrush sandal was dated at 9000 B. P. (Bedwell 1973).

Little archaeological activity occurred in Warner Valley until the late 1960s, when Weide (1968) and her husband conducted her dissertation field work in the area. At this time, in addi-

tion to her subsistence and settlement work, Weide proposed a three period chronology based on projectile point types. The Early Period lasted from 7000 B. P. to 3450 B. P., the Middle Period from 3450 B. P. to 1450 B. P.; lastly the Late Period began about 1450 B. P. and continued into historic times (Figure 7) (Weide (1968).

By the 1970s, Warner Valley experienced a surge of archaeological research, from Bureau of Land Management compliance and mitigation projects to Fagan's dissertation (Minor et al. 1979). In 1976, William Cannon and Mary Ricks began recording Warner Valley's rock art (Ricks 1995).

The Warner Valley Project began in the late 1980s. For management purposes, the Bureau of Land Management invited the University of Nevada-Reno (UNR) to conduct archaeological research in the area. UNR's research teams hoped to test, stratigraphically, Margaret Weide's (1968) dating and more fully understand the valley's cultural history. Research conducted in 1987-1988 was disappointing. Apparent pit house sites turned out not to have pit house features after all - rather, they were 40+ year old holes left by vandals (Fowler et al. 1989:56). However, recovered materials suggested, as Weide had proposed (Fowler et al. 1989:58), "that marsh-edge sites and the arcuate dunes were focal points of subsistence activities". Survey and subsurface testing of multiple sites continued from 1989 to 1996 (Eiselt 1998; Fowler 1993).

Since 1990, archaeological research in Warner Valley has been productive. During the field seasons of 1990, 1995, and 1996, UNR conducted sub-surface testing on three of twenty-one depressions at the Peninsula site (35LK2579). The testing of this lowland site proved fruitful. An abundant variety of artifacts and intact house pit structure remains were excavated (Eiselt 1998).

William Lyons conducted archaeological surveys on the Hart Mountain Antelope Refuge, an upland area adjacent to Warner Valley, in 1993. He reported associations between projectile point types and site locations. Early Archaic point types most often occurred in open areas along the northwestern shores of ephemeral lakes. Sites along the southwestern shores of ephemeral

lakes that have small rock rings situated on rimrocks above rockselters with rock art, usually are associated with middle to late Archaic points. Stemmed early Archaic points and lanceolate points are found in conjunction with cairns or rock stacks. Lyons expanded his studies in 1994 by testing the subsurface of sites to establish a cultural resource inventory. In 1997 Lyons surveyed nine more sites (Lyons 1993, 1997a, 1997b).

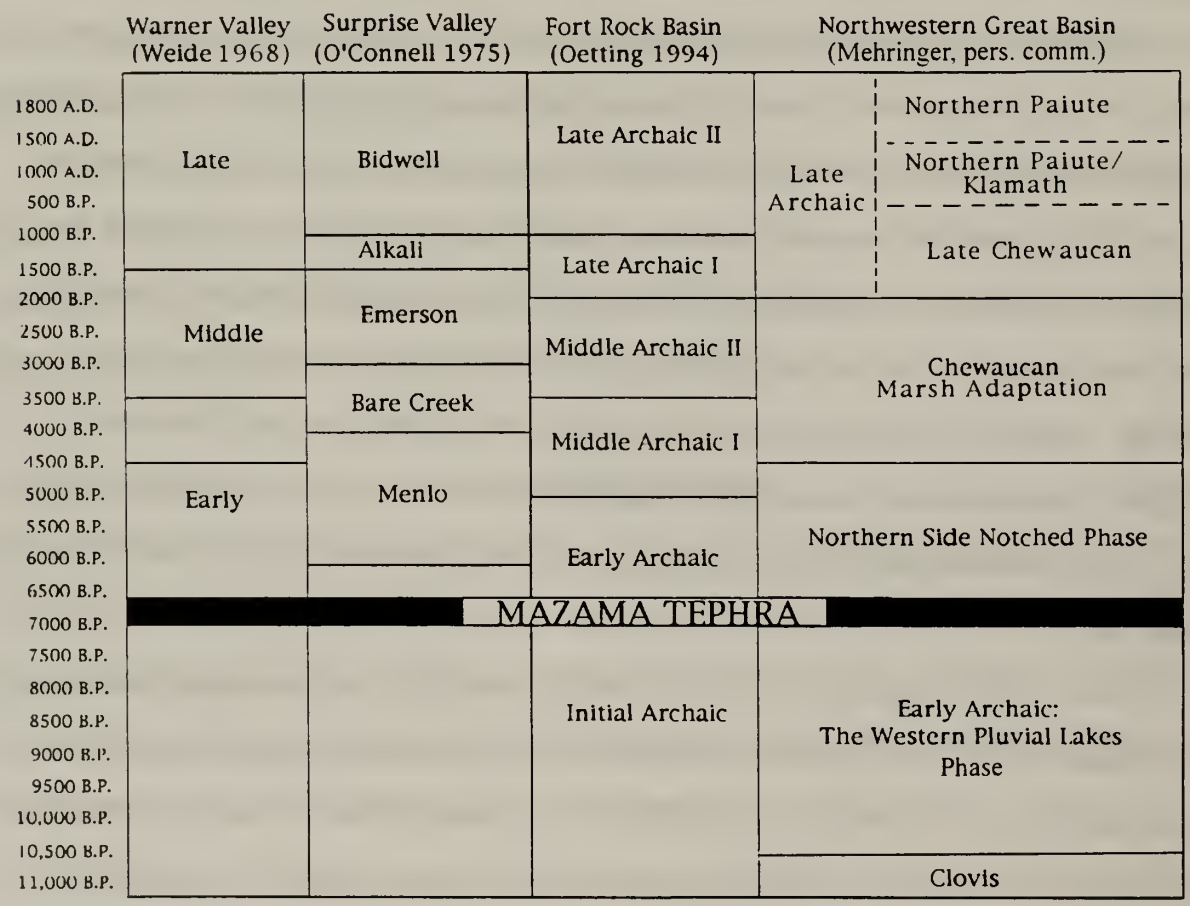


Figure 7. Chronologies of the Nothern Great Basin.

CHAPTER 3

METHODS

Site Descriptions

Calderwood Rockshelters

The Calderwood Rockshelters (35LK684/685) are located in the south end of Warner Valley, northeast of Adel, in Lake County, Oregon. The site consists of two east-northeast facing rimrock rockshelters in close proximity (about 60 meters apart) overlooking the man-made Calderwood Reservoir (Figure 8 and 9). Of the two rockshelters, site 35LK685 (Figure 11) is the deeper (12 meters long x 4 meters deep), whereas site 35LK684 (Figure 10) is 13.4 meters long x 2.4 meters deep. A climbing dune partly anchored by sagebrush and bunchgrass covers the talus slope below the rockshelters.

Figure 8. Calderwood Rockshelters; (right) 35LK684, (left) 35LK685.

Figure 9. View to the northeast of Calderwood Reservoir from site 35LK685 (March 1997).

The reservoir blankets approximately 2.5 square miles, collecting spring runoff from the intermittent Fish Creek. Built privately before 1909 for irrigation, the water is contained by a 9.5

Figure 10. Calderwood Rockshelter "A" (35LK684).

Figure 11. Calderwood Rockshelter "B" (35LK685).

foot high earth fill dam. The reservoir usually dries up by mid-August, except for a 125 x 73 foot (5 feet deep) livestock waterhole dug into its bed approximately 1.5 miles upstream from the dam (BLM reservoir and waterhole inspection sheet 1996).

Both rockshelters contain rock art. Site 35LK684 has petroglyphs and red pictographs, whereas site 35LK685 has pictographs colored with red and black pigment. In addition to its mid-elevation location, the Calderwood Rockshelters are unusual in having rare combinations of pigment colors and rock art styles. Ricks (1995:117) reports only three out of 117 recorded Warner Valley sites have black pigment.

Bitterroot Rockshelter

Located in the valley west of the Calderwood Rockshelters is the Bitterroot Rockshelter site (35LK635) (Figure 12). The site overlooks a dry valley floor from an east facing basalt rock outcrop jutting from a fault block ridge line at an elevation of 4890 feet. The 2.20 meter deep by 3.44 meter wide shelter holds petroglyphs as well as red pictographs. The site's name honors the few bitterroot plants discovered nearby by Lucile Housely, Lakeview District Bureau of Land Management Botanist.

Figure 12. Bitterroot Rockshelter (35LK635).

Recording Rock Art

Cressman became the first to systematically record rock art in Warner Valley. He included the region in his 1932 study on the distribution of Oregon's rock art (Cressman 1937). Since 1976, William Cannon and Mary Ricks have recorded and studied the rock art of Warner Valley as part of the Lake County Rock Art Inventory for the Bureau of Land Management. In their study, Cannon and Ricks treated rock art as artifacts, as did I.

All three sites were first recorded in 1976 by William Cannon. I rerecorded the rock art of the Calderwood Rockshelters in 1996 and the rock art of the Bitterroot Rockshelter in 1997. The recording process incorporated filling out a rock art record form (Appendix B) for each panel complemented by 35mm color, and black and white photographs. The Adobe Photoshop 4.0 computer program allowed for color enhancement of the color photographs without compromising the integrity of the rock art.

Excavation

Excavation began in August 1996 at the Calderwood Rockshelters (35LK684/685), and resumed in May 1997, and continued through August 1997. Excavation at the Bitterroot Rockshelter (35LK635) began in July 1997. The field work, conducted entirely by volunteers, usually took place on weekends. Crew size varied from 2 to 6 people. Although no artifacts were found during initial visits, a surface survey eventually revealed several flakes and a freshwater mussel shell at site 35LK684.

To establish horizontal control a grid oriented to magnetic north and encompassing both shelters was staked out using a transit (Figure 13). The datum, a one foot metal rod, was positioned in a natural bowl-like terrace half way down the slope between shelter 35LK685 and Calderwood Reservoir's shoreline. My site sampling strategy focused on areas of potential archaeological deposits with stratigraphic control. I established 1x1 meter units (except for a 1x2 meter unit staked out at site 35LK685 and later divided into a north and south section) with numeral designations.

During excavation, troweled 5 to10 cm arbitrary levels secured vertical control. The complete excavation of every level followed the removal of a 10 x 10 cm soil sample located in the SW corner of each unit at sites 35LK684 and 35LK635, and the NW corner of each unit at

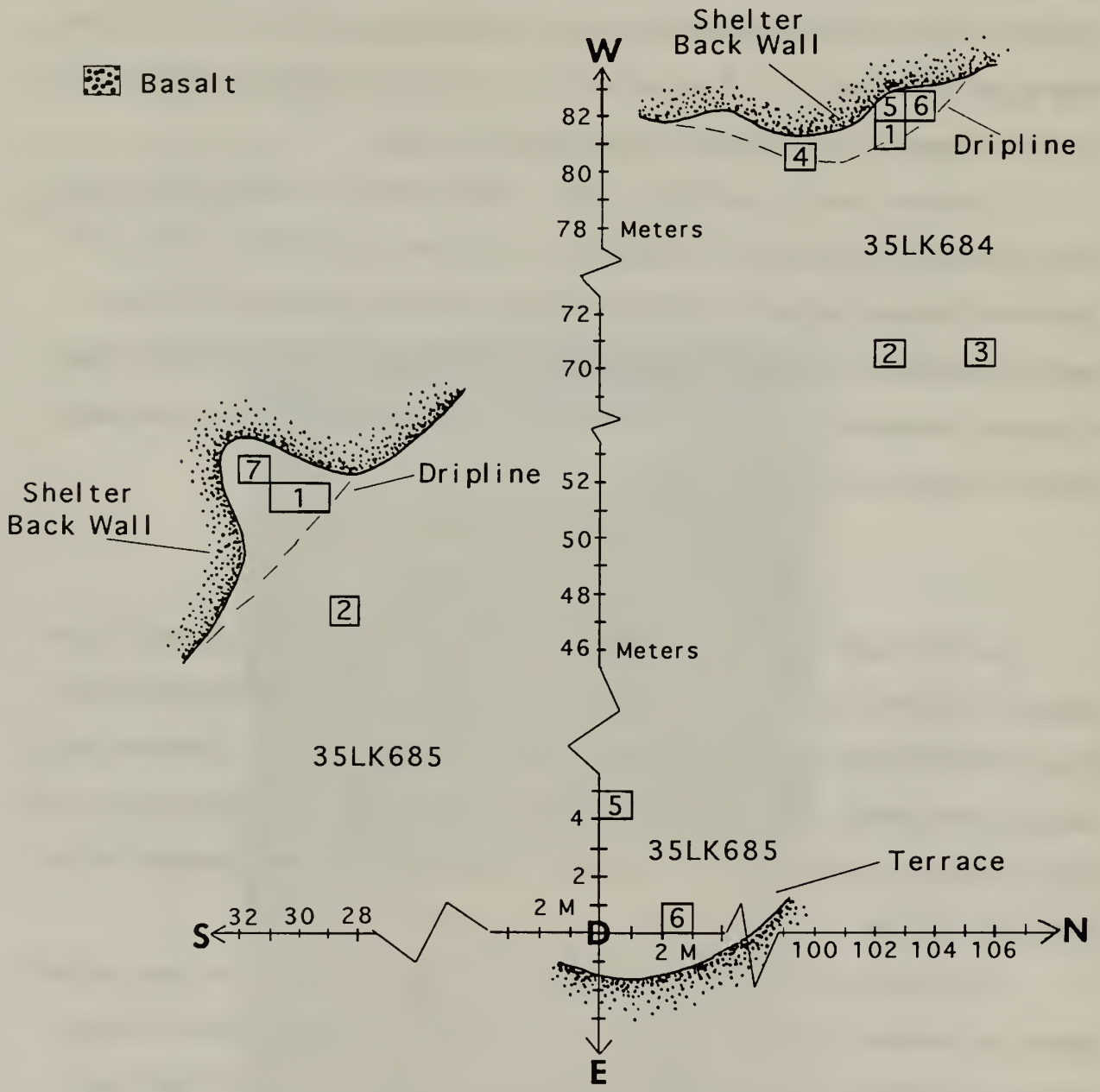


Figure 13. Plan view map of Calderwood Rockshelters and excavated unit designations through Unit 7.

site 35LK685. If an obstruction (e.g., >10cm in diameter rock) impeded the extraction of a "good" sample, then the soil sample was taken from a different corner. I used Thein's (1979)

"feel method" to determine texture and a Munsell Soil Color Chart (Munsell Soil Color Chart 1994) to determine the soil's wet and dry colors. A hand drawn sketch and photographs completed the level. All excavated materials were screened in 1/8 in. wire mesh .

Screened material filled "lots" bags according to unit, depth, and raw material (e.g., bone, chert, obsidian, groundstone). The bags were then cataloged on site and assigned numbers.

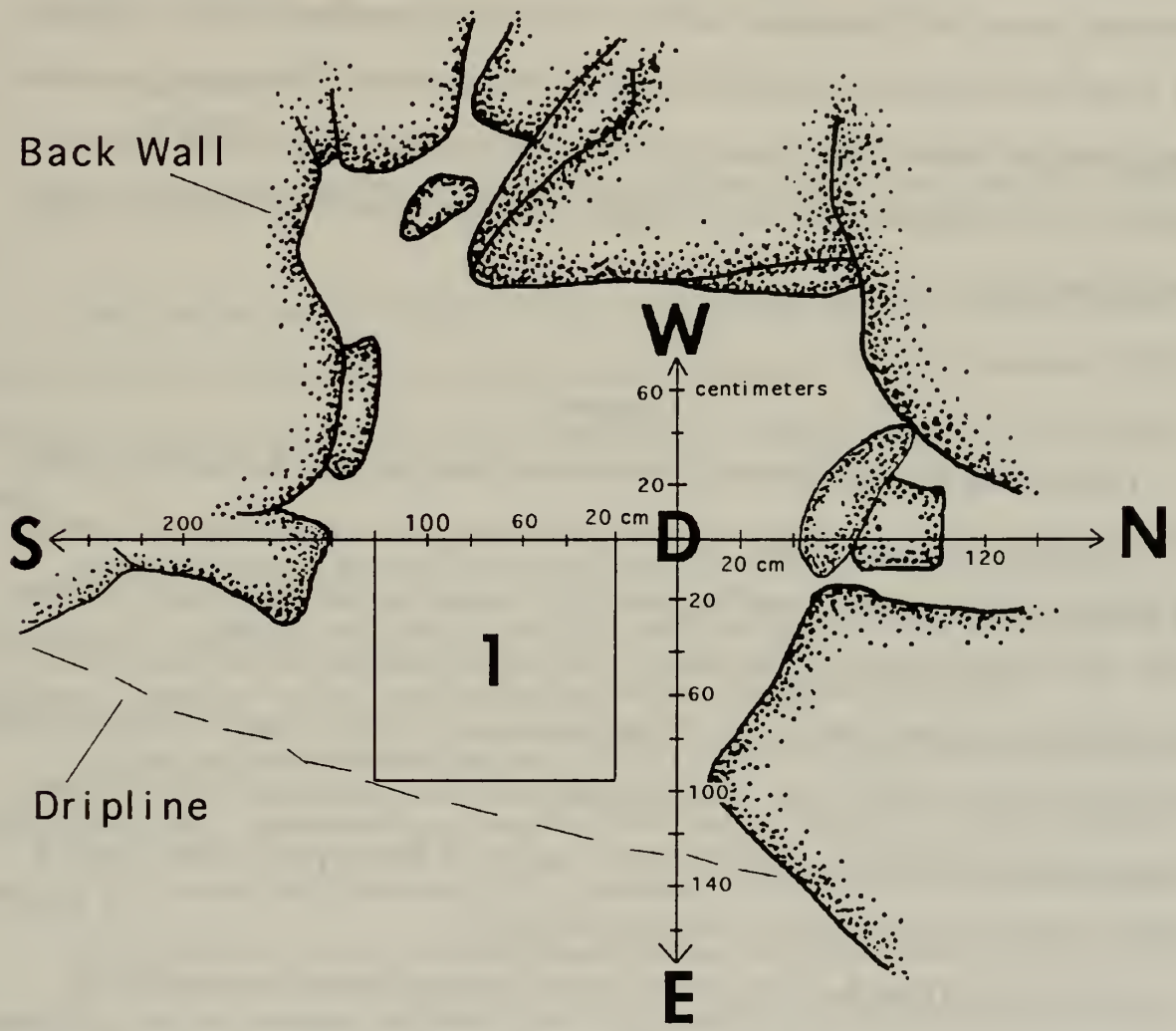


Figure 14. Plan view map of excavation grid and excavation Unit 1 at Bitterroot Rockshelter (35LK635).

Numbers began with an "E" denoting "excavation of," and followed by a letter designating the site of origin, then a consecutive number. The letter "A" identifies site 35LK684; whereas "B" stands for site 35LK685. For example, an artifact labeled EB-325 means the 325th bag of artifacts found at the excavation of site 35LK685. "Lots" bags were later sorted in the labora-

tory. Collected charcoal was stored in alumnum foil, assigned an excavation number, and labeled according to unit, level, and feature. I drew and photographed stratigraphic profiles of unit side walls.

Combining all three sites, I excavated 13 units; six units at site 35LK685, six at site 35LK684, and one at site 35LK635 (Figure 13 and 14). Units were excavated to an average of 50 cm below surface, with the deepest (unit 2 at site 35LK685) extending to 70 cm. Two units, Units 1 and 7 inside rockshelter 35LK685, bottomed out onto bedrock. We were still encountering archaeological remains when excavation ended. The field phase of the project was concluded due to time constraints and lack of funding; in addition, no new types of artifacts were being encountered.

Laboratory

I analysed the excavated artifacts at Washington State University, Pullman, WA. Here, bone was separated into three categories: cranial, post cranial, and indistinguishable fragments. Bags labeled "skull" contained cranial fragments (e.g., mandibles, teeth, brain cases, maxillas). "Limbs" (long bones, metacarpals, metatarsals, ribs, scapula, pelvises) and vertebra comprised the two categories of post cranial bones. Further subdivision of these categories depended upon separating burnt from unburnt bone. After separating the bones I recataloged (using the same procedure established during excavation), labeled, and stored them in plastic vials. Finally, I counted, weighed and, where possible, identified the bones.

Once removed from their original "lots" bags, (separated during excavation by raw material types) lithic materials were counted, weighed, sorted into eight categories, and measured using calipers. Following Andrefsky (1998), the types include hafted bifaces (HB), bifaces (BF), flake tools (FT), unidirectional cores (UC), multidirectional cores (MC), proximal flakes (PF), flake shatter (FS) and angular shatter (AS). Measurements included maximum width, maximum length, proximal flake platform type, proximal flake termination type, and cortex amount to determine which stage of tool manufacturing the combined asseblages may represent.

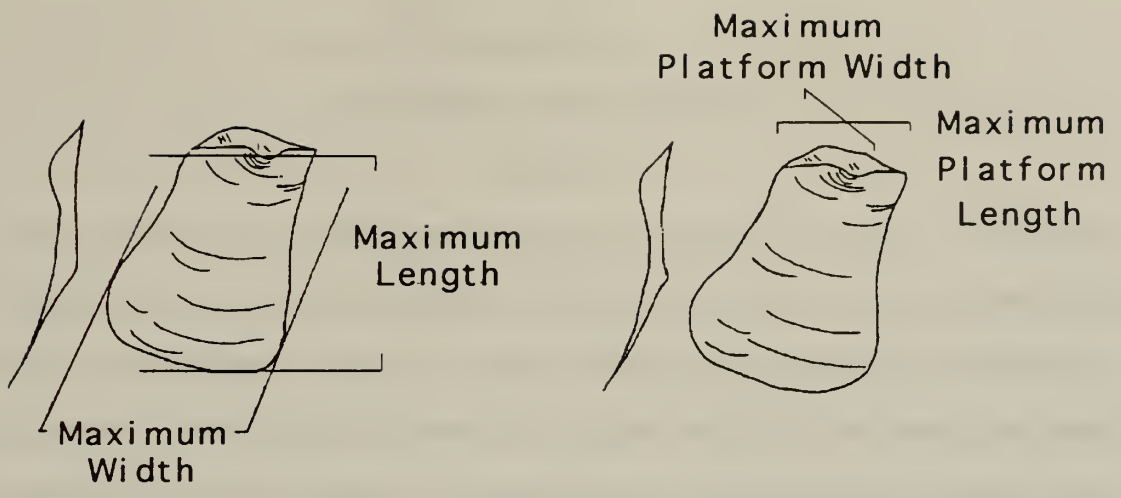


Figure 15. Measuring technique used on proximal flakes (adopted from Andrefsky 1998).

Cortex amount was determined ordinally. A zero indicated no cortex present. If cortex comprised <50% of a flake's dorsal side, then it was recorded as a "1." A "2" indicated >50% of the flake possessed cortex, a "3" symbolized total cortex coverage of the dorsal side (Andrefsky 1998).

Although angular shatter and flake shatter have no striking platforms, an arbritrary measruement was taken by measuring the smallest and largest portions. For proximal flakes, the maximum length and width of the body and platform were measured (Figure 15).

Proximal platform types included cortical (CR), flat (FT), complex (CM), abraded (AB), and shattered (SH). Termination types constitute feathered (F), stepped (S), hinged (H), and plunging (P) (Cotterell and Kamminga 1987). Incomplete proximal flakes went unmeasured.

Extracted intact from site 35LK684, hearth feature 4 underwent water screening in the laboratory. The five centimeter arbitrary levels initally taken during excavation were screened through five nested sieves (mesh sizes 8, 16, 24, 32, and 42). The same recording procedure previously mentioned applied to artifacts recovered from the 8 mesh sieve. I entered and recorded all labratory data in an Excel spreadsheet. With the completion of this report, the collection will be curated at the Museum of Natural History repository at the University of Oregon in Eugene, Oregon.

CHAPTER 4

RECOVERED INFORMATION

Rock Art

Warner Valley is renowned for the abundance and variety of its rock art. The general term "rock art" incorporates petroglyphs, figures pecked or incised into a rock, and pictographs, figures painted with pigments onto a rock surface. On public lands within the valley, Ricks (1995) reported 117 sites displaying 144 rock art designs. The art is most abundant at upland sites such as Long Lake and lowland sites like the Narrows. Yet, rock art is not limited to lowland or upland base camps; rather, it occurs at all elevations and at places lacking other evidence of occupation. The Calderwood and Bitterroot Rockshelters all exhibit various forms of rock art as described later in this chapter.

Function and Interpretation

Interpreting and dating rock art has many pit falls. As Keyser (1992:21) notes ". . . scholars [are] reluct[ant] to speculate in print about their subject beyond the limits of statistical confidence intervals, competing hypotheses, and regional style definitions." Of course, this is not universal; still the need for caution is well expressed by Cannon and Woody (1996). They state that rock art is ". . . especially vulnerable to pure speculation. Once made, these speculations often continue unchallenged, in an example of what Binford called 'myth making' " (Cannon and Woody 1996:2).

Rock art fuels the imagination. When confronting a rock art panel, one immediately wants to know what it means, as if viewing readable Egyptian hieroglyphics. Rock art is not script, but a collage of symbols representing concepts and ideas, perhaps comparable to an art style represented by Picasso's *The Accordionist* or *Girl Before a Mirror* paintings. Unfortunately, there is little ethnographic information to support hypotheses of function and interpretation. Historic informants maintain having no knowledge of the art. Though searching for exact

meaning is futile, rock art may be described, compared, and sometimes dated. This may lead to hypotheses about function or relationships.

The study of rock art can "illuminate cultural history, as style and content reflect continuity as well as changes through time or between regions" (Schaafsma 1986:215). It may indicate certain events, like a successful raid or the birth of an important individual. For example, two glyphs in Northern Arizona, and glyphs at the Abo monument and Chaco Canyon, New Mexico, depict a supernova that occurred in 1054 A. D. (Patterson 1992:194). One of my crew members, Dan Braiden, suggested a possible astronomical explanation for the creation of the Calderwood Rockshelter pictographs. His hypothesis proved to be unsupported, at least not for a connection to the summer solstice. Photographs and compass readings of the sun rising from both shelters at Calderwood and from Panel 4 at site 35LK684 (Figure 21) were sent to Frank Occhipinti, a University of Colorado student researching possible site connections to astronomical events. From these records, he calculated where the sun would rise for the summer solstice and found no apparent alignment between the suns solstice position and Panel 4.

Rock art may be associated with "hunting magic" and shamanistic ritual, or mark food processing, residential, or sacred localities. Heizer and Baumhoff (1959) used the concept of "hunting magic" in connection with rock art. They found that rock art usually occurred along prehistoric game trails and other locations ideal for ambushing game. Thus, they believed the designs were "aimed at insuring success in the chase" (Heizer and Baumhoff 1959:904). Whitley (1992) connects rock art to shamanistic practices. He notes that caves served as entrances into the supernatural world and rock art functioned as the shaman's spirit helpers seen in dreams and hallucinations. One spirit helper, the bighorn sheep, possessed the powers of curing and weather control, not hunting success. Cannon and Woody (1996) view both the hunting magic and shamanistic ideas as male-biased. They refer to site reports emphasizing projectile points, while neglecting rock art that is "often found in direct association with ground stone and habitation sites" (Cannon and Woody 1996:1). They speculate that rock art is primarily associated with food processing and/or residential locations. Ricks and Cannon agree that because rock art is

found at a variety of sites in Warner Valley, it was "integrated into the daily life of the prehistoric residents of Warner Valley" (Ricks and Cannon 1993:98).

Dating

Dating is a significant problem in rock art research. Most of the dating methods are relative, such as seriation or stylistic analysis. In addition, dating methods include: 1) presence of historical elements (e.g., the horse), 2) association with other datable archaeological materials (e.g., projectile point styles or the bow and arrow), and 3) superimposition, when one design overlaps another. Other relative dating methods include patination, weathering, and stratigraphy.

In petroglyph manufacture, one pecks a design into surface patina to reveal light un-weathered or oxidized rock underneath. The patina is a dark chemical weather stain made of oxides and hydroxides of manganese and iron, clay minerals, and adhered trace elements (Dorn and Whitley 1983). Patination occurs when the dark patina or "desert varnish" slowly reclaims a design. The deeper the patina cover, the older the design. However, dates are not consistent at all locations because of varying environmental contexts.

Weathering of minerals or deposition of animal feces obscure or fade designs. Thus, rock art dulled by layered streaks of bird droppings combined with dissolved minerals, like iron, from the parent rock may be older than a design not possessing this cover. Spalling, caused by freeze/ thaw cycles, may also threaten rock art compositions (Keyser 1992). Damage occurs as chunks of design-bearing parent rock fall away.

Stratigraphic position rarely supports rock art dating. Occasionally, however, a spall with rock art may be buried, preserving it in a chronological stratigraphic profile. Sediments may also build up quickly against a rock art panel. For example, a buried panel was located at Long Lake (35LK514) and found to extend below a layer of Mazama tephra (Fowler 1993, Ricks 1995).

Other time placement dating techniques applied to rock art include radiocarbon, cation-ratio dating, and lichenometry. Patina builds in layers upon rock surfaces. These weathering

rinds can be counted, but the growth rate is seldom known. If the layers contain organic matter, they may be datable by radiocarbon. Radiocarbon dating is also possible if pigments include organic matter, such as blood. However, the small sample size requires the use of accelerator mass spectrometry (AMS-dating) (Chaffee et al. 1994). Cation-ratio dating (CR dating) measures the ratio of cations (positive ions) of (potassium+calcium)/titanium. The titanium decreases with age in geochemical environments (Dorn and Whitley 1983). Lichen dating stems from early studies of lichen on stones in the Austrian Alps where researchers established growth rates of the lichen *Rhizocarpon*, subgenus *Rizocarpon*. These organisms, known for their slow growth and long life, are used to estimate the age of exposed surfaces (Benedict 1988; Winchester 1988).

The time placement techniques are controversial because of the likelihood of contamination and because they are affected by varying microenvironments. Contamination occurs when carbon is present in the parent rock or is added by mineral or animal fecal deposits. For example, recently, colleagues attempted to duplicate Dorn's technique of preparing patina samples for AMS radiocarbon analysis. They found possible contaminants in the form of carbon-rich particles within the samples. Most samples treated by Dorn possessed the carbon-rich particles. However, additional samples from the same locale taken by colleagues, following Dorn's technique and treatment, did not contain the carbon-rich particles (Beck et al. 1998). Here, a researcher has been accused of tampering with the data, instead of focusing on the problematic existence of contamination.

Problems ensue when attempting to analyze weathering rinds that grew at varying rates, on differing minerals in varying microenvironments. In addition, in lichenometry, the large number of subspecies (many yet unknown) in subgenus *Rhizocarpon* grow at varying rates (Benedict 1988). Like the weathering rinds, growth rates of lichen may vary in different microenvironments.

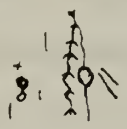
Title	Text Description	Visual Description
Great Basin Rectilinear Abstract	Straight lines, zig zags, hashmarks, "rakes", squares, chevrons, and complex rectilinear designs	
Great Basin Curvilinear Abstract	Circles, curvilinear meanders, dots, arcs, tailed circles, and complex curvilinear figures	
Great Basin Representational	Zoomorphs, fantastic creatures, and anthroporphic forms	

Figure 16. Ricks' (1995) pictograph styles.

Title	Text description	Visual Description
Great Basin Curved Abstract	A deep carving (<12mm) with complex designs and no "white out" in compositions	
Pit and Groove	Random pecked/ground pits varying in size (<10cm); sometimes asociated with groves	
Great Basin Rectilinear Abstract	Shallow straight lines and rectangular or polygonal figures, grids, and zig zags	
Great Basin Curvilinear Abstract	Circles, connected circles, dots, and curvilinear meanders	
Great Basin Representational	Shallowly abraded or pecked zoomorphs, anthropomorphs, plants, handprints, and footprints	
Abraded Areas	Possible art that has become indescribable	
Great Basin Scratched	Usually superimposed over other styles as if "canceling out" the earlier design	
Historic	Representation of historic elements or writing	

Figure 17. Ricks' (1995) petroglyph styles.

Typology

Heizer and Baumhoff (1962) developed a Great Basin rock art typology grounded in manufacturing techniques. Figures 16 and 17 show Ricks' (1995:83-102) modified version of the Heizer and Baumhoff typology. Figure 16 displays pictograph styles, whereas figure 17 represents petroglyph styles. Both figures present each style's name used by Ricks followed by a text description and picture.

Descriptions

In the following descriptions of the rock art at Calderwood and Bitterroot rockshelters, I used Ricks' (1995) typology and design type terminology. With few exceptions, the designs are Great Basin Representational and Great Basin Curvilinear Abstract. Weathering left many of the designs indistinct. For clarity, drawings accompany the rock art computer enhanced photographs.

Calderwood Rockshelters (35LK684/685)

Site 35LK684 consists of five rock art panels. A panel is a rock face of any size used as a canvas. Figure 18 shows Panel 1, made with a red pigment pictograph (probably iron oxide). The design elements include a fat lizard and a sinusoidal line. The lizard is an example of the Great Basin Representational style, while the sinusoidal line is the Great Basin Curvilinear Abstract style. Panels 2, 3, and 5 (Figures 19, 20, and 22) also show pictographs with red pigment, the most common pigment color used in Warner Valley. The pictographs on Panel 5 is discernible, but indeterminate in shape. Panels 2 and 3 combine the Great Basin Curvilinear Abstract and Representational styles. Panel 4 (Figure 21) is unusual in exhibiting a petroglyph and pictograph combination. The design is of concentric circles with tails. Red pigment covers the underlying pecked surface.

Site 35LK685 holds two panels. Both panels display red pictographs of the Great Basin Curvilinear Abstract and Great Basin Representational styles. Panel 1 (Figure 23) consists of

three sections. Section II stands out. Here the red pigment is combined with black (possibly charcoal). Panel 2 (Figure 24) possesses a figure of a downward pointing dart pierced through an open circle. This design may represent an atlatl.

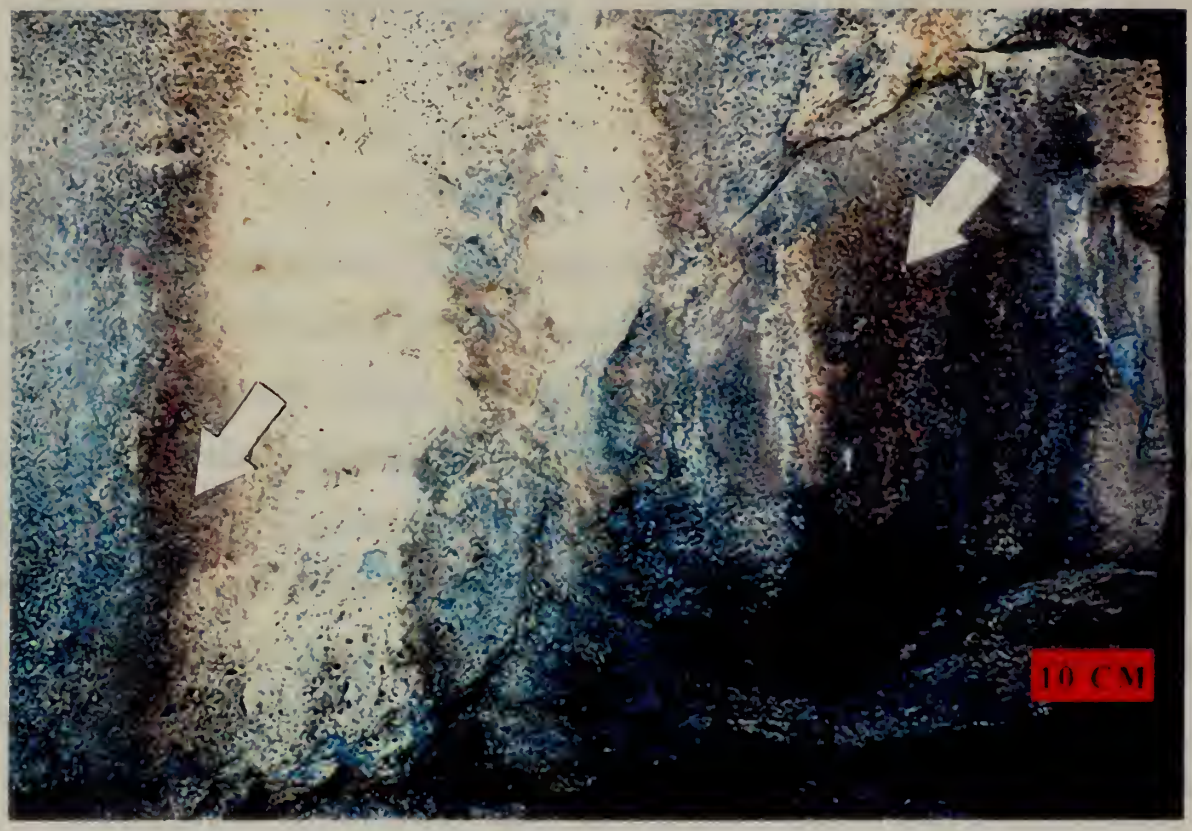
Bitterroot Rockshelter (35LK635)

The Bitterroot Rockshelter houses three rock art panels. Panel A (Figure 25) features a combination of red pigment pictographs and petroglyphs. Note that the designs do not overlap. They occupy separate spaces on the panel. The pictographs are of the Great Basin Curvilinear Abstract and Rectilinear Abstract styles, while the petroglyphs are Great Basin Representational and Abraded Area styles. The dots and sinusoidal line of Panel B (Figure 26) are reminiscent of the Great Basin Curvilinear Abstract style with the addition of a fantastic creature from the Great Basin Representational style. Panel C (Figure 27) is barely discernible. Though difficult to see in the photograph, to the naked eye the design resembles a braid or sinusoidal line, suggesting the Great Basin Curvilinear Abstract style.

Analysis

Due to reasons described at the beginning of this chapter, no attempt has been made to interpret the rock art found at the Calderwood and Bitterroot Rockshelter sites. However, it is interesting to compare and contrast the designs. Table 2 tallies and summarizes the design styles. Note that only the most distinguishable designs were used in this analysis.

Pictographs make up 89% of the distinguishable rock art. Of this amount, 65% are Great Basin Curvilinear Abstract and 33% are Great Basin Representational. Rare combinations of red and black pigments are used at the Calderwood Rockshelters (Figure 23.2). Red pigment is common in Warner Valley pictographs, whereas black pigment occurs in only three of 117 recorded Warner Valley sites including Calderwood Rockshelter (Ricks 1995:117). Of the Great Basin Representational pictograph styles, zoomorphs, especially lizard designs, are the most common.



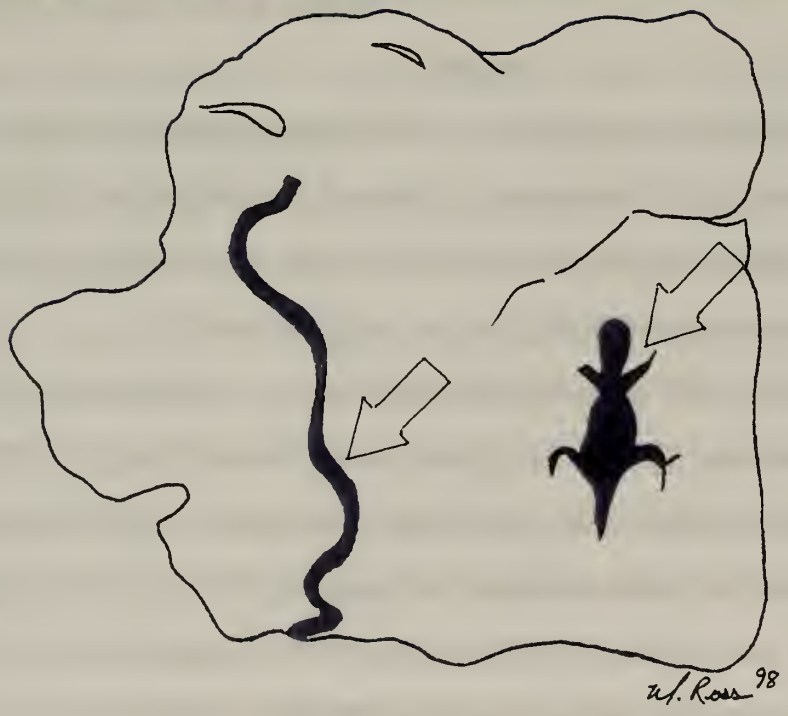


Figure 18. Site 35LK684, panel 1.

Figure 19. Site 35LK684, panel 2.

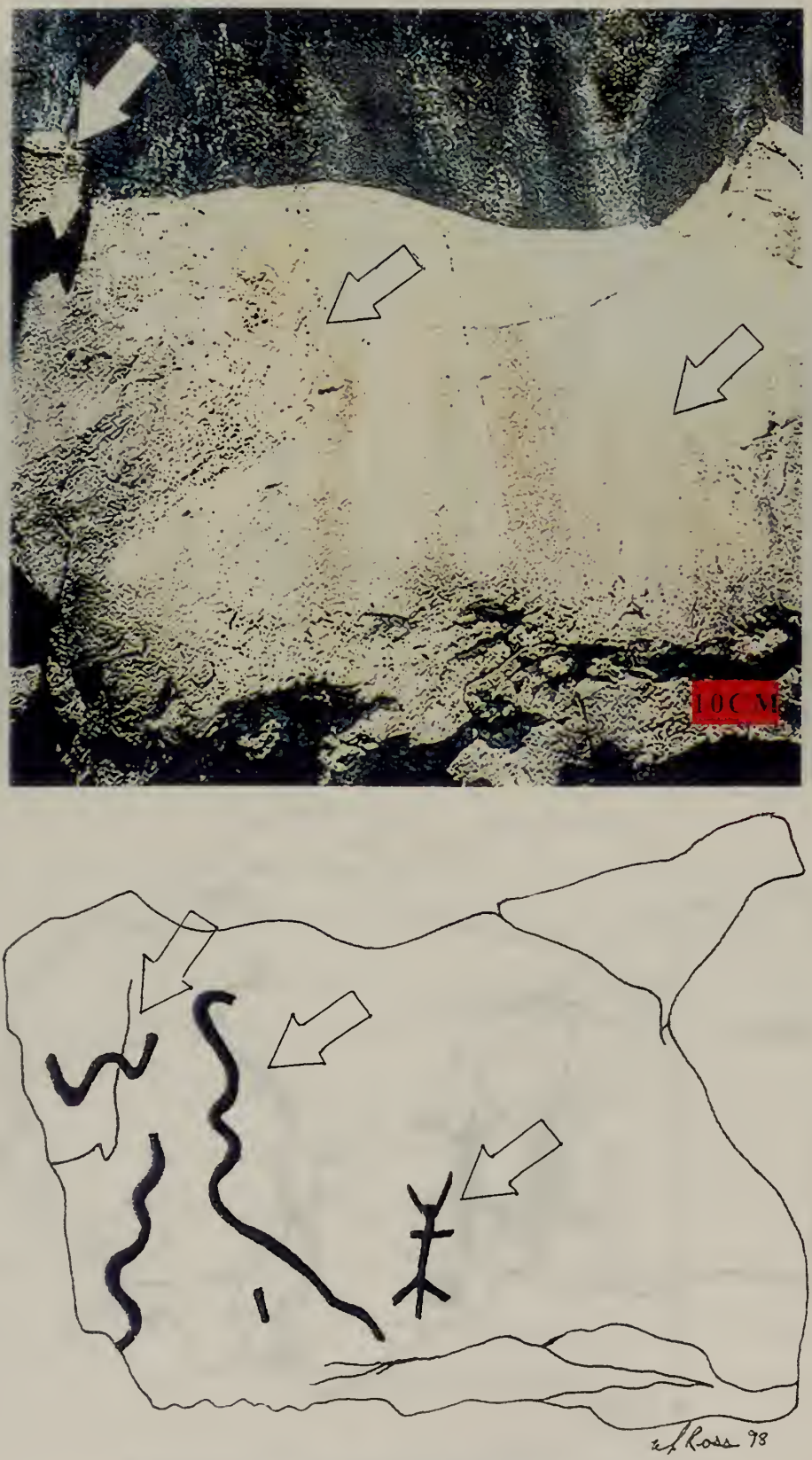


Figure 20. Site 35LK684, panel 3.

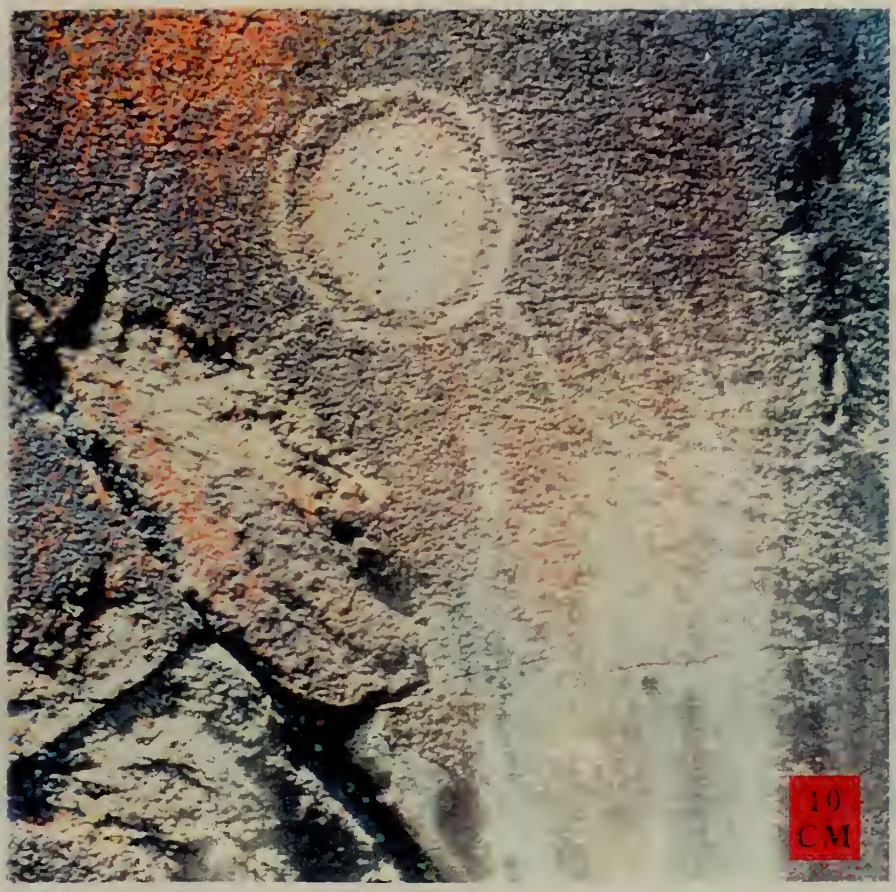


Figure 21. Site 35LK684, panel 4.

Figure 22. Site 35LK684, panel 5.

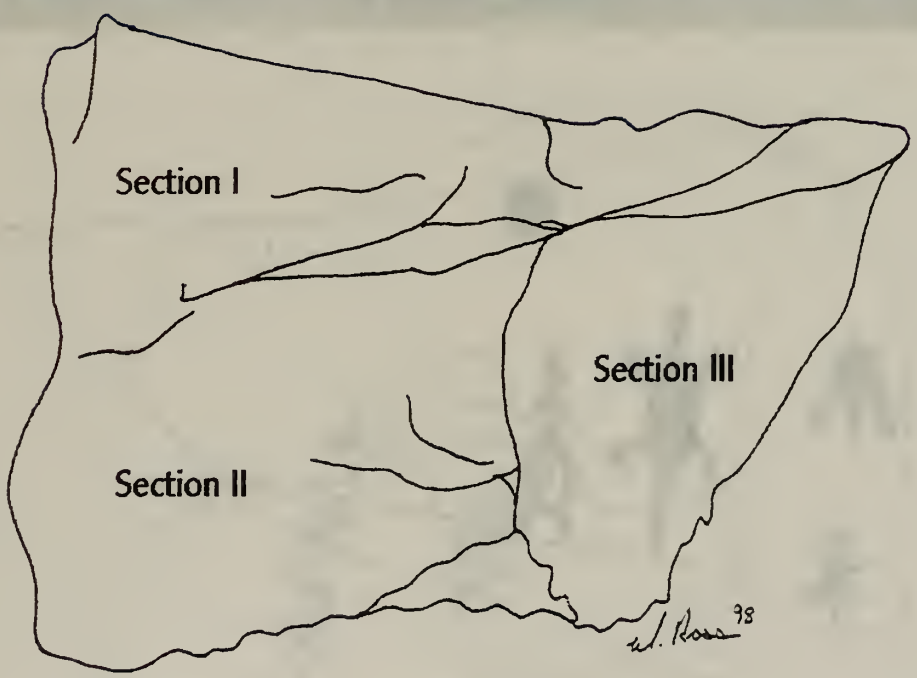
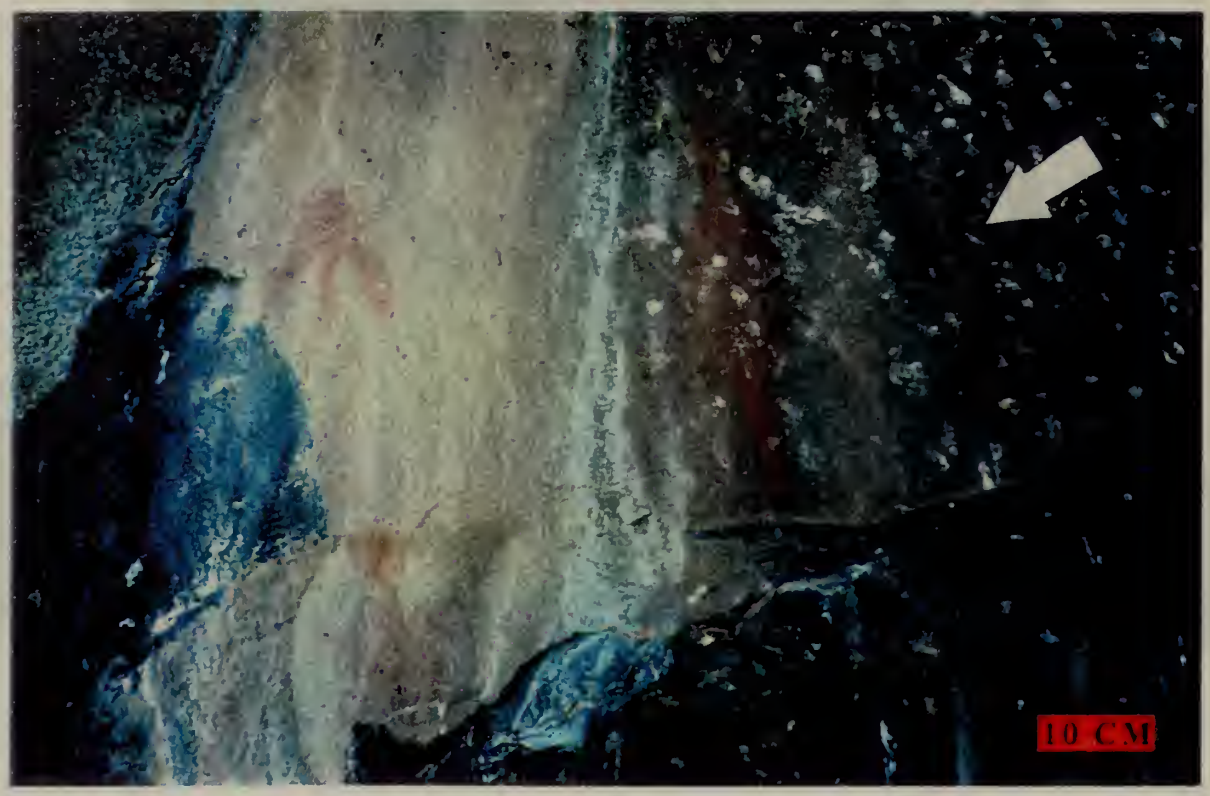


Figure 23. Site 35LK685, panel 1.



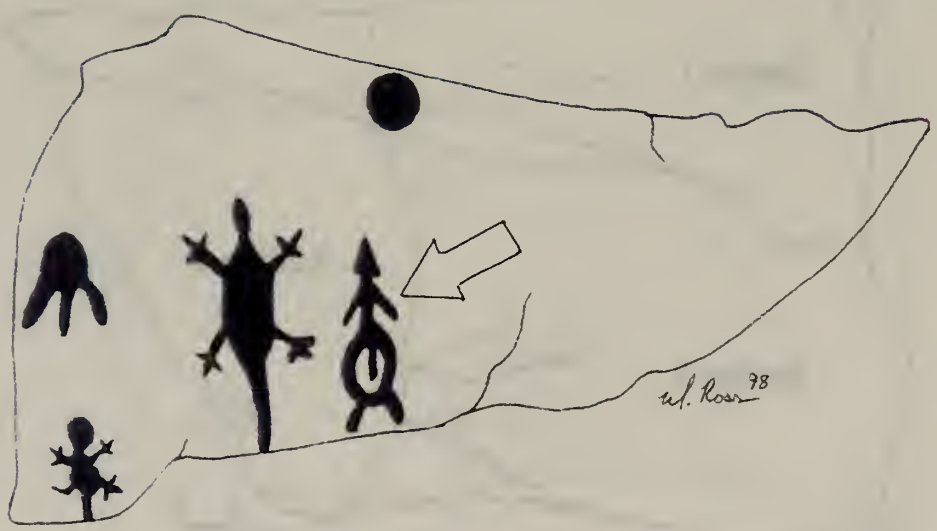


Figure 23.1. Site 35LK685, panel 1, section I.

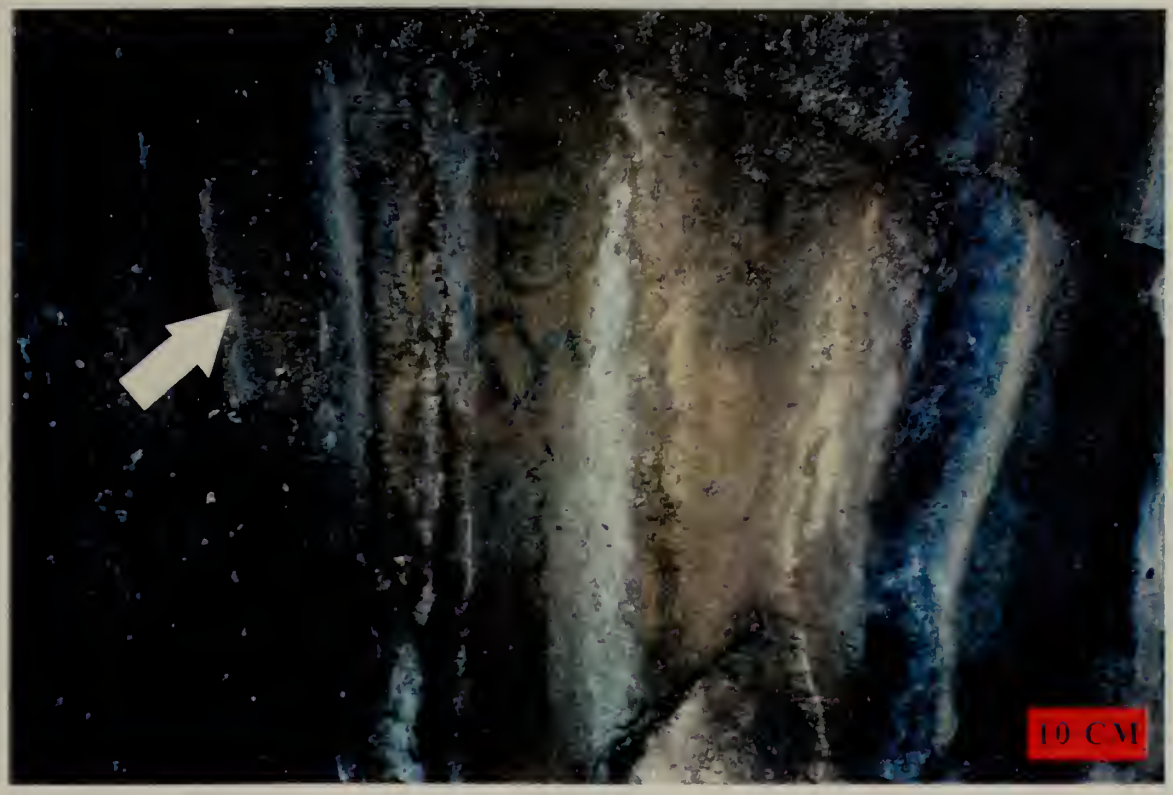


Figure 23.2. Site 35LK685, panel 1, section II.

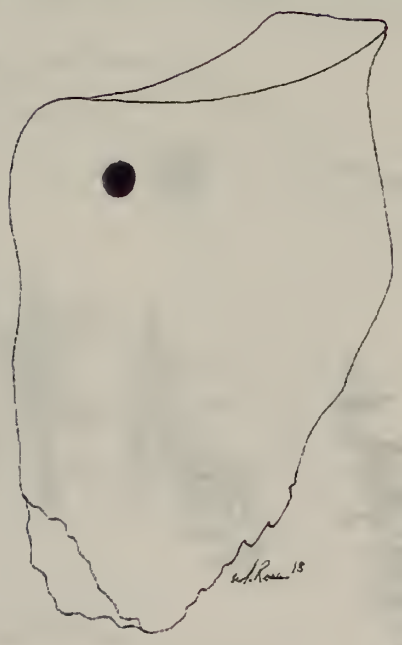


Figure 23.3. Site 35LK685, panel 1, section III.

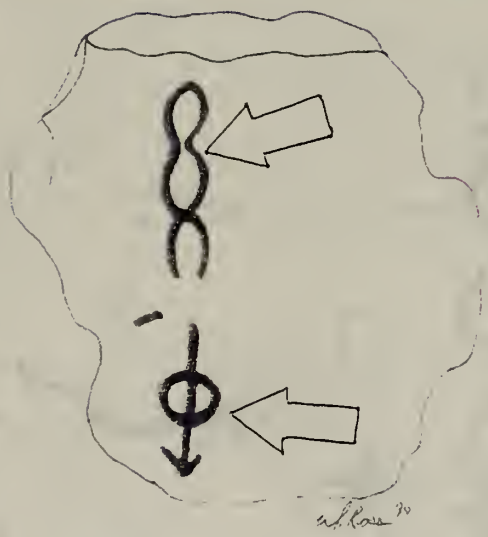
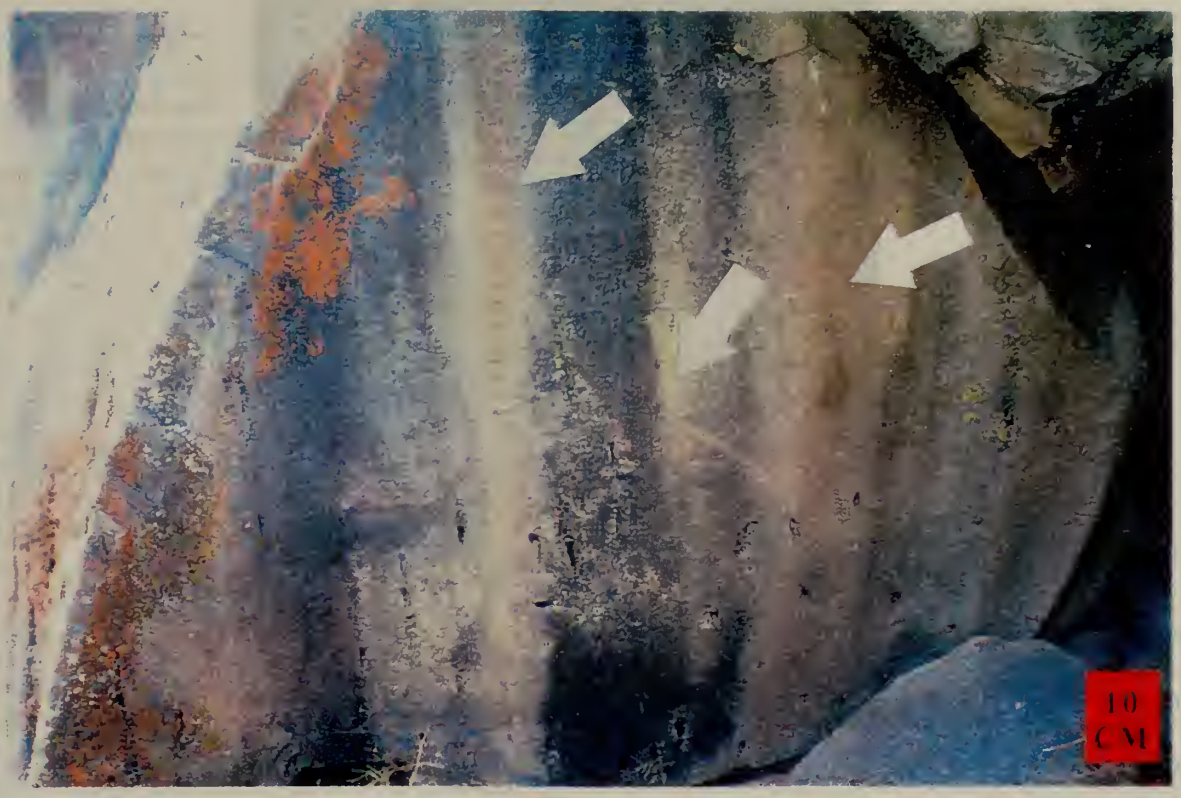


Figure 24. Site 35LK685, panel 2.

Figure 25. Site 35LK635, panel A.



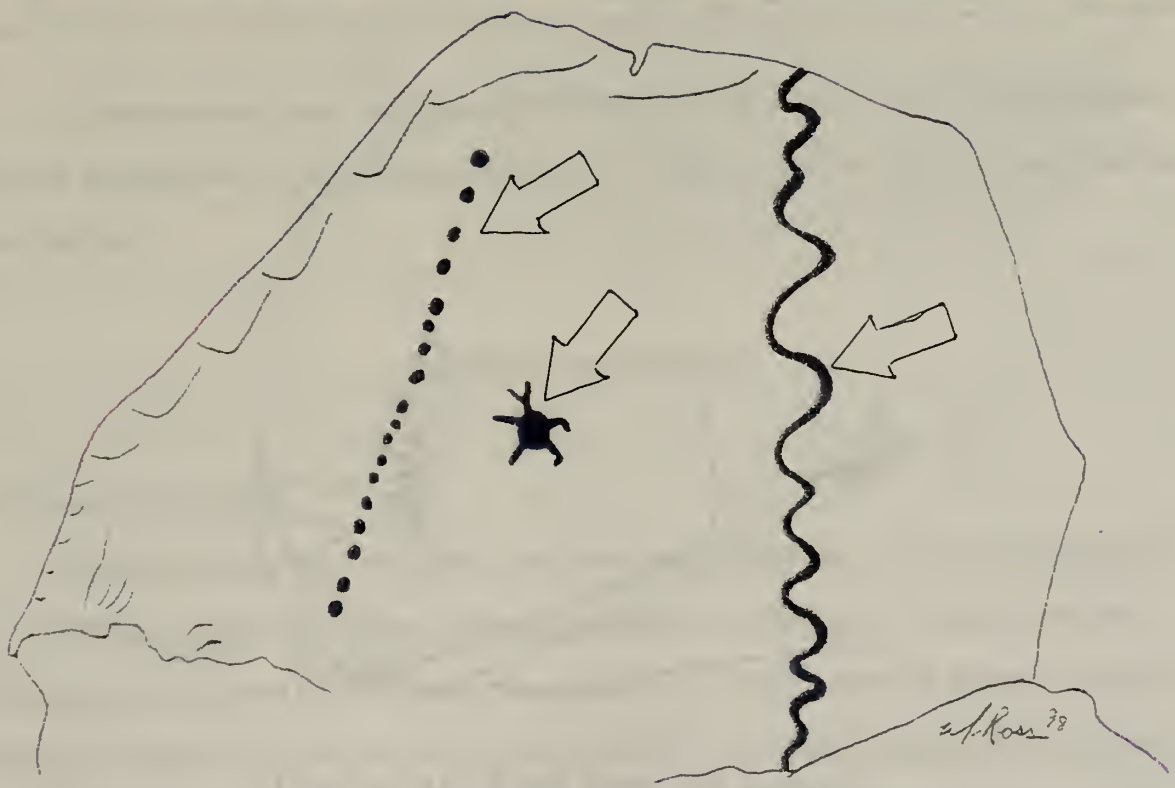


Figure 26. Site 35LK635, panel B.

Figure 27. Site 35LK635, panel C.

Table 2. Rock art styles at Calderwood and Bitterwood Rockshelters.

SITES	PICTOGRAPHS			PETROGLYPHS			TOTAL
	Great Basin Curvilinear Abstract	Great Basin Representational	Great Basin Rectilinear Abstract	Great Basin Curvilinear Abstract	Great Basin Representational	Great Basin Rectilinear Abstract	
35LK684							
Panel 1	1	1	0	0	0	0	2
Panel 2	1	1	0	0	0	0	2
Panel 3	4	1	0	0	0	0	5
Panel 4	1	0	0	1	0	0	2
Panel 5	2	0	0	0	0	0	2
35LK685							
Panel 1 Sec. I	2	3	0	0	0	0	5
Panel 1 Sec. II	5	5	1	0	0	0	11
Panel 1 Sec. III	1	0	0	0	0	0	1
Panel 2	1	1	0	0	0	0	2
35LK635							
Panel A	5	0	0	0	4	0	9
Panel B	2	1	0	0	0	0	3
Panel C	1	0	0	0	0	0	1
TOTAL	26	13	1	1	4	0	45

Although occupational dates may not be obtained from the rock art at Calderwood and Bitterroot Rockshelters nor any suggestion about site function, they do indicate a human connection to the sites.

Stratigraphy and Sediments

Calderwood Rockshelters

A climbing dune, which stretches from the reservoir shoreline to the mouth of the shelters, contributed to the deposition of some of the sediments at both sites. I assume that this eolian material originated from the valley floor and more recently, from the reservoir bottom. It is uncertain whether the strata present represent different depositional episodes due to extensive rodent activity, sporadic basalt roof fall, and/or wall slump. The following figures begin with a

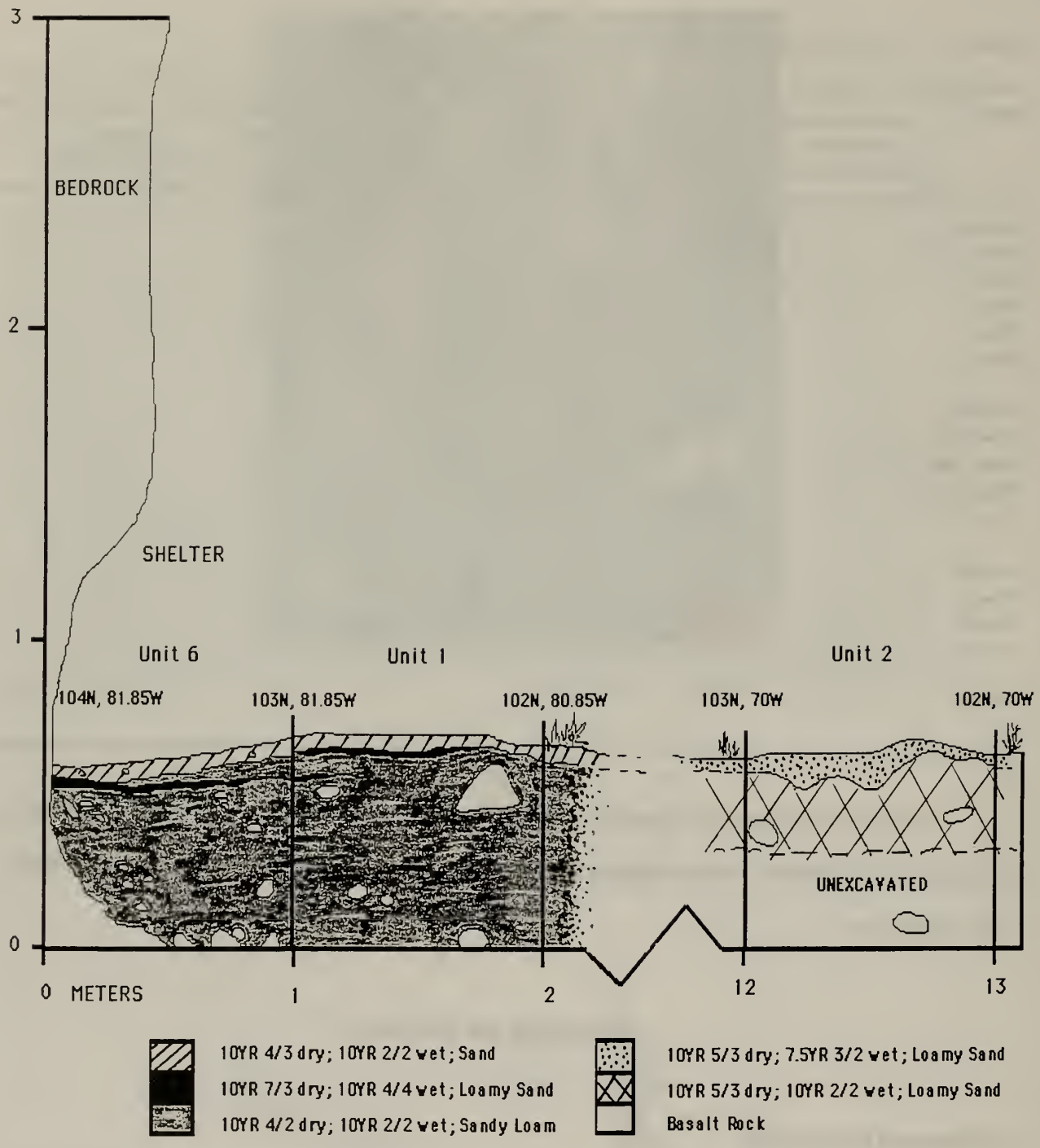


Figure 28. Generalized statigraphic cross section of site 35LK684 as viewed to the east.

cross section of each site followed by detailed stratigraphic profiles of each unit within the sites. A graphic symbol was chosen to represent each soil type throughout the figure series. Site strata are reported here as part of the site data collected during excavation. They were not used to test

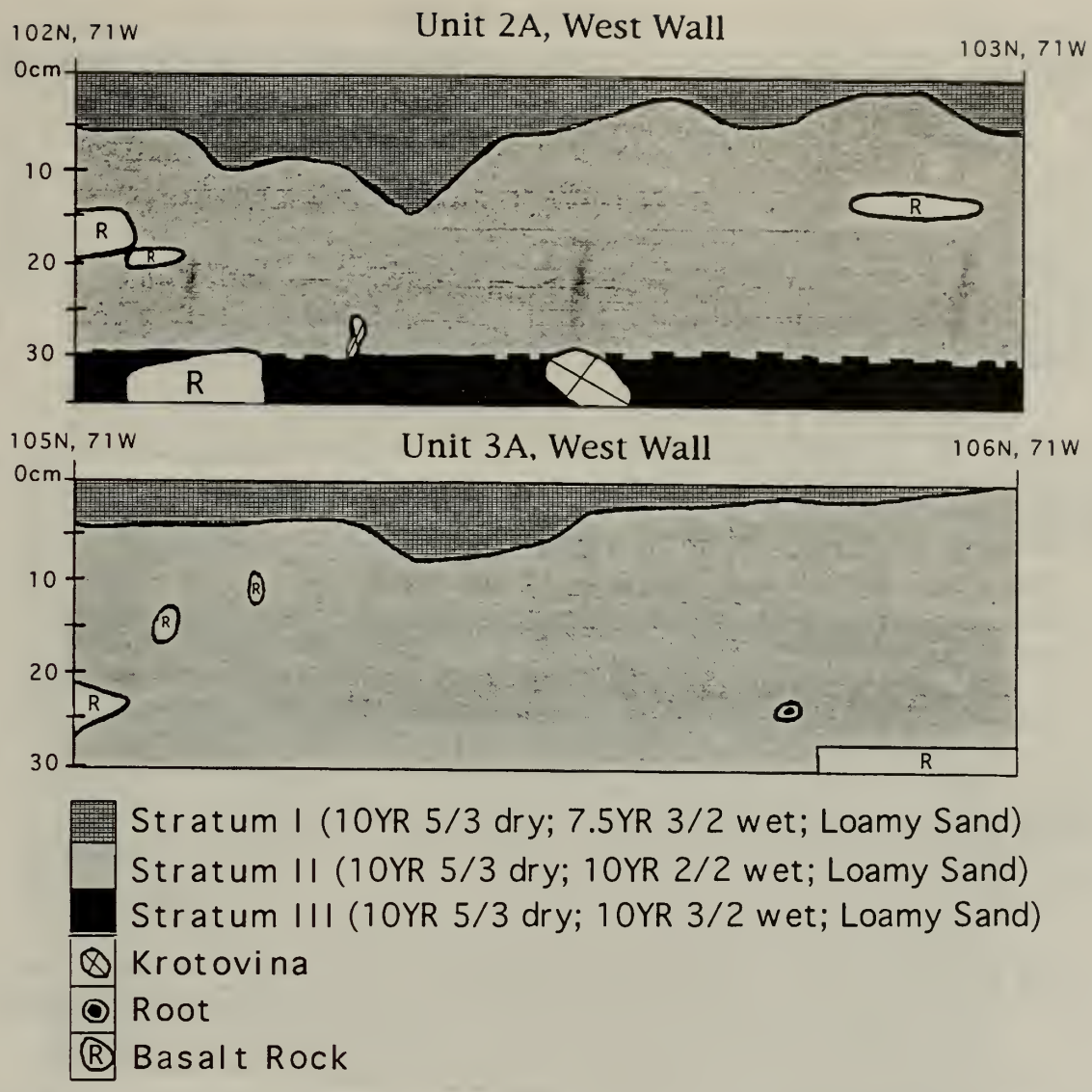


Figure 29. Stratigraphic profiles of Units 2A and 3A at Calderwood Rockshelter (35LK684).

the various subsistence and settlement models for Warner Valley except to show midden depth. Few units contained enough material to support significant stratigraphic analysis.

The six excavation units at site 35LK684 show very slight stratigraphic differences possibly due to varying exposure to the elements (Figure 28). A loamy sand marked by three color differences make up the three stratigraphic layers of units 2A and 3A (Figure 29). These fully exposed units are positioned about 10 meters in front of the shelter. Laden with organic matter (e.g., sagebrush leaves and grass debris) in various stages of decomposition, stratum I is brown (10YR 5/3 dry; 7.5YR 3/2 wet). The brown color of Stratum II intensifies with moisture

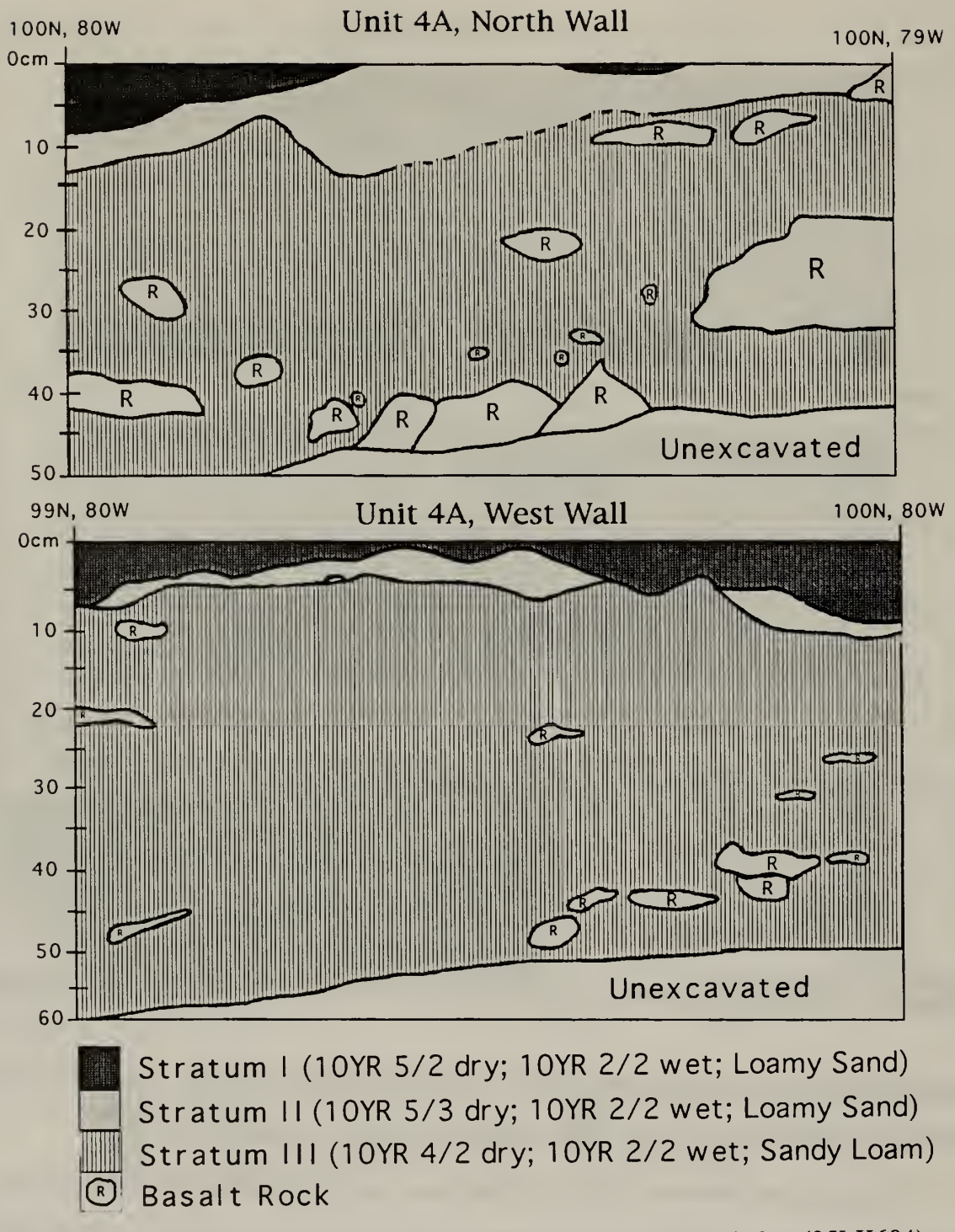


Figure 30. Stratigraphic profile of Unit 4A at Calderwood Rockshelter (35LK684).

(10YR 5/3 dry; 7.5YR 2/2 wet). Stratum III, noted only in unit 2A, turns to a very dark grayish brown with added moisture (10YR 5/3 dry; 10YR 3/2 wet).

The shelter's dripline crosses unit 4A (Figure 30), leaving a good portion exposed. Three

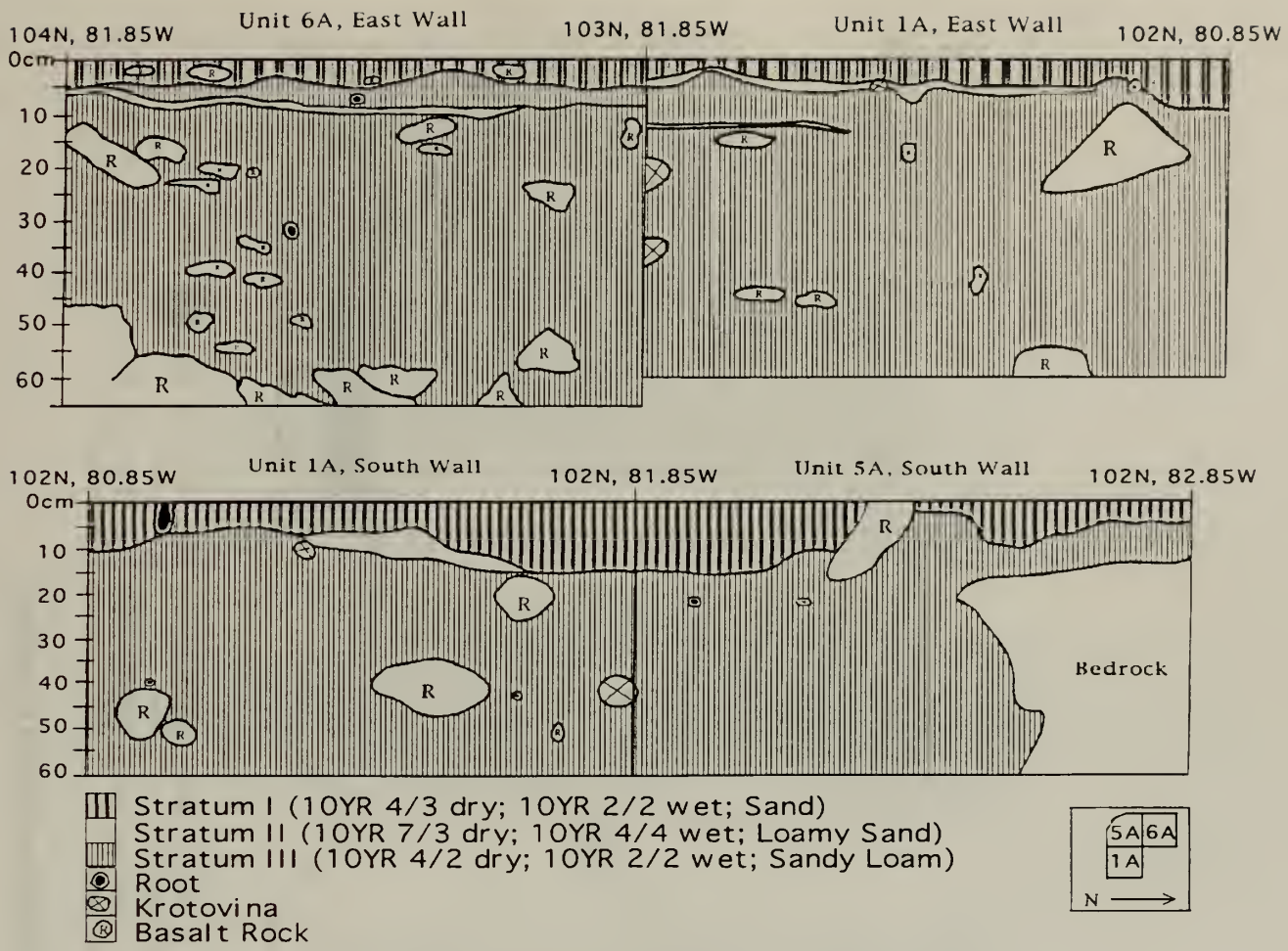


Figure 31 (top) and Figure 32 (bottom). Stratigraphic profile of Units 1A, 5A, and 6A at Calderwood Rockshelter (35LK684).

sediment layers comprise this unit's stratigraphic profile. Stratum I and II are loamy sands, again distinguished by color. Stratum I is a grayish brown loamy sand (10YR 5/2 dry; 10YR 2/2 wet), whereas stratum II is brown (10YR 5/3 dry; 10YR 2/2 wet). The color of stratum III changes to a dark grayish brown sandy loam (10YR 4/2 dry; 10YR 2/2 wet).

Units 1A, 5A, and 6A (Figure 31 and 32), are generally located behind the dripline out of the weather. The stratigraphic profile starts along the surface laden with organic matter followed by lenses of loamy sand in stratum II and finally to the dominating sandy loam of stratum III Stratum I's hue lies between brown and dark brown on the Munsell Color Chart (10YR 4/3 dry; 10YR 2/2 wet) (Munsell Soil Color Chart 1994). Stratum II lightens to a very pale brown (10YR

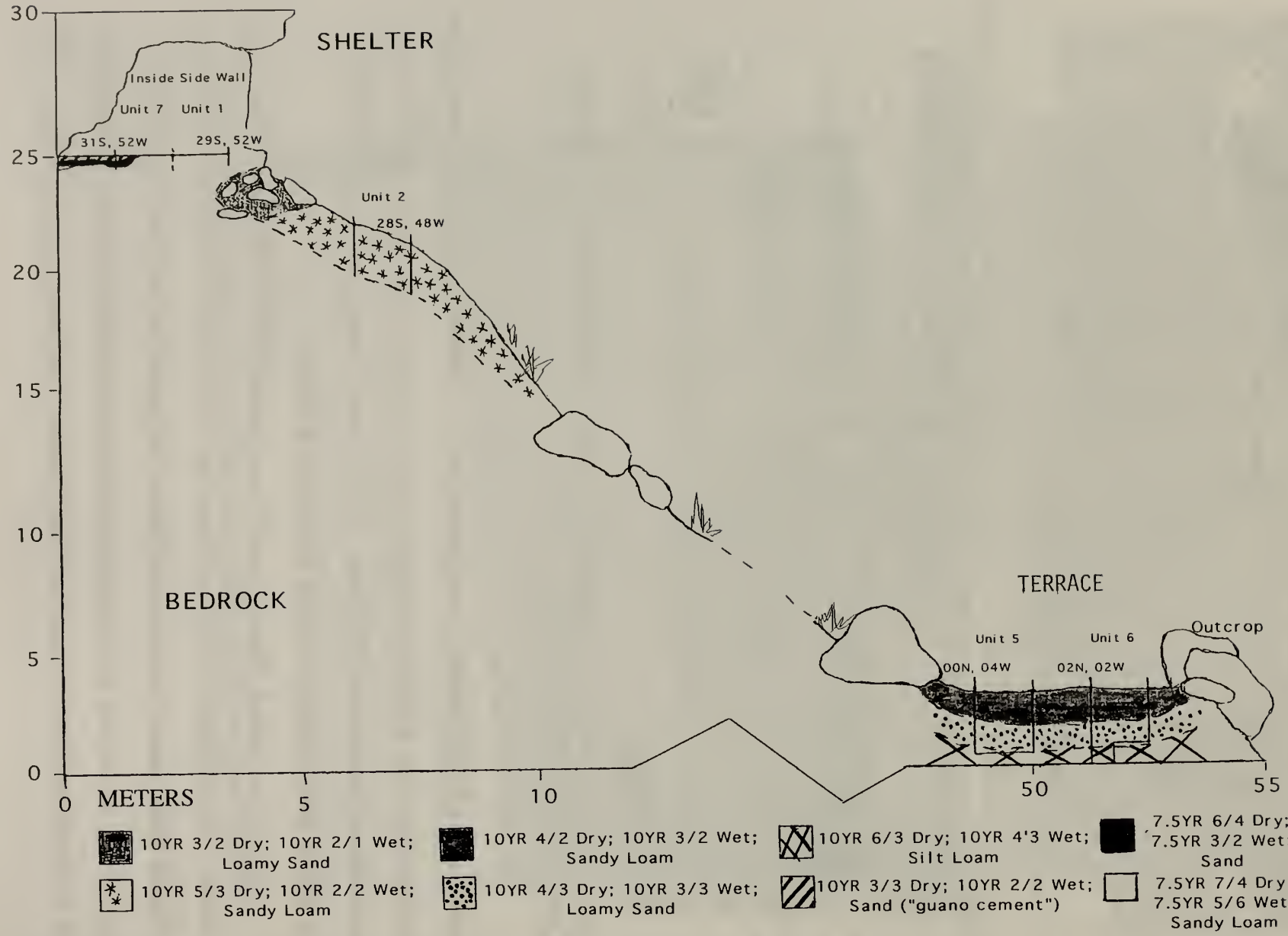


Figure 33. Generalized stratigraphic cross section of site 35LK685 as viewed to the east.

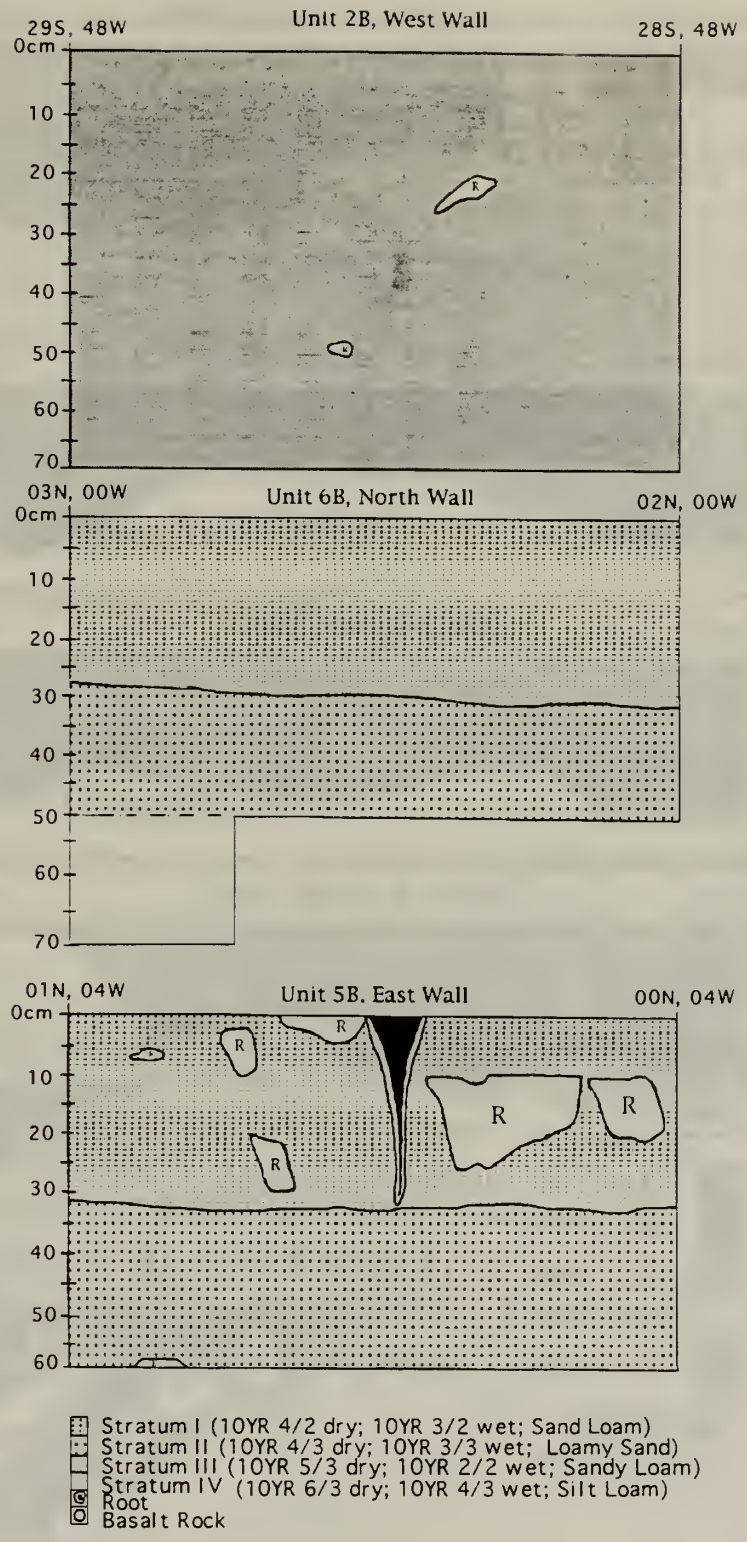


Figure 34. Stratigraphic profiles of Units 2B, 6B, and 5B at Calderwood Rockshelter (35LK685).

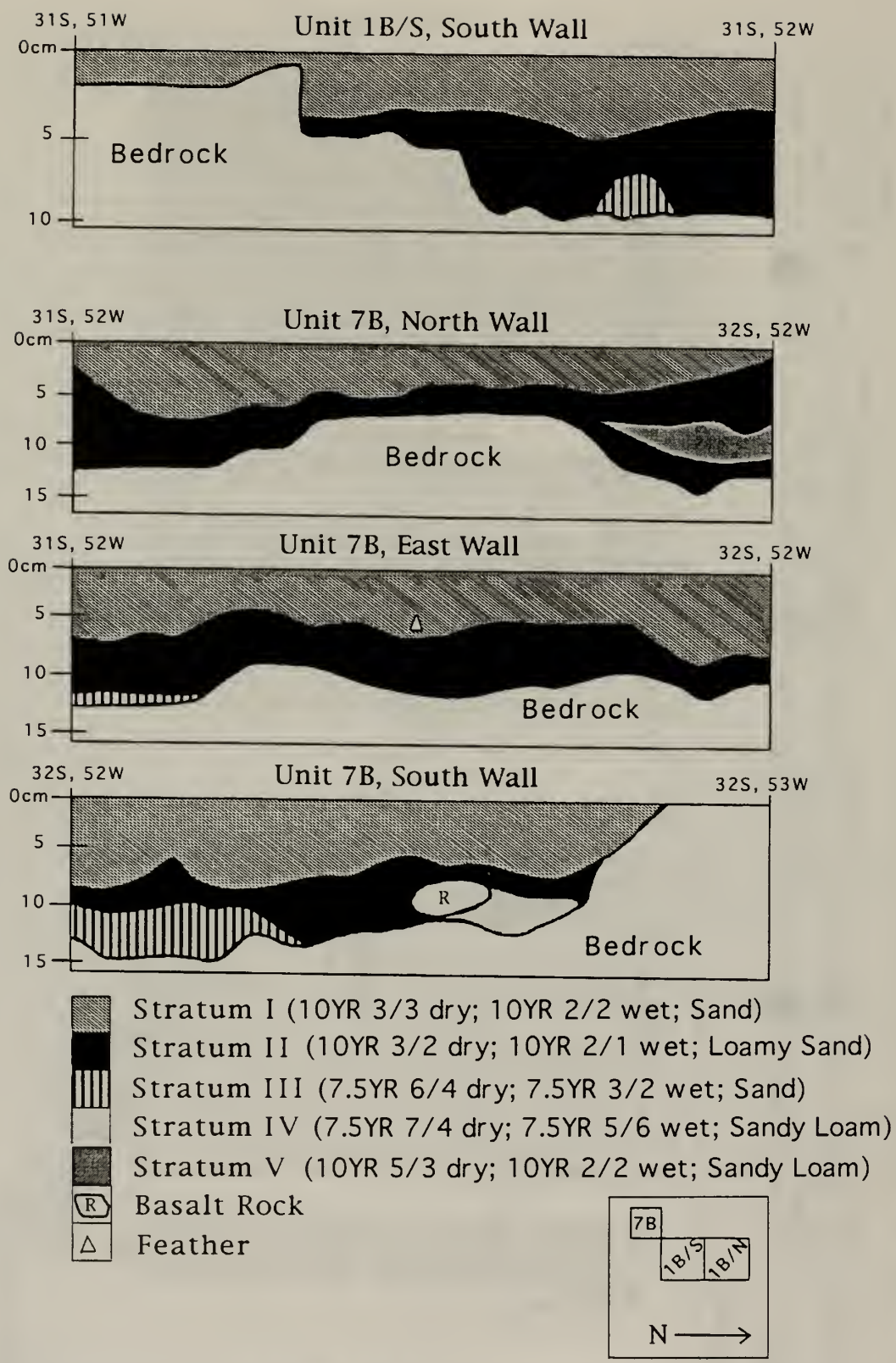


Figure 35. Stratigraphic profile of Units 1B/S and 7B at Calderwood Rockshelter (35LK685).

7/3 dry; 10YR 4/4 wet). Stratum III turns to a dark grayish brown (10YR 4/2 dry; 10YR 2/2 wet).

As at site 35LK684, the units at site 35LK685 portray varying statigraphic profiles (Figure 33). Units 6B and 5B (Figure 34), located in a depression behind a small rock outcrop found about halfway down the slope from the shelter, indicate two strata separated by color and texture. Stratum I is a dark grayish brown (10YR 4/2 dry; 10YR 3/2 wet) sandy loam. Stratum II is between a brown and dark brown loamy sand (10YR 4/3 dry; 10YR 3/3 wet).

At a depth of 45 cm, the loamy sand became compacted in both units. Unit 6B holds a concentration of whitish silt loam (10YR 6/3 dry; 10YR 4/3 wet). Investigation revealed that the silica rich material followed old root hollows.

Unit 2B (Figure 34) lies on top of the vegetated sandy slope just outside the shelter's mouth. The soil profile showed no distinguishable layers. The entire unit's sediment was a brown sandy loam (10YR 5/3 dry; 10YR 2/2 wet).

Units 1B and 7B (Figure 35 and 36) behind the dripline inside the shelter have shallow deposits covering basalt bedrock. Combined, these units have 6 strata. The sand- stratum I,

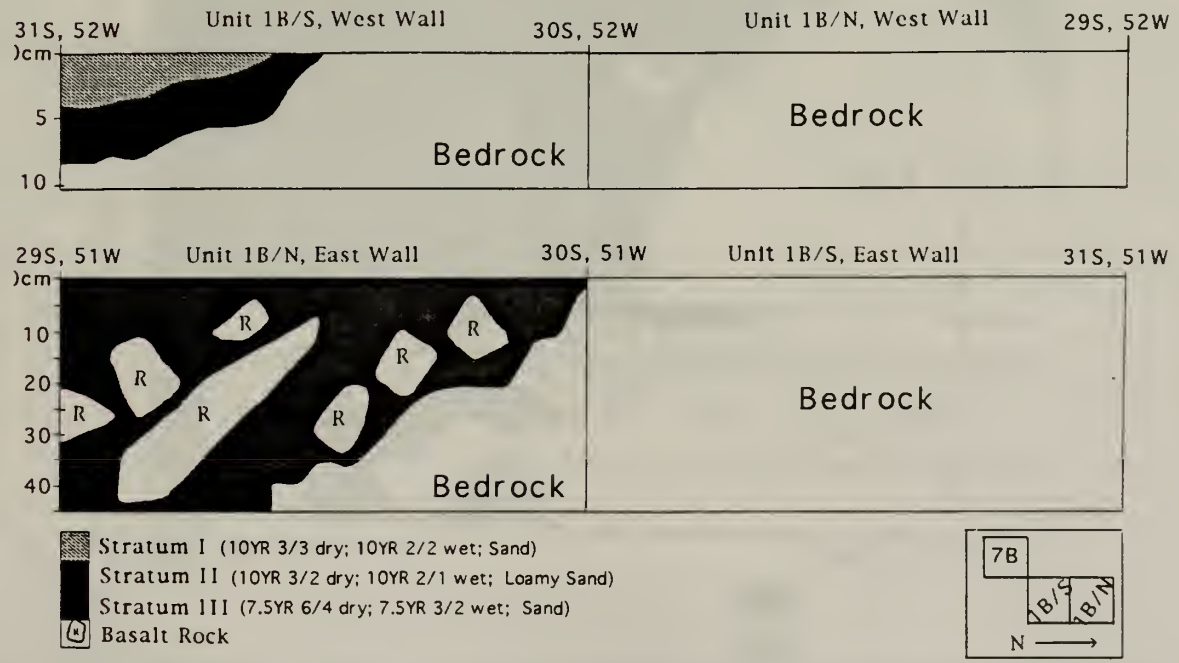


Figure 36. Stratigraphic profile of Unit 1B at Calderwood Rockshelter (35LK685).

composed mostly of compacted organic material, named affectionately during the excavation as "guano cement," is dark brown (10YR 3/3 dry; 10YR 2/2 wet). Stratum II, loamy sand laden with charcoal (10YR 3/2 dry; 10YR 2/1 wet), contains the hearth features. Under stratum II and above the basalt bedrock rests stratum III, a weathered and oxidized basalt with a sand texture (7.5YR 6/4 dry; 7.5YR 3/2 wet). Interestingly, the material from this stratum easily separates in water becoming silt-like. Stratum IV, a pink granular material (7.5YR 7/4 dry; 7.5YR 5/6 wet), is only found in the south wall of unit 7B as a small deposit. Stratum V, a dark brown sandy loam, may mark the extent of the climbing dune in the north section of unit 1B.

Bitterroot Rockshelter

Excavation of unit 1 exhibited three stratigraphic layers (Figure 37 and 38). The first two layers had a sandy clay texture. Stratum I, possessing organic material, was brown (10YR 5/3 dry; 10YR 3/3 wet), whereas stratum II was a medium brown (10YR 4/3 dry; 10YR 2/2). The

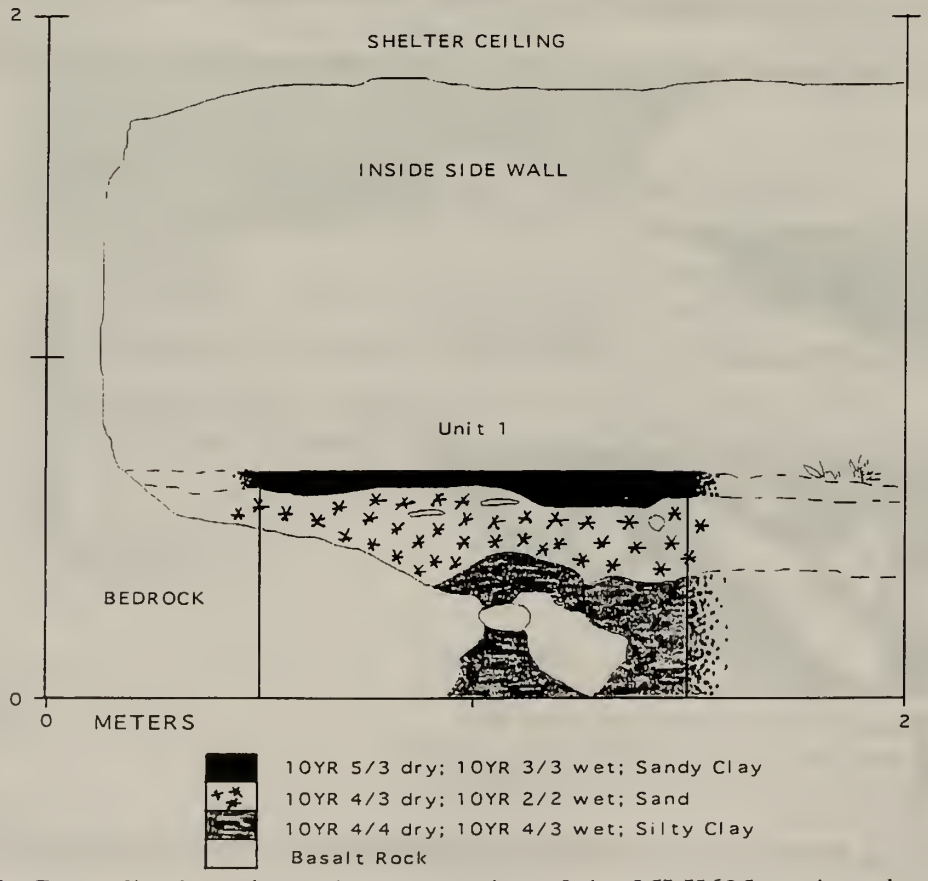


Figure 37. Generalized stratigraphic cross section of site 35LK635 as viewed to the west..

peculiar granular, silty clay stratum III was a dark yellowish brown (10YR 4/4 dry; 10YR 4/3 wet). During excavation, stratum III proved hard and difficult to trowel.

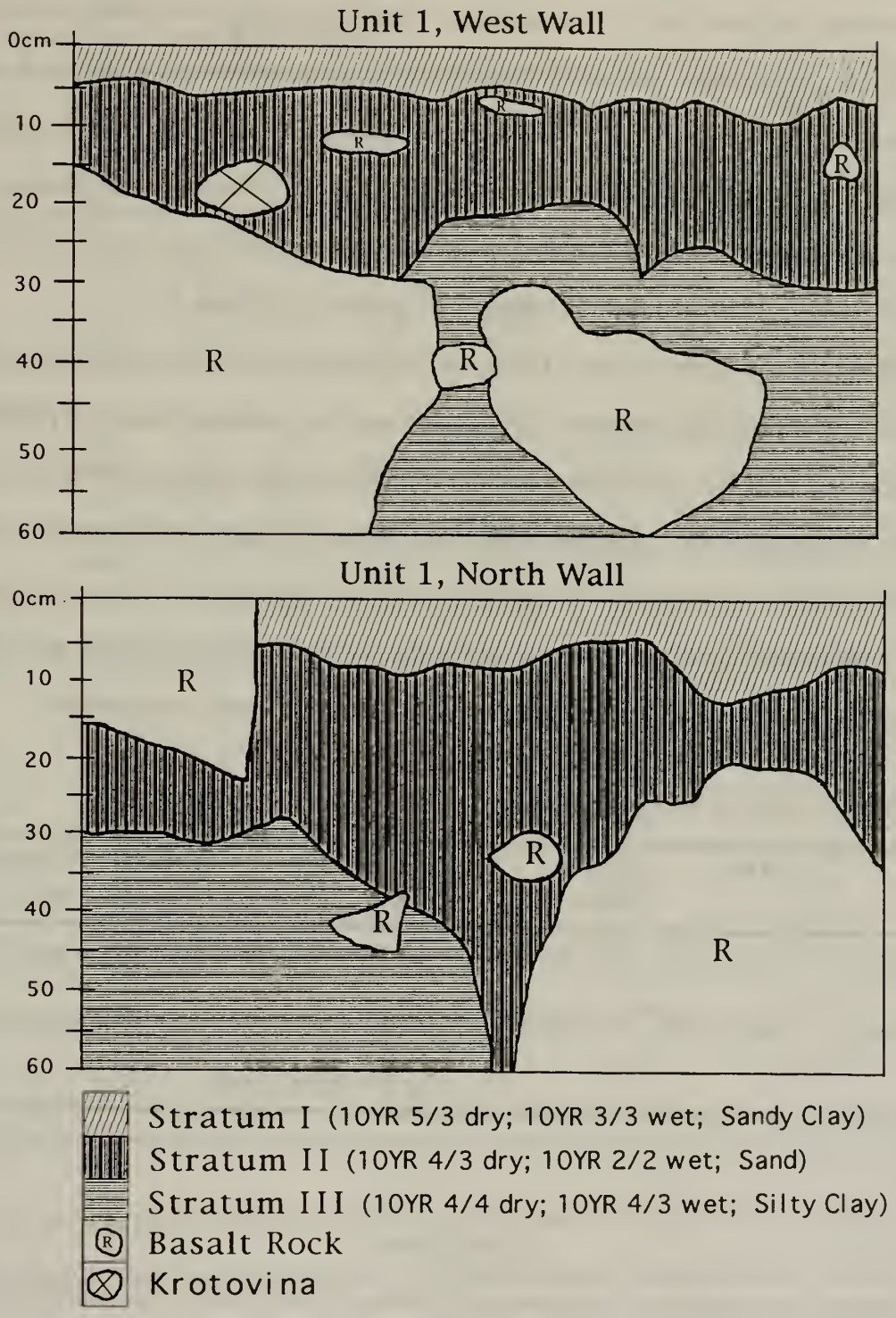


Figure 38. Stratigraphic profile of Units 1B/S and 7B at Bitteroot Rockshelter (35LK685).

Radiocarbon Dates

Two samples, a textile fragment and a sagebrush charcoal fragment, from Hearth 1 of site 35LK685, were sent to Beta Analytic Radiocarbon Dating Laboratory for Accelerator Mass Spectrometry (AMS) analysis. The textile fragment, recovered from level 1 of Hearth 1, is described in more detail on page 64. AMS analysis determined the calibrated date of the textile to be cal. A. D. 980 to 1175 (2 sigma; 95% probability) (Table 3). The sagebrush charcoal fragment excavated from level 5 of Hearth 1 has a calibrated date of cal. A. D. 1475 to 1675, 1775 to 1800, 1945 to 1950, and 1645 (2 sigma; 95% probability) (Table 3).

Although the two sigma calibrated ages are approximately 700 years apart, both agree with the Late Archaic site age indicated by association with the recovered Rosegate projectile points described on page 61. Several explanations may account for the great difference in age between the two samples found stratigraphically four centimeters apart. AMS sample contamination, bioturbation, or excavation error may account for the discrepancy. However, the most likely possibility for the discrepancy is reuse of the site. As people returned to the rockshelters, they may have mixed the charcoal by digging into old fire pits to create new fire pits.

Table 3. AMS ^{14}C dates of the textile and charcoal fragments.

MATERIAL	LAB NO.	C13/C12 RATIO	CALIBRATED DATE	INTERCEPT	CONVENTIONAL ^{14}C DATE
Burnt Tule Textile	Beta-116103	-28.1 0/00	A. D. 980 to 1175	A. D. 1025	990 +/- 50 B. P.
Sagebrush Charcoal	Beta-117539	-25.8 0/00	A. D. 1475 to 1675 A. D. 1775 to 1800 A. D. 1945 to 1950	A. D. 1645	290 +/- 50 B. P.

Flaked Stone

Chipped stone from the Calderwood and Bitterroot Rockshelters were combined to create a flaked stone assemblage consisting of 459 pieces, excluding surface finds (Figure 39, Table 4, and Appendix C). Nearly all obsidian (94%), the assemblage reflects the importance of

obsidian as tool stone (Figure 40 and Table 5). Natives easily procured the raw material from the many obsidian sources in the region.

Table 4. Total Flaked Stone assemblage.

SITES	ARTIFACTS						TOTAL
	Biface	Flake Tool	Hafted Biface	Flake Shatter	Angular Shatter	Proximal Flake	% (n)
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	
35LK635							
Unit 1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	100 (4)	100 (4)
SUBTOTAL	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	100 (4)	100 (4)
35LK684							
Unit 1A	3 (5)	1 (2)	1 (1)	32 (47)	11 (16)	51 (75)	99 (146)
Unit 2A	0 (0)	0 (0)	0 (0)	67 (2)	0 (0)	33 (1)	100 (3)
Unit 3A	0 (0)	0 (0)	0 (0)	50 (1)	0 (0)	50 (1)	100 (2)
Unit 4A	0 (0)	0 (0)	29 (2)	0 (0)	29 (2)	43 (3)	100 (7)
Unit 5A	6 (9)	1(2)	1(2)	26 (37)	6 (9)	59 (85)	99 (144)
Unit 6A	2 (1)	2 (1)	0 (0)	25 (14)	12 (7)	59 (33)	100 (56)
SUBTOTAL	4 (15)	1(5)	1(5)	28 (101)	10 (34)	55 (198)	99 (358)
35LK685							
Unit 1B	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	100 (2)	100 (2)
Unit1B/S	0 (0)	0 (0)	0 (0)	24 (5)	19 (4)	57 (12)	100 (21)
Unit 1B/N	0 (0)	0 (0)	0 (0)	35 (6)	6 (1)	59 (10)	100 (17)
Unit 2B	6 (3)	2 (1)	4 (2)	40 (21)	2 (1)	46 (24)	100 (52)
Unit 5B	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unit 6B	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Unit 7B	20 (1)	0 (0)	0 (0)	60 (3)	0 (0)	20 (1)	100 (5)
SUBTOTAL	4 (4)	1 (1)	2 (2)	36 (35)	6 (6)	51 (49)	100 (97)
TOTAL	4 (19)	1 (6)	1 (7)	30 (136)	9 (40)	55 (251)	100 (459)

The average proximal flake size of the debitage in the flaked stone assemblage is <1cm (Table 6) possibly denoting retouch activity. Crabtree defines debitage as the "residual lithic material resulting from tool manufacture" (Crabtree 1972:32). I divided the debitage into three categories: 1) flake shatter, meaning the flake presents no intact point of applied force; 2) angular

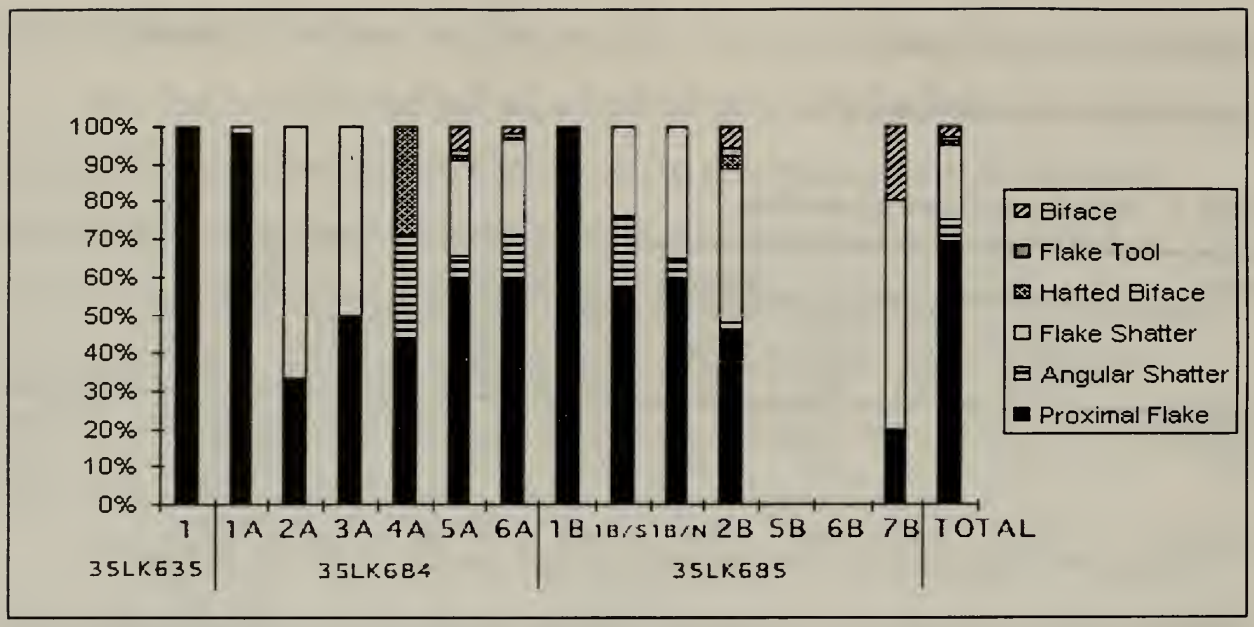


Figure 39. Flaked stone assemblage.

Table 5. Distribution of raw material in the total flaked stone assemblage.

ARTIFACTS	RAW MATERIAL				TOTAL
	Obsidian	Basalt	Chert	Quartz	
Biface	15	0	3	1	19
Hafted Biface	7	0	0	0	7
Flake Tools	5	1	0	0	6
Angular Shatter	35	0	5	0	40
Flake Shatter	131	2	4	0	136
Proximal Flakes	240	2	9	0	251
TOTAL	433	5	21	1	459

shatter, or knapping waste with no distinctive characteristics; and 3) proximal flakes, or flakes possessing an intact point of applied force. The method of measurement used on these three categories is described in chapter 3. The term "average size" used in this analysis refers to the arithmetic means of the recorded measurements of maximum width and maximum length.

Flake tools, hafted bifaces, and bifaces make up the tools of the chipped stone assemblage. Only six flake tools (a flake artifact showing unifacial retouch) are part of the assemblage; whereas, 26 pieces in this assemblage conform to Crabtree's (1972) definition of a biface

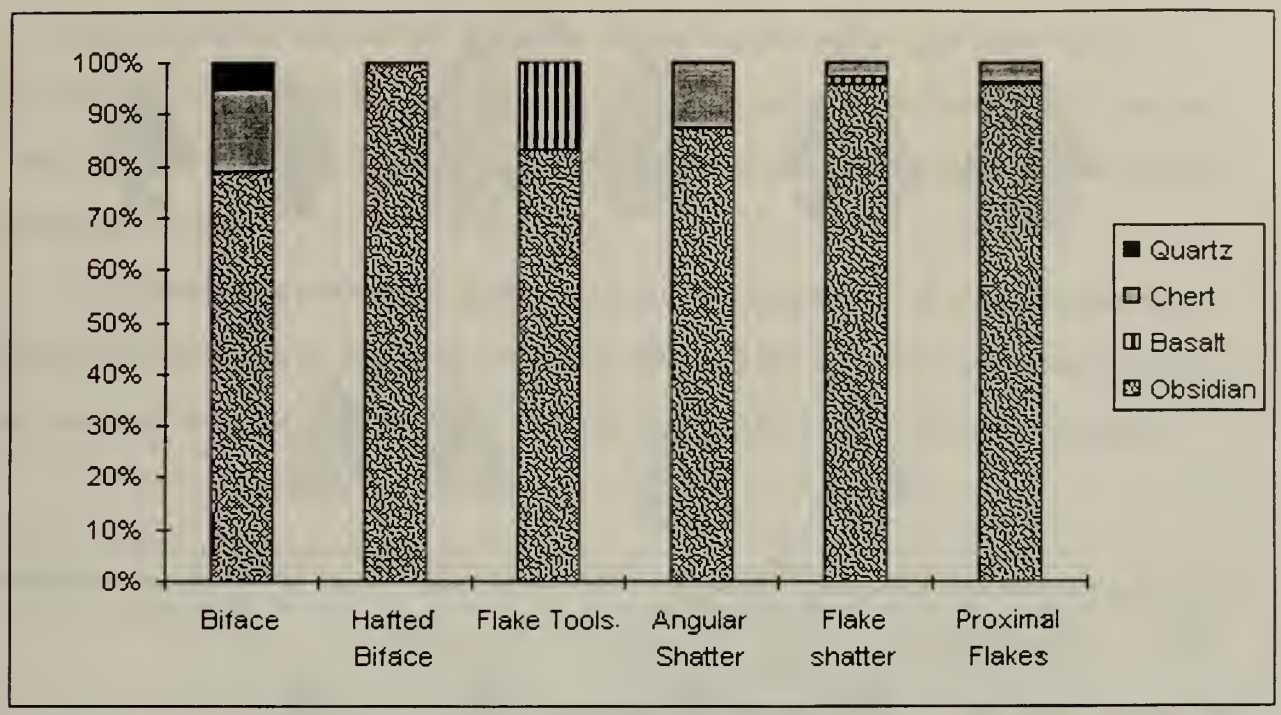


Figure 40. Raw material type to artifact type.

(an artifact bearing bifacial flake scars). Seven are whole specimens (Figure 41). Of the seven, one is a hafted biface (a biface possessing a hafting element, a place of attachment for a shaft or handle).

Analysis indicates that the total assemblage represents late stage tool manufacturing and resharpening activities because cores are absent, the debitage is dominated by small (<2 cm) flakes with little cortex (Table 7), and 7% of the assemblage is comprised of tools.

All tools go through a production process. This is reductive and continues throughout a tool's uselife. According to Whittaker (1994:201-203), this process for a biface occurs in four stages from choosing a suitable piece of raw material (stage 0), the edged blank (stage 1), to the preform

Table 6. Average measurements of debitage in centimeters.

	Angular Shatter	Flake Shatter	Proximal Flakes
Max. Length	1.35	1.43	0.77
Max. Width	0.74	0.57	0.68

(stage 2), followed by the refined biface (stage 3) and finally the finished biface (stage 4). Removal of each flake reduces the core's size. An assemblage dominated by small flake debitage with little or

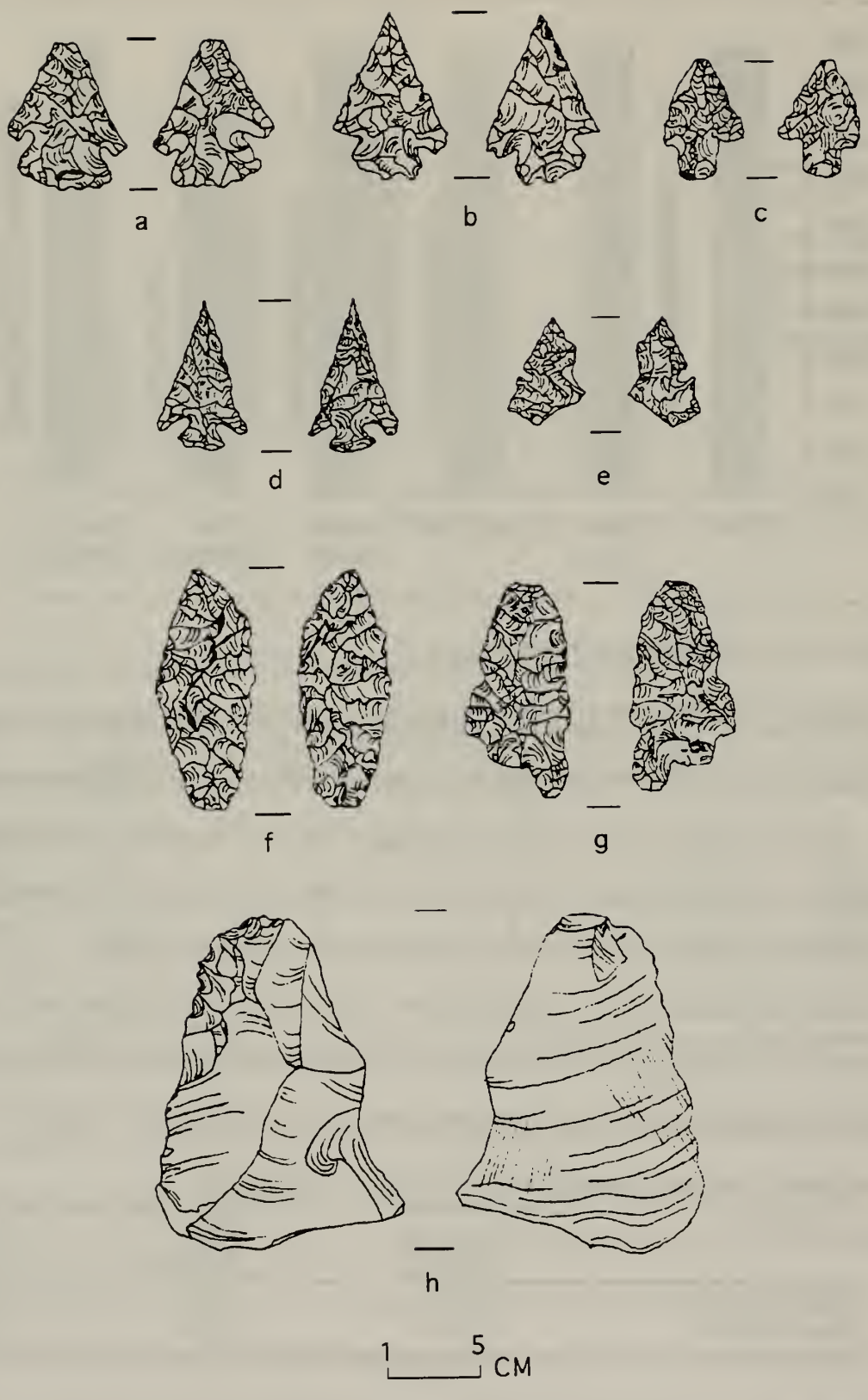


Figure 41. Drawings of excavated tools; (a-d) Rose Spring Series, (e) Sierran Type Desert Side-Notched, (f) hafted biface, (g) Gatecliff Split Stem, and (h) flake tool.

no cortex and bearing whole and/or fragments of tools represents late stage tool manufacture (Mauldin and Amick 1989; Magne and Pokotylo 1981; Patterson 1990; Shott 1986; Stahle and Dunn 1982). Also, as reuse and resharpening increase, the presence of small flakes within the assemblage increase.

In addition to representing late stage tool manufacture, the flaked stone assemblage displays little tool variety. A lack of tool variety hints at single task function for mid-elevation sites and short term use while traveling. As mobility increases, artifact diversity decreases

Table 7. Cortex amount in debitage.

SITE	ARTIFACTS	CORTEX AMOUNT				TOTAL
		NO CORTEX	< 50%	>50%	TOTAL CORTEX	% (n)
		% (n)	% (n)	% (n)	% (n)	
35LK635	Angular Shatter	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Flake Shatter	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Proximal Flake	50 (2)	50 (2)	0 (0)	0 (0)	100 (4)
	SUBTOTAL	50 (2)	50 (2)	0 (0)	0 (0)	100 (4)
35LK684						
	Angular Shatter	71 (24)	18 (6)	12 (4)	0 (0)	101 (34)
	Flake Shatter	95 (96)	3 (3)	2 (2)	0 (0)	100 (101)
	Proximal Flake	91 (181)	7 (13)	2 (4)	0 (0)	100 (198)
	SUBTOTAL	90 (301)	7 (22)	3 (10)	0 (0)	100 (333)
35LK685						
	Angular Shatter	17 (1)	50 (3)	33 (2)	0 (0)	100 (6)
	Flake Shatter	94 (33)	3 (1)	3 (1)	0 (0)	100 (35)
	Proximal Flake	90 (44)	8 (4)	2 (1)	0 (0)	100 (49)
	SUBTOTAL	87 (78)	9 (8)	4 (4)	0 (0)	100 (90)
TOTAL		89 (381)	8 (32)	3 (14)	0 (0)	100 (427)

(Andrefsky 1998:204-205; Shott 1986). Only four retouched flakes were uncovered, suggesting that little to no butchering activity occurred at these sites. Puzzling is the recovery of 14 bifaces and six hafted bifaces. Could this suggest hunting as mid-elevation site function?

Besides serving as a means at attempting to understand site function, the biface artifacts

from the combined flake stone assemblages may serve as a temporal indicator. Of the seven whole bifaces found, four are Rose Spring series points, one is a Sierran type Desert Side-Notched point, and one is a Gatecliff Split Stem point.

Oetint (1994:57) characterizes Rose Spring series points as narrow-necked, corner notched points with expanding sides and straight to concave bases. According to him, rose Spring points date from 2000 B. P. to historic times. Holmer suggests that this widely occurring point type may correspond with the initial spread of the bow and arrow. He also believes that Desert Side-Notched arrow points replaced Rose Spring points around 750 B. P. (Holmer 1986:107).

Holmer (1986) divides the five styles of Desert Side-Notched points into early and late series. The early styles include Bear River, Uinta, and Nawthis. The General and Sierran styles make up the late series. Thomas (1981:18) defines Desert Side-Notch points as small triangular points weighing less than or equal to 1.5 grams with a basal maximum/minimum width ratio > 0.90 cm. He claims they date to the last 650 years.

First described by Thomas (1981:22-23), Gatecliff Split Stem points are bifurcate, contracting or parallel-sided stemmed points with a basal indentation to stem length ratio $\leq$ 0.97 cm. Because Gatecliff Split Stem points date from 4950 to 3250 B. P., the single surface-collected specimen portrayed in figure 41 is likely the oldest point in the collection.

The site was occupied during what Oetting (1994:57) called the Late Archaic. He distinguished Late Archaic I (2000 B. P. to 1000 B. P.) by presence of Rosegate and Elko series points, while Late Archaic II (1000 B. P. to historic times) is dominated by Rosegate series points with Desert Side-Notched, and Cottonwood Triangular points appearing occasionally. The Calderwood and Bitterroot flaked stone assemblages are comprised mostly of Rose Spring (Rosegate) series points. In addition, the textiles' AMS date of about 925 B. P. and the charcoal date of 290 B. P. both support the sites as Late Archaic II.

The use of black pigment also supports a late occupation because historic subjects (e.g., horses) have appeared in black designs in Warner Valley (Fowler 1993:95).

Groundstone

Made of locally abundant fine grained aphanitic and vesicular basalt, groundstone in Warner valley is found at both upland and lowland sites. It comes in a variety of forms including bedrock mortars and monos (Fowler 1993). Excavation at Calderwood and Bitterroot Rockshelters unearthed only five possible groundstone fragments, all of aphanitic basalt. Of the five pieces, only one, the palette (Figure 42) in undoubtedly groundstone. The palette (artifact no. EB-0051) is a 9x7.5 cm, 556.4 gram groundstone slab fragment with red pigment on one side. It was found at Calderwood Rockshelter 35LK685 in Unit 2B, level 6.

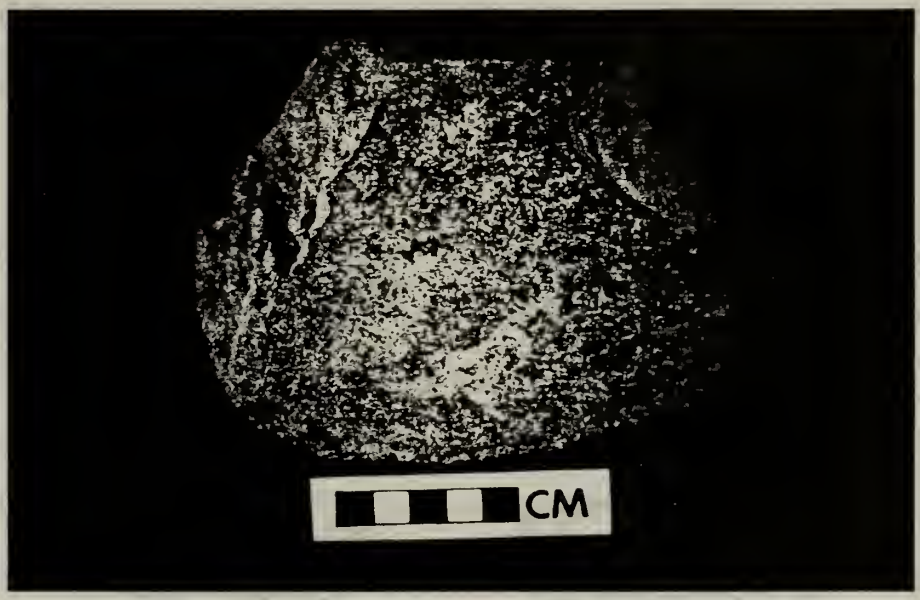


Figure 42. Stained red palette fragment excavated from site 35LK685.

The lack of groundstone is an indication of short term site use supporting all three Warner Valley subsistence and settlement models.

Textiles

Many dry caves and rockshelters in the northern Great Basin have produced astonishing amounts of preserved textiles. Guano Lake cave, Paisley cave No. 1, Catlow cave No. 1, and Roaring Springs caves are four such sites. Four 2x3 cm square fragments of twined basketry came from Guano Lake Cave, while Paisley Cave No. 1 yielded three fragments of twined tule

basketry and two pairs of sandals (Cressman 1936). Cressman et al. (1940:11-13) noted that Catlow Cave No. 1 produced "over 100 pieces of twined basketry ....; nine pieces of coiled basketry ....; [and] thirty-four sandal fragments." However, Cressman believed the Catlow Twined basketry from Roaring Spring Cave possesses more impressive artistry (Cressman et al. 1940:11-12).

Calderwood Rockshelter 34LK685 produced one textile fragment (artifact no. EB-0006) (Figure 43) found in hearth feature 1, level 1, Unit 1 B/S, the fragment typifies a close simple twining, z twist weft. This 3x2 cm fragment, comprised of tule (*scirpus* sp.; identified by Joy Mastrogiuseppe, Museum of Anthropology, WSU), weighs .05 grams. Similar specimens were recovered from Dirty Shame Rockshelter 1973 excavations. Adovasio et al. (1977) reports that the majority (>90%) of the 3000+ vegetal artifacts were manufactured using the twining, z twist weft technique.

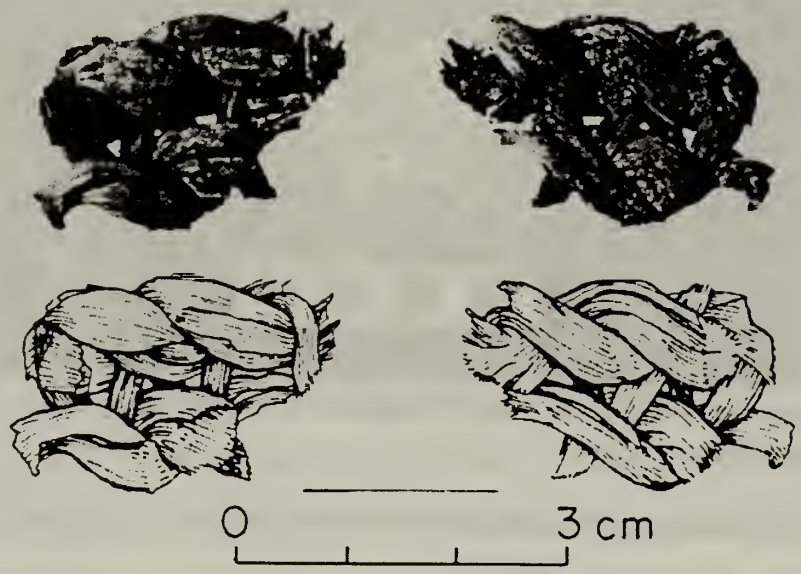


Figure 43. Tule textile fragment excavated from Calderwood Rockshelter 35LK685.

Adovasio (1977:15) defines twining as passing horizontal elements, called wefts, around stationary vertical elements, called warps. In close twining the "weft rows are . . . tightly spaced" (Adovasio 1977:16). Single twining means "a 'single' warp is engaged at each weft crossings" (Adovasio 1977:16). The z describes the lean of the weft down to the right because the paired wefts

resemble the diagonal parts of the letter z. If the weft pitches to the left, resembling a letter s, it is called as s twist weft (Adovasio 1977:20). The oldest textile form in the Northern Great Basin is close simple twining that persisted into historic times (Adovasio 1986). Interestingly, a fragment similar to the one found at Calderwood was excavated from fort Rock Cave. Cressman reported uncovering a piece of basketry below Mt. Mazama pumice and described it as possibly made of tule with "fine twining on a single warp with the twist downward to the right" (Cressman 1936:64).

The textile fragment found at calderwood Rockshelter provided a conventional radiocarbon date of 990 +/- 50 B. P. Other than the date, the single textile fragment provided little interpretable information needed to discover site function or occupation duration.

Faunal Remains

Combining the Calderwood and Bitterroot Rockshelters, the faunal assemblage consists of 1,765 specimens. Unidentifiable fragments make up 65% of the assemblage, 7% of which is charred. Dr. Carl Gustafson and Robert Wagener identified several species (Table 8) from skull fragments. Table 9 gives the contexts of identified bones.

Rodent remains constitute most of the faunal assemblage. Although Kelly (1932) reports the use of groundhogs, squirrels, and rats (wood rats and/or kangaroo rats) as food, I believe the specimens recovered in this investigation could be intrusive due to extensive bioturbation and other animal activities. In addition, no evidence of butchering was observed on the recovered faunal remains.

Many animals were observed living around the sites that could have easily contributed to the faunal remains. These include swallows, owls, raptors, woodrats, ravens, badgers, and coyotes. Like humans, these animals seek the rimrock for shelter. Some leave the remains of their meals behind adding to the faunal assemblage, especially owls and woodrats. Owls leave pellets comprised of small rodent remains. Woodrats collect various nest material including bones from larger animals. In addition, some of the previously listed animals live in burrows at the site.

Table 8. Bones identified from the deposits of Calderwood and Bitterroot Rockshelters.

Taxon		Common Name
Aves		
	Callipepla californica-sized	Quail
Mammalia		
	Bos sp.	Cow
	Canis latrans	Coyote
	cf. *Antilocapra*	Pronghorn-sized
	cf. *Bos* or *Bison*	Cow or Bison
	Lagurus curtatus	Sagebrush Vole
	Lepus sp.	Jack Rabbit
	Marmota flaviventris	Yellow-bellied Marmot
	Microtus sp.	Vole
	Mustelidae	Skunk-sized
	Neotoma lepida	Desert Woodrat
	Peromyscus maniculatus	Deer Mouse
	Spermophilus leucurus	Antelope Ground Squirrel
	Sylvilagus nuttallii	Cottontail Rabbit
	Taxidea taxus	Badger
	Thomomys talpoides	Northern Pocket Gopher
Mollusks		
	Anodonta cf. *oregonensis*	Fresh Water Mussel
Pisces		
	Fish Vertebrae	Fish
Reptilia		
	Crotalus-sized	Snake
	Sceloporus-sized	Lizard

Other potentially intrusive elements include a song bird sized beak, a quail sized sternum, a *Sceloporus*-sized lizard mandible, and snake vertebrae. The snake vertebrae may represent *Crotalus viridis* or *Coluber constrictor*; both species were observed at the site along with many lizards. The assemblage also contains 30 fish vertebrae that may be intrusive. Of these,

Table 9. Contexts of identified bone.

LOCATION	TAXA																			
	cf. *Bos* or *Bison bison*	*Bos*	cf. *Antilocapra*	*Canis latrans*	*Taxidea taxus*	Mustelidae	*Marmota flaviventris*	*Thomomys talpoides*	*Spermophilus leucurus*	*Lepus* sp.	*Sylvilagus nuttallii*	*Neotoma lepida*	*Peromyscus maniculatus*	*Microtus* sp.	*Lagurus curtatus*	Fence Lizard-sized	Rattle Snake-sized	Fish Vertebrae	*Andodonta* cf. *oregonensis*	Quail-sized
35LK684 (A)																				
Unit 1																				
Level 1																			1	
Level 2																			4	
Level 3		1			1						2								6	
Level 4		1																1	6	
Level 5			1					2								1			2	
Level 6																	1		2	
Level 7																			2	
Level 8																		2	3	
Level 9									1									3	8	
Level 10																			4	
Level 11																		1	8	
Level 12																			1	
Unit 2																				
Level 2																			2	
Unit 3																				
Level 1																			33	
Unit 4																				
Level 1																			4	
Level 3																			15	
Unit 5																				
Level 2a										3	2	1		1					26	
Level 2b							1											1	9	
Level 3															1			1	7	
Level 4									1									1	1	
Level 5				1						2					1			2	2	1
Level 6							1											2	6	
Level 7																		2	2	
Level 8									1									3	6	
Level 9									2									1	1	
Unit 6																				
Level 2																			3	
Level 3																		4	7	
Level 4																		3	4	
Level 5																	3			
Level 6							1				1						1		2	
Level 7													1							
Level 8											1								1	
Level 11									1										8	
Level 12																			4	
Level 13							1											1	3	

Table 9 Continued.

LOCATION	TAXA																				
	cf. *Bos* or *Bison bison*	*Bos*	cf. *Antilocapra*	*Canis latrans*	*Taxidea taxus*	Mustelidae	*Marmota flaviventris*	*Thomomys talpoides*	*Spermophilus lecurus*	*Lepus* sp.	*Sylvilagus nuttallii*	*Neotoma lepida*	*Peromyscus maniculatus*	*Microtus* sp.	*Lagurus curtatus*	Fence Lizard-sized	Rattle Snake-sized	Fish Vertebrae	*Andodonta* cf. *oregonensis*	Quail-sized
35LK685 (B)																				
Unit 1/N																				
Surface		1																		
Level 1										2							2			
Unit 1/S																				
Surface	1																			
Level 1												1							4	
Level 2																			5	
Unit 2																				
Level 1																			1	
Level 5			1																1	
35LK635																				
Unit 1																				
Level 0						1			1											
Level 1							2				1	3	2	4						
Level 2							1				1	2								
Level 3							1													
Level 4							1													
Level 5							1			3										
Level 7	1									1	1				1					
TOTAL	2	3	2	1	1	1	10	2	8	11	9	7	3	5	3	1	5	30	204	1

none came from the Bitterroot Rockshelter, while 93% came from site 35LK684. Though unidentified, these specimens may represent one or all three of the kinds of fish Kelly's informants called; *pakwi' (chub)*, *sigu'* (trout?), and *ha'wa'gu* or *tutsi* (sucker). She noted that fishing occurred "almost exclusively in early spring when the snow was melting and before roots were ready to be gathered" (1932:95).

Animals that may have transported fish to the site include coyotes, ravens, magpies and raptors. No cut marks were observed on the fish vertebrae.

Egg and Mussel Shell Remains

Excavation at Calderwood Rockshelters uncovered both egg shell and fresh water mussel shell. Due to the presence of swallow nests directly above the Calderwood excavation units, the 34 fragments of egg shell are considered intrusive. During excavation, swallows tended their young in mud nests hanging from the rockshelter roofs. Remains of old mud nests suggest extensive past use of these locations by swallows.

The site yielded a total of 203 fresh water shell fragments, excluding specimens collected from the surface and collapsed wall material. Site 35LK684 held 95% of the fresh water mussel shell assemblage. These fragments may be *Anodonta oregonsis*, a fresh water mussel that thrives in the waters of Warner Valley. Just as the egg shell is intrusive, so also maybe the mussel shells. It is possible that the mussels may have been transported to the site by raptors or ravens. Two raptor nests were built on the rimrock above the mouth of Calderwood Rockshelter 35LK685. In addition, an active raven nest was located within 400 meters of the shelters at the same elevation in the same rim rock. Osprey and ravens have been known to feed on crustaceans and mollusks (Ehrlich et al. 1988; Wiley and Lohrer 1973).

Hearth Features

Hearth feature 1, one of four hearths excavated at Calderwood Rockshelters, produced a textile fragment (previously described on page 65) and 38 feathers. The unidentified small black feathers maybe intrusive due to the extensive avian use of the shelters.

Hearth features 1, 2, and 3 (Figure 44 and 45) lie between "guano cement" and basalt bedrock within rockshelter 35LK685 in units 1B/S and 7B. The expression "guano cement" refers to a $\leq$5 cm thick compacted crust of sediment mixed with animal and bird feces. Oxidized basalt bedrock lay beneath the hearths. Characterized by natural depressions in the bedrock choked by sagebrush charcoal, these hearth features show no lenses that indicate multiple use.

Unlike the hearth features of site 35LK685, the boundary of hearth feature 4 (Figure 46 and 47) at site 35LK684 (first observed in the northwestern corner of the west wall of unit 1A)

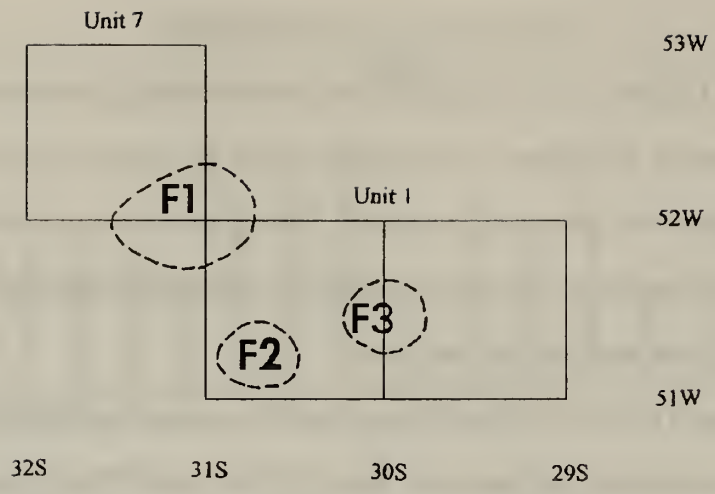
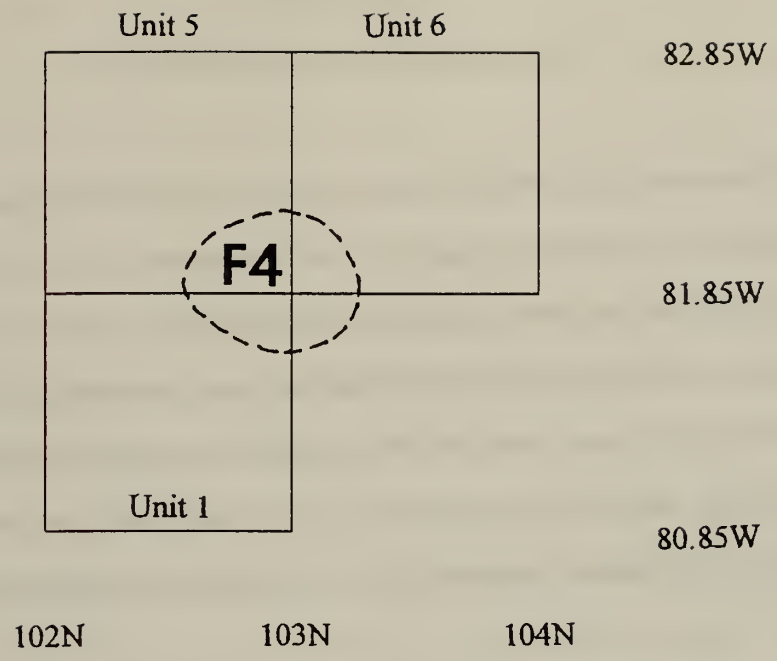


Figure 44. Plan view of Units 1B and 7B of site 35LK685, showing relationships between features 1, 2, and 3.

Figure 45. Hearth features 1, 2, and 3 at Calderwood Rockshelters (35LK685).

was indistinct. Its removal procedure from unit 5B for water screening (described in chapter 3, page 27) included all material within 10-cm of the feature. Thirty seven percent (by weight) of the fresh water mussel shell came from water screening hearth feature 4. The hearths lacked fire cracked rock. Sagebrush served as fuel.



Feature 46. Plan view of Units 1A, 2A, and 6A of site 35LK684, showing position of hearth feature 4.

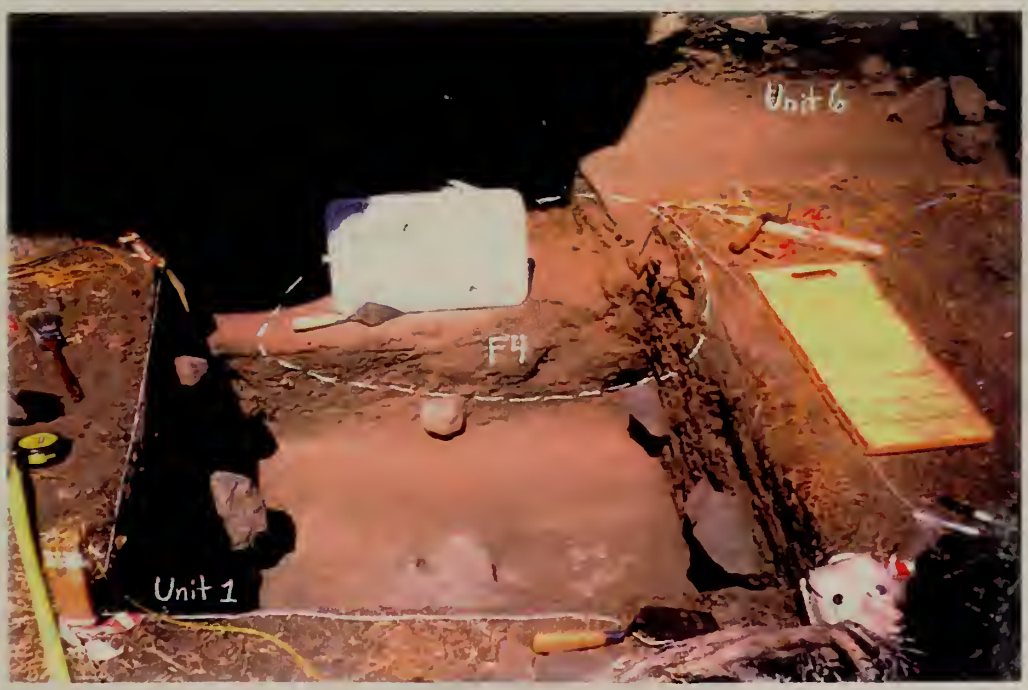


Figure 47. Hearth feature 4 at Calderwood Rockshelters (35LK684) as seen in the sidewall between Unit 1 in the foreground and Unit 5.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

The Calderwood and Bitterroot Rockshelter sites represent mid-elevation sites within Warner Valley. The role of mid-elevation sites in the region's subsistence and settlement system has yet to be determined. Ricks' subsistence and settlement model suggests that intermediate sites served as temporary camps as people moved between longer-occupied lowland and upland sites. Fagan's and Weide's traditional subsistence and settlement model did not define mid-elevation camps; rather they considered mid-elevation sites as upland sites associated with single task locations. Do the Calderwood and Bitterroot Rockshelters support Ricks' or Fagan's and Weide's models?

The evidence indicates temporary occupations of the Calderwood Rockshelters in support of Ricks' model; however more investigation is required to make any conclusion at the Bitterroot Rockshelter. The combined assemblage contains little or no groundstone. The flaked stone artifacts display little tool variety and suggest an orientation toward a single task. Ricks, Fagan, and Weide all note these characteristics as elements of mid-elevation sites. Though evidence suggests single task orientation, it does not indicate the butchering aspect of hunting which would have supported Weide's model.

Weide linked upland sites to hunting due to the great proportion of scrapers she found there. Granted, the Calderwood/Bitterroot Rockshelter flaked stone assemblage may represent late stage tool manufacturing; but, barely 5% of the assemblage consists of flake tools. Flake tools, such as scrapers (flakes showing unifacial retouch distally or laterally), may be typically associated with hideworking, but these simple tools may have many purposes (Shott 1995). Instead, the predominance of late stage tool manufacturing (resharpening pressure flakes and whole or fragments of complete tools) represents a retooling station.

In addition, the mammals typically associated with hunting, such as deer and antelope, are not present in the faunal assemblage. Rabbit and rodent remains that are present, can not be

positively associated with human occupation due to biological influences and no evidence of utilization (e.g., cut marks). If rabbit and rodent processing occurred, as with ungulate butchering, discarded flake tools would have been found. The large number of animals harvested would have required the replacement and reworking of tools as they became dull.

The Calderwood Rockshelter sites also have deep middens (>60 cm), a characteristic Fagan notes an upland site would lack. Excepting hearths, excavation yielded no distinctive features. Today the sites are a long distance from permanent water (i.e., approximately 2.5 miles to Crump Lake). Though ephemeral today, it is unknown how much water Fish Creek carried in the past.

In Warner Valley, major occupation sites have abundant fish and shellfish remains (Fowler 1993). Calderwood Rockshelters held few shellfish and fish remains. These remains could have easily been carried in by humans or birds from Crump Lake (2.5 miles; < one-half days walk). Without butchering evidence or charring, it is difficult to ascertain how the fish remains were brought to the site.

Only the groundstone palette connects the rock art of the Calderwood and Bitterroot rockshelters to Warner Valley's settlement and subsistence models. However, in her analysis, Ricks (1995) provided some statistical correlation between rock art sites and local resources. She found that rock art sites tend to be associated with upland low sage plant communities, and lowland marsh resources and big-sage/bunchgrass communities. The Calderwood and Bitterroot rockshelters lie between these two communities. She also found no correlation between rock art sites and present distribution of big game species. In addition, she noted "aggregation sites" or villages hold the most variation in design styles (Ricks 1995:180). Though Calderwood and Bitterroot rockshelters possess several rock art design types, infrequent visits over many years may have contributed to the variety.

The sites were occupied during the Late Archaic based on the Calderwood and Bitterroot stone tool assemblage comprised mostly of Rose Spring (Rosegate) series points. This date is supported by the textiles' AMS date of about 925 B. P. and the charcoal date of 290 B. P. In

addition, the use of black pigment supports a late occupation because historic subjects (e.g., horses) have appeared in black designs in Warner Valley (Fowler 1993:95).

The presence of a rock art panel depicting a possible atlatl (site 35LK685, panel 2) and the Gatecliff Split Stem (>4950 B. P.) suggest an earlier date. The Gatecliff Split Stem point and this rock art panel perhaps hint at possible earlier deposits not encountered during excavation or at brief occupations that did not result in identifiable occupations.

Future analysis should focus on determining seasonality of repeated occupational use. Seeds recovered from flotations await identification.

Seasonality may also be determined by analyzing the growth rings of fish vertebrae and mussel shell. According to Greenspan (1994:497), seasonality can be determined by analyzing "incremental growth rings, preserved in the vertebrae." Fish vertebrae increase in size when material is added to the outermost layers. The accretionary rate of this material correlates to the water temperature of the fishes' environment. With higher temperatures, the incremental growth structure becomes wider and lighter in color. Colder temperatures restrict the secretion of material thereby creating a dark thin band. To further deduce a fish's season of death, the specimen must be compared to a reference collection of the same fish species from the same environment (Greenspan 1994). However, at this time it is useless to pursue this kind of analysis because it is impossible to determine if the fish vertebrae and mussel shell were brought to the site by humans.

Recently Tipps (1998:7) tested Weide's settlement and subsistence model against an "alternative model," where emphasis is on intensive use of uplands in spring and early summer for plant procurement. Her evidence supports the subsistence portion of the alternative model, but not the seasonal element. Tipps also notes that her test supports Weide's model even though the 30 year old model needs improvement (Tipps 1998:119).

In coming to this conclusion she examined evidence from upland, mid-elevation, and lowland sites in Warner Valley. In particular, she noted that midland sites were habitation (intensively utilized) sites with the following characteristics 1) they are found along drainages, escarp-

ments and near springs, 2) their assemblages are diverse with little or no fish remains, 3) net sinkers are not present, and 4) rock art is present at or nearby the sites.

Although my test of the subsistence and settlement models of Warner Valley are similar to Tipps, our conclusions differ. The Calderwood and Bitterroot Rockshelters match Tipps' mid-land characteristics except for the rarity of fish remains, location near a spring, and presence of a diverse artifact assemblage. I still believe from the evidence gathered, that Calderwood Rockshelters held only temporary camps. However, the evidence is not conclusive. Did the inhabitants of Warner Valley utilize the site while traveling to and from the uplands or was it just a task location from which they later returned to permanent camps in the lowlands? From time to time the rock shelters may have served in either or both capacities.

At the very least, the excavation material reported on in this manuscript provides additional knowledge about mid-elevation sites in Warner Valley. This data contributes information needed for furthering understanding of regional subsistence and settlement patterns and provides an archaeological link between site deposits and rock art.

REFERENCES CITED

Adovasio, J. M.

1977 *Basketry Technology: A Guide to Identification and Analysis*. Aldine, Chicago.

1986 Prehistoric Basketry. In *Great Basin*, edited by W. L. D'Azevedo, pp. 194-205. Handbook of North American Indians, vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D. C.

Adovasio, J. M, R. Andrews, and R. Carlisle

1977 Perishable Industries from Dirty Shame Rockshelter. In *Tebiwa: Miscellaneous Papers of the Idaho State University Museum of Natural History* No. 7. Pocatello, Idaho.

Alt, D. D., and D. W. Hyndman

1978 *Roadside Geology of Oregon*. Mountain Press, Missoula.

Andrefsky, W. Jr.

1998 *Lithics: Macroscopic Approaches to Analysis*. Cambridge University Press, Cambridge, UK.

Antevs, Ernst

1955 Geologic-Climatic Dating in the West. *American Antiquity* 20(4):317-335.

Bach, Melva.

1990 *History of the Fremont National Forest*, edited by W. Tonsfeldt. U.S. Department of Agriculture. Tonsfeldt Consulting, Bend, Oregon.

Beck, W., D. J. Donahue, A. J. T. Jull, G. Burr, W. E. Broecker, G. Bonani, I. Hajdas, and E. Malotki

1998 Ambiguities in Direct Dating of Rock Surfaces Using Radiocarbon Measurements. In *Science* 280:2132-2139.

Bedwell, S. F.

1973 *Fort Rock Basin Prehistory and Environment*. University of Oregon Books, Eugene, Oregon.

Benedict, J. B.

1988 Techniques in Lichenometry: Identifying the Yellow Rhizocarpons. *Arctic and Alpine Research* 20(3):285-291.

Binford, L. R.

1980 Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45(1):4-20.

Brown, V., C. Yocom, and A. Starbuck

1958 *Wildlife of the Intermountain West.* The American Wildlife Region Series Vol. 4. Naturegraph, Healdsburg, California.

Cannon, W. J.

1993 Utilization of Fish and Shellfish. In *Archaeological Investigations in Warner Valley, Oregon, 1989-1992, An Interim Report.* Technical Reports 93-1. Department of Anthropology, University of Nevada, Reno.

Cannon, W. J., C. C. Creger, D. D. Fowler, E. M. Hattori, and M. F. Ricks

1990 A Wetlands and Uplands Settlement-Subsistence Model for Warner Valley, Oregon. In *Wetland Adaptations in the Great Basin*, edited by J. J. Janetski and D. B. Madsen, pp. 173-182. Museum of Peoples and Cultures Occasional Papers No. 1. Brigham Young University, Provo, Utah.

Cannon, W. J. and A. Woody

1996 Were They Throwing Ground Stone at the Antelope? Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California.

Chaffee, S. D., M. Hyman, and M. W. Rowe

1994 Radiocarbon Dating of Rock Paintings. In *New Light on Old Art: Recent Advances in Hunter-Gatherer Rock Art Research*, edited by D. S. Whitley and L. L. Loendorf, pp. 9-12. Institute of Archaeology, University of California, Los Angeles.

Cotterell, B. and J. Kamminga

1987 The Formation of Flakes. *American Antiquity* 52(4):675-708.

Couture, M. D., M. F. Ricks, and L. Housley

1986 Foraging Behavior of a Contemporary Northern Great Basin Population. *Journal of California and Great Basin Anthropology* 8(2):150-160.

Crabtree, D. E.

1972 *An Introduction to Flintworking*. Occasional Papers of the Idaho Museum of Natural History No. 28. Idaho Museum of Natural History, Pocatello.

Cressman, L. S.

1936 *Archaeology Survey of the Guano Valley Region in Southeastern, Oregon*. University of Oregon Monographs, Studies in Anthropology No. 1. Eugene.

1937 *Petroglyphs of Oregon*. University of Oregon Monographs, Studies in Anthropology No. 2. Eugene.

Cressman, L. S., H. Williams, and A. D. Krieger

1940 *Early Man In Oregon: Archaeological Studies in the Northern Great Basin*. University of Oregon, Eugene.

Cronquist, A., A. H. Holmgren, N. H. Holmgren, and J. L. Reveal

1972 *Intermountain Flora: Vascular Plants of the Intermountain West, U.S.A*. Vol. 1. Hafner, New York and London.

Csuti, B., A. J. Kimerling, T. A. O'Neil, M. M. Shaughnessy, E. P. Gaines, and M. M. Huso

1997 *Atlas of Oregon Wildlife: Distribution, Habitat, and Natural History*. Oregon State University Press, Corvallis.

D' Azevedo, W. L.

1986 Introduction. In *Great Basin*, edited by W. L. D' Azevedo, pp. 1-14. Handbook of North American Indians, vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D. C.

Dorn, R. I.

1994 Dating Petroglyphs with a Three-Tier Rock Varnish Approach. In *New Light on Old Art: Recent Advances in Hunter-Gatherer Rock Art Research*, edited by D. S. Whitley and L. L. Loendorf, pp. 13-36. Institute of Archaeology, University of California, Los Angeles.

Dorn, R. I. and D. S. Whitley

1983 Cation-Ratio Dating of Petroglyphs from the Western Great Basin, North America. *Nature* 302:816-818.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye

1988 *The Birder's Handbook; A Field Guide to the Natural History of North American Birds.* Simon and Schuster Inc., New York.

Eiselt, S. B.

1998 *Household Activity and Marsh Utilization in the Archaeological Record of Warner Valley: The Peninsula Site.* Research Report 98-2. Department of Anthropology, University of Nevada, Reno.

Fagan, J. L.

1974 *Altithermal Occupation of Spring Sites in the Northern Great Basin.* University of Oregon Anthropological Papers No. 6. University of Oregon Press, Eugene.

Fiero, Bill

1986 *Geology of the Great Basin.* University of Nevada Press, Reno.

Fowler, C. S., and S. Liljeblad

1986 Northern Paiute. In *Great Basin*, edited by W. L. D'Azevedo, pp. 435-465. Handbook of North American Indians, vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D. C.

Fowler, D. D., E. M. Hattori, and C. C. Creger

1989 *Summary Report of Archaeological Investigations in Warner Valley, Lake County, Oregon, 1987-1988.* Research Reports 89-1. Department of Anthropology, University of Nevada, Reno.

Fowler, D. D. (editor)

1993 *Archaeological Investigations in Warner Valley, Oregon, 1989-1992, An Interim Report.* Technical Reports 93-1. Department of Anthropology, University of Nevada, Reno.

Gould, R. A.

1977 Puntutjarpa Rockshelter and the Australian Desert Culture. Anthropological Papers Vol. 54, Pt. 1. American Museum of Natural History, New York.

Greenspan, R. L.

1994 Archaeological Fish remains in the Fort Rock Basin. In *Archaeological Researches in Northern Great Basin: Fort Rock Archaeology Since Cressman*, edited by M. C. Aikens and D. L. Jenkins, pp. 485-504. University of Oregon Anthropological Papers No. 50. University of Oregon, Eugene.

Hatton, R. R.

1988 *Oregon's Big Country: A Portrait Of Southern Oregon*. Maverick, Bend.

Heizer, R. F. and M. A. Baumhoff

1959 Great Basin Petroglyphs and Prehistoric Game Trails. *Science* 129(3353):904-905.

1962 *Prehistoric Rock Art of Nevada and Eastern California*. University of California Press, Berkelley and Los Angeles.

Holmer, R. N.

1986 Common Projectile Points of the Intermountain West. In *Anthropology of the Desert West: Essays in Honor of Jesse D. Jennings*, edited by C. J. Condie and D. D. Fowler, pp. 90-115. University of Utah Anthropological Papers 110. University of Utah Press, Salt Lake City.

Hunt, C. B.

1974 *Natural Regions of the United States and Canada*. W. H. Freeman and Company, San Francisco.

Kelly, I. T.

1932 *Ethnography of the Surprise Valley Paiute*. University of California Publications in American Archaeology and Ethnography Vol. 31, No. 3:67-210. Berkeley.

Keyser, J. D.

1992 *Indian Rock Art of the Columbia Plateau*. University of Washington Press, Seattle.

Lyons, W. H.

1993 *Archaeological Survey of Hart Mountain National Antelope Refuge Southern, Oregon*. Washington State University. Submitted to U.S. Fish and Wildlife Service Regional Office, Eastside Federal Complex, 911 NE 11th Ave. Portland Oregon.

1997a *Archaeological Testing at Hart Mountain National Antelope Refuge, Lake County, Oregon, 1994: Sediments and Cultural Stratigraphy*. Submitted to U.S. Fish and Wildlife Service, Region 1.

1997b *Survey and Collection at Non-Tested Sites, Hart Mountain National Antelope Refuge, Lake County, Oregon, 1994: Rock Features and a Lithic Assemblage*. Submitted to U.S. Fish and Wildlife Service, Region 1

Magne, M. and D. Pokotylo

1981 A Pilot Study in Bifacial Lithic Reduction Sequences. *Lithic Technology* 10:34-47.

Mauldin, R. P., and D. S. Amick

1989 Investigating Patterning in Debitage from Experimental Bifacial Core Reduction. In *Experiments in Lithic Technology*, ed. D. S. Amick and R .P. Mauldin, pp. 67-88. BAR International Series 528, Oxford.

McArthur, L. L.

1997 *Oregon Geographic Names*. Oregon Historical Society, Portland.

Mehringer, Jr. P. J.

1986 Prehistoric Environments. In *Great Basin*, edited by W. L. D'Azevedo, pp.31-63. Handbook of North American Indians, vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington D.C.

Mehringer, Jr. P. J., and P. E. Wigand

1990 Comparison of Late Holocene Environments from Packrat Middens and Pollen: Diamond Craters, Oregon. In *Packrat Middens: The Last 40,000 Years of Biotic Change*, edited by J. L. Betancourt, T. R. Van Devender, and P. S. Martin, pp. 294-325. University of Arizona Press, Tucson.

Minor, R., S. D. Beckham, and K. A. Toepel

1979 *Cultural resource Overview of the BLM Lakeview District, South-Central Oregon: Archaeology, Ethnography, History.* University of Oregon Anthropological Papers No. 16. University of Oregon, Eugene.

Munsell Soil Color Charts

1994 Macbeth Division of Kollmorgan Instruments Corporation, New Windsor, New York

Oetting, A. C.

1994 Chronology and Time Markers in the Northwestern Great Basin: The Chewacuan Basin Cultural Chronology. In *Archaeological Researches in the Northern Great Basin: Fort Rock Archaeology Since Cressman,* edited by M. C.. Aikens and D. L. Jenkins, pp. 41-63. University of Oregon Anthropological Papers No. 50. University of Oregon, Eugene.

Patterson, A.

1992 *A Field Guide to Rock Art Symbols of the Greater Southwest.* Johnson Books, Boulder.

Patterson, L. W.

1990 Characteristics of Bifacial-Reduction Flake-Size Distribution. In *American Antiquity* 55(3):550-558.

Phillips, F. M.

1977 *Desert People and Mountain Men.* Chalfant Press. Bishop, California.

Ricks, M. F.

1995 *A Survey and Analysis of Prehistoric Rock Art of the Warner Valley Region, Lake County, Oregon.* Ph.D. dissertation, Portland State University, Portland. UMI Dissertation Service, Ann Arbor.

Ricks, M. F. and W. J. Cannon

1993 Rock Art of the Warner Valley Region. In *Archaeological Investigations in Warner Valley, Oregon, 1989-1992,* An Interim Report, Technical Reports 93-1, edited by D. D. Fowler, pp. 91- 103. Department of Anthropology, University of Nevada, Reno.

Schaafsma, Polly

1986 Rock Art. In *Great Basin*, edited by W. L. D'Azevedo, pp. 215-226. Handbook of North American Indians, vol. 11, W. C. Sturtevant, general editor. Simithsonian Institution, Washington D.C.

Shott, M. J.

1986 Technological Organization and Settlement Mobility: An Ethnographic Examination. *Journal of Anthropological Research* 42:15-51.

1995 How Much is a Scraper? Curation, Use Rates, and the Formation of Scraper Assemblages.*Lithic Technology* 20 (1): 53-72.

Stahle, D. W. and J. E. Dunn

1982 An Analysis and Application of the Size Distribution of Waste Flakes from the Manufature of Bifacial Tools. *World Archaeology* 14:84-97.

Stenholm, N. A.

1994 Paleoethnobotanical Analysis of Archaeological Samples recovered in the Fort Rock Basin. In *Archaeological researches in the Northern Great Basin: Fort Rock Archaeology Since Cressman,* edited by M. C.. Aikens and D. L. Jenkins, pp. 531-559. University of Oregon Anthropological Papers No. 50. University of Oregon, Eugene.

Steward, J. H.

1938 *Basin-Plateau Aboriginal Sociopolitical Groups*. Smithsonian Institution, Bureau of American Ethnology Bulletin 120. United States Government Printing Office, Washington.

Taylor, R. J.

1992 *Sagebrush Country, A Wildflower Sanctuary*. Mountain Press, Missoula.

Thien, S. J.

1979 A Flow Diagram for Teaching Texture-by-Feel Analysis. *Journal of Agronomic Education* 8:54-55.

Thomas, D. H.

1981 How to Classify the Projectile Points from Monitor Valley, Nevada. *Journal of California and Great Basin Archaeology* 3(1):7-43.

Thomas, D. H., L. S. A. Pendleton, and S. C. Cappannari

1986 Western Shoshone. In *Great Basin*, edited by W. L. D'Azevedo, pp. 262-283. Hand book of North American Indians, vol. 11, W. C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Tipps, J. A.

1998 *High, Middle, and Low: An Analysis of Resource Zone Relationships in Warner Valley, Oregon*. M. A. thesis, University of Nevada, Reno.

Weide, D. L.

1975 *Postglacial Geomorphology and Environments of the Warner Valley - Hart Mountain Area, Oregon*. Ph.D. dissertation, University of California, Los Angeles. UMI Dissertation Services, Ann Arbor.

Weide, M. L.

1974 North Warner Subsistence Network: A Prehistoric Band Territory. *Nevada Archaeological Survey Research Paper* 5:64-78.

1968 *Cultural Ecology of Lakeside Adaptation in the Western Great Basin*. Ph. D. dissertation. University of California, Los Angeles. UMI Dissertation Services, Ann Arbor.

Wheat, M. M.

1967 *Survival Arts of the Primitive Paiutes*. Reno: University of Nevada Press.

Whitley, D. S.

1992 Shamanism and Rock Art in Far Western North America. *Cambridge Archaeological Journal* 2:89-113.

Whittaker, J. C.

1994 *Flintknapping, Making and Understanding Stone Tools*. University of Texas Press, Austin.

Wigand, P. E.

1987 Diamond Pond, Harney County, Oregon: Vegetational History and Water Table in the Eastern Oregon Desert. *Great Basin Naturalist* 47:427-458.

Wiley, J. W. and F. E. Lohrer

1973 Additional Records of Non-Fish Pray taken by Ospreys. *Wilson Bulletin* 25:468-470.

Winchester, Venessa

1988 An Assessment of Lichenometry as a Method for Dating Recent Stone Movements in Two Stone Circles in Cumbria and Oxfordshire. *Botanical Journal of the Linnean Society* 96:57-68.

Zweifel, M. K.

1994 *A Guide to the Identification of the Molariform Teeth of Rodents and Lagangomorphs of the Columbia Basin*. Unpublished Master's thesis, Department of Anthropology, University of Washington, Pullman.

APPENDIX A

Plants Collected or Observed Near Calderwood Rockshelters

	Common Name	Taxon
Trees	Western Juniper	*Juniper occidentalis*
Shrubs	Big Sage	*Artemisia tridentata*
	Bud Sage	*Artemisia spinescens*
	Green Rabbit Brush	*Chrysothamnus viscidiflorus*
	Hop Sage	*Atriplex spinosa*
	Horse Brush	*Tetradymia spinosa*
	Low Sage	*Artemisia rigida*
	Purple Sage	*Salvia dorrii*
Grasses	Cheat Grass	*Bromus tectorum*
	Crested Wheat Grass	*Agropyron cristatum*
	Indian Rice Grass	*Stipa hymenoides*
	Needle Grass	*Stipa therbergian*
	Needle and Thread Grass	*Stipa* cf. *comata*
	Sand Drop Seed	*Sporobolus cryptandrus*
	Squirrel Tail	*Sitanion hystrix*
Forbs	Buckwheat	*Eriogonum ovalifolium*
	Cryptantha	*Cryptantha* sp.
	Desert Groundsmoke	*Gayophytum decipiens*
	False Dandelion	*Agoseris glauca*
	Loco weed	*Astragulus filipies*
	Microseris	*Microseris trozimoides*
Mosses	Hairy Moss	*Tortula* sp.
Lichens	Fire Dots	*Caloplaca* spp.
	Rock Brooch	*Rhizoplaca chrysoleuca*
	Rock Brooch	*Rhizoplaca melanopthalma*
	Rock Tripe	*Umbilicaria* spp.
	Sun Burst	*Xanthoria elegans*
	Sun Burst	*Xanthoria polycarpa*
	-	*Diploschistes* sp.
	-	*Lecidea atrobrunnea*
	-	*Lecidea* spp.

APPENDIX B

ROCK ART RECORD

Site Name: _____ Site Owner: _____
County/ State: _____ Permanent No.: _____

Agency/ Fiels No.: _____
USGS Map Quad.: _____ Series: _____ Date: _____
Legal Description: _____1/4 _____ 1/4 _____ 1/4, Sec. ____, T. ____ R. ____
UTM: Zone _____ Northing _____ Easting _____
Elevation: _____ Above Sea Level

Recorder: _____ Date: _____

1. Number of panels at this site: _____
2. Site Plant Community: _____
   _____
3. Site Distance to Water: _____
4. This form is for panel number: _____
5. Panel is situated on:
   ____ Bedrock ____ Rockshelter Interior ____ Other
   ____ Boulder ____ Rimrock/Cliff Face
   Additional Information: _____
   _____
6. Panel Orientation/Aspect: _____
7. Panel Dimension: _____
8. Worked Surface is:
   ____ Vertical ____ Horizontal ____ Sloping
9. Type of Rock: _____
10. Category and Technique:
    ____ Petroglyphs ____ Abraded ____ Incised ____ Scratched
    ____ Pictographs ____ Solid Pecked ____ Stipple Pecked
    ____ Combinations
    Additional Information: _____
    _____
11. Prehistoric Modifications:
    ____ Covering with Pigment ____ Reworking/Additions
    ____ Superimposed Figures ____ Other
    ____ None
    Describe: _____
    _____

ROCK ART RECORD (Continued)

12. Impacting Agents:

____ Bird/Rodent/Insect Nests
____ Exposure - Wind/Rain
____ Water Run Off
____ Bullet holes
____ Livestock
____ Patination
____ None
____ Surface Spalls
____ Lichen Growth
____ Mineral Deposits
____ Graffiti
____ Attempted Removal
____ Other

Additional Information: _____
_____

13. Incorporation of natural features in design: ____ Yes ____ No
Describe: _____
_____

14. Photographs:
Film Type: _____ Camera Type: _____
Photo # _____ Aspect: _____
Photo# _____ Aspect: _____
Photo# _____ Aspect: _____
Photo# _____ Aspect: _____

15. Panel Field Sketch:

APPENDIX C

Contexts of Flaked Stone Assemblage

SITES	ARTIFACTS					
	Biface	Flake Tool	Hafted Biface	Flake Shatter	Angular Shatter	Proximal Flake
35LK684 (A)						
Unit 1						
Level 1	1					1
Level 2	1			5	3	5
Level 3				8		4
Level 4		1		1	1	2
Level 5	2			7	3	8
Level 6				8	2	14
Level 7				6	2	13
Level 8	1	1		5	1	10
Level 9				3	1	5
Level 10				3	1	3
Level 11				1	1	6
Level 12			1	1	1	4
Unit 2						
Level 1				1		1
Level 2						
Level 3						
Level 4				1		
Level 5						
Unit 3						
Level 1						
Level 2				1		1
Level 3						
Level 4						
Level 5						
Unit 4						
Level 1						1
Level 2		2				
Level 3			1			
Level 4			1			
Level 5					1	1
Level 6					1	
Level 7						1
Level 8						
Level 9						
Level 10						
Unit 5						
Level 1	2		1	1		5
Level 2a	4			4	2	8
Level 2b	1	1	1	4	1	8

Contexts of Flaked Stone Assemblage (Continued)

SITES	ARTIFACTS					
	Biface	Flake Tool	Hafted Biface	Flake Shatter	Angular Shatter	Proximal Flake
Level 3					1	4
Level 4				2	1	3
Level 5				1		3
Level 6				1		5
Level 7				1		1
Level 8					1	2
Level 9				1		4
*Hearth 4						
Level 3a				5		6
Level 3b				3	2	10
Level 4	1			7		10
Level 5		1		2	1	8
Level 6				3		4
Level 7	1					2
Level 8				2		2
Unit 6						
Level 1	1			1	1	5
Level 2				1	1	3
Level 3				3		6
Level 4		1				1
Level 5						3
Level 6				5	3	6
Level 7						2
Level 8				1	1	2
Level 10				2	1	1
Level 11						3
Level 12						1
Level 13				2		
35LK685 (B)						
Unit 1B						
Level 1						2
Unit 1B/N						
Level 1					1	1
Level 2				3		2
Level 3				2		2
Level 4						1
Level 5						1
Level 6				1		2
Level 7						1

Contexts of Flaked Stone Assemblage (Continued)

SITES	ARTIFACTS					
	Biface	Flake Tool	Hafted Biface	Flake Shatter	Angular Shatter	Proximal Flake
Unit 1B/S						
Level 1				4	2	10
Level 2					1	1
Level 3				1	1	1
Unit 2						
Level 1				1		2
Level 2			1			4
Level 3	1					
Level 4	1			2		1
Level 5	1			3		7
Level 6		1	1	7	1	4
Level 7				3		
Level 8				2		1
Level 9						
Level 10				3		
Level 11						2
Level 12						1
Level 13						2
Level 14						
Unit 5						
Level 1						
Level 2						
Level 3						
Level 4						
Level 5						
Unit 6						
Level 1						
Level 2						
Level 4						
Level 5						
Unit 7						
Level 1						
Level 2	1			2		
Level 3				1		1

Contexts of Flaked Stone Assemblage (Continued)

SITES	ARTIFACTS					
	Biface	Flake Tool	Hafted Biface	Flake Shatter	Angular Shatter	Proximal Flake
35LK635						
Unit 1						
Level 0						
Level 1						
Level 2						1
Level 3						
Level 4						
Level 5						
Level 6						2
Level 7						1

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