Archaeological Surveys of Crater Lake National Park and Oregon Caves National Monument, Oregon

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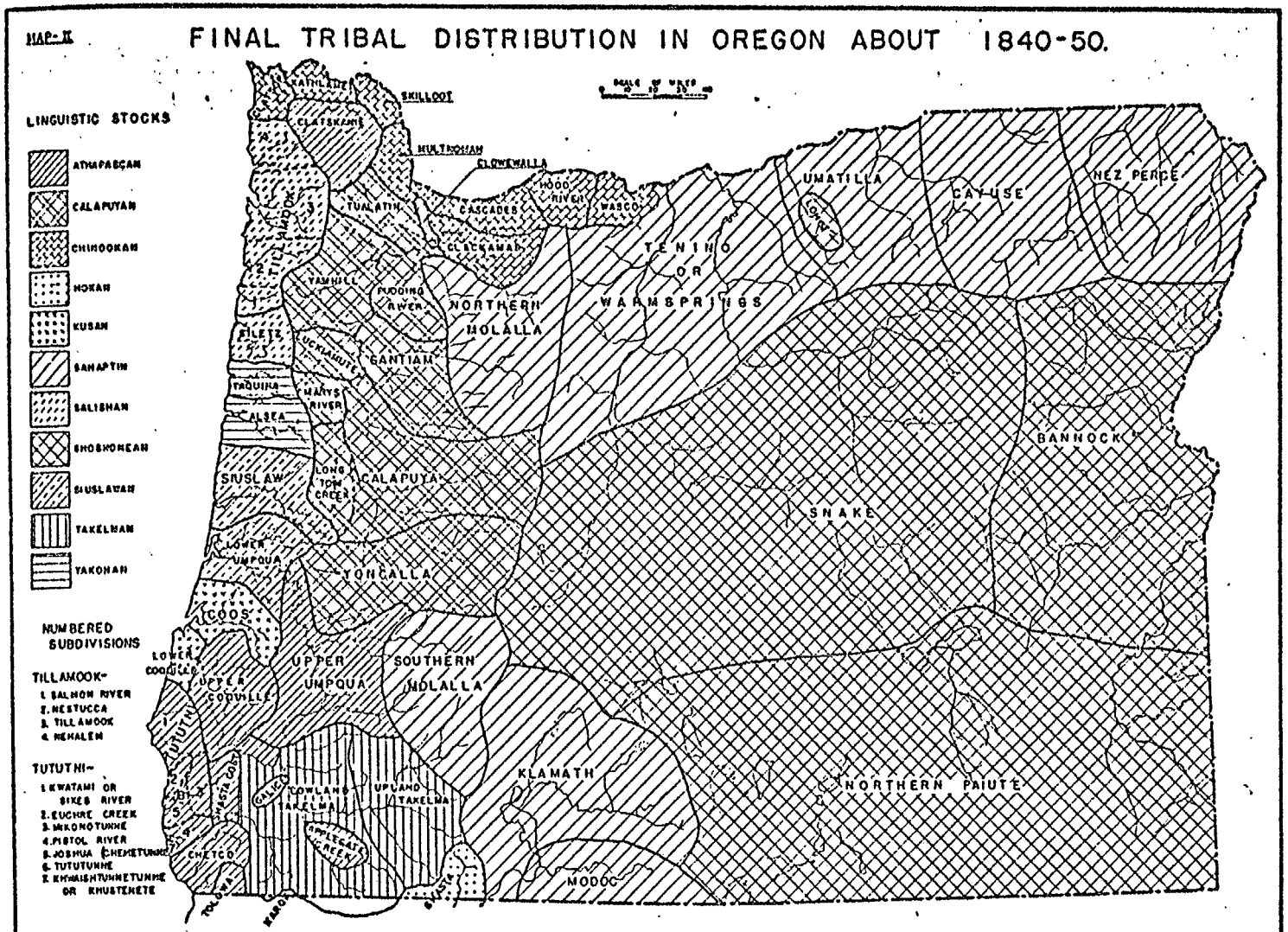
Report on an archaeological project carried out under terms of a Memorandum of Agreement, Crater Lake National Park - FY 1963 (Contract No. 14-10-0434-900), between the University of Oregon and the U. S. National Park Service.



MAP 1
(from Cressman 1940a)

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A survey of the archaeological resources of Crater Lake National Park and Oregon Caves National Monument was carried out by a University of Oregon field party during the 1963 summer field season. The purpose of the project was to determine the extent of aboriginal occupation and utilization of the two areas. The project was authorized by the National Park Service under the Mission 66 program, whose objectives are the interpretation for the public of the natural and scientific resources contained within the National Park system. The archaeological program of Mission 66 "deal primarily in scientific research, preservation, the recovery of archaeological values, and the protection of these values for the enjoyment of future generations" (Anonymous 1963).

The survey of the Oregon Caves and Crater Lake regions yielded almost completely negative results. No evidence of aboriginal occupation or use was found on the Monument or adjacent lands, and the evidence at Crater Lake consists of a few flakes and projectile points. Our study showed that the areas were suboptimal habitats for aboriginal groups dependent upon hunting and gathering subsistence economies.

This report reviews briefly (1) the culture chronology of southcentral Oregon with notes on the historic tribes having access to the study areas; (2) the geology, climate and economic resources of Crater Lake Park from the standpoint of aboriginal use and occupation; and (3) comparisons with other surveys of equivalent altitudes.

The survey:

A two-man survey crew spent seven weeks exploring over 255 square miles of mountainous terrain. Crater Lake National Park contains over 235 square miles of land surface; the lake covers approximately 30 square miles. The Oregon Caves Monument covers only nine-tenths of a square mile, but about 30 square miles of adjacent land was included in the search for archaeological sites. The strategy employed was to eliminate from the survey as rapidly as possible barren or otherwise unsuitable terrain and to concentrate on the

regions where food plants and/or game animals were present. The survey sought for economically productive lands, such as berrying grounds or marshy ground where edible roots or tubers might grow, for suitable village or camp-site areas, inhabitable rock shelters or caves, and for rock exposures where pictographs or petroglyphs might occur.

The Oregon Caves National Monument encompasses parts of Sections 9, 10, 16, and 15, Township 40 South, Range 6 West, Willamette Meridian. The Monument lies in the Siskiyou Mountains at about 4,000 feet elevation. It probably lies within the northern portion of the Californian Biotic Province just a few miles east of the Redwood district of the Oregonian Province (Dice 1943; Map 1, 33-34, 47-49). The caves are solution caverns dissolved out of a local marble formation. The openings are found in outcrops on a steep hillside. The cover is conifer forest with an understory of deciduous species such as oaks, vine maple, chinquapin, laurel, and madrona occurring in clearings and along the stream banks. The climate is characterized by cool dry summers and moist winters with considerable snowfall at higher elevations (Wilson 1952).

The black-tail deer (Odocoilus virginianus) range throughout the region, and wapiti (Cervus canadensis roosevelti) formerly were plentiful. Several species of nuts and berries were noted in the vicinity of the Caves: hazel nut, chinquapin, acorns, blackcaps, blackberry (Western Dewberry), salmon berry, and red huckleberry.

No attempt was made to secure a complete list of available flora and fauna of economic value. The survey covered No Name Creek, Cave Creek and Lake Creek, the seep at Big Tree, Bigelow Lakes, Grayback Ridge, and the area at the confluence of Grayback and Sucker Creeks. In all, approximately 20 miles of trail over about 30 square miles of terrain were traversed in the search for sites, with negative results. The interior of the caves, their

mouths, and a large shelter at the man-made exit were also checked.

The region is peripheral to the major population centers of the Takelma, even though it is reputedly a part of the territory claimed by them (Sapir 1907:251-252; Berreman 1937). It is concluded that the region was rarely visited, although of seasonal utility.

Crater Lake occupies the caldera of former Mt. Mazama, on the divide of Oregon's Cascade Range. The rim of the caldera is a prominant feature of the High Cascades, and is visible for many miles. Former Mt. Mazama was a volcanic cone of hypersthene basalts that towered over 12,000 feet before its collapse. The rectangular National Park surrounding the Lake has a rough and extremely varied topography, rising from 4400 feet at the south entrance panhandle to 8926 feet at the top of Mt. Scott. Mt. Scott is a parasitic scoria cone on the eastern flank of the former mountain. In addition, the Park contains Union Peak, an old, glacier-eroded shield volcano, Timber Crater, a young unglaciated shield volcano, and numerous scoria cones formed parasitically from vents radiating from Mazama. Many treeless pumice flats are reminders of the cataclysmic events leading to the collapse of Mazema's cone. The Park is heavily timbered, aside from the pumice flats, but there is hardly any understory of deciduous trees or brush, except in the southeastern corner where dense stands of ceanothus makes travel difficult. For the most part, the terrain is open and parklike, and ideal campsites are easily found wherever water is available.

Survey of the National Park was carried out by jeep and on foot. The field party familiarized itself with the Park topography and concentrated upon terrain judged to be most accessible from lowland population centers and most economically productive from the aboriginal point of view. Almost the whole of the northern half of the Park was quickly eliminated from consideration. Though forested for the most part, the dominant tree is the lodgepole pine. There is no understory of shrubs or brush, except for manzanita which occurs

sparsely on Timber Crater and rocky ridges and outcrops below the rim. Groundcover is very sparse. Red Cone Spring is the only permanent source of water from Bear Creek, north of Mt. Scott, to the springs and bogs along the western boundary (Map 2). Both Mule Deer, in the eastern section, and Blacktail Deer were seen throughout the area, but less than ten individuals were sighted, indicating a scarce population.

Search was concentrated in the southern half of the Park, especially in the southeastern glacier-carved valleys. These valleys were accessible to the largest lowland populations, the Klamath bands, and appeared to be the most feasible areas in terms of aboriginal economics. In addition, the bluffs and ridges north of Mt. Scott, where numerous suitable rock shelters occur, the ponds, streams and park-like areas around Union Peak, and the springs and bogs along the western boundary were carefully searched. Throughout the survey the party also searched for preMazama exposures which might contain occupational evidence, but without any success.

The survey was critically hampered by the overwhelming evidence of recent White use connected with Park maintenance and improvement and with recreational activities. Old roads, trails, campsites, telephone lines, quarries, etc., were encountered everywhere. The most frustrating factor was the fact that every suitable campsite examined yielded copious evidence of post-contact use via the presence of tin cans, bottles, and garbage pits.

Two flakes of chalcedony-veined jasper found near Lightning Spring and an obsidian flake found in the residence area at Park Headquarters were the only evidence of presumably purely Indian use found by the survey party. The two jasper flakes were found associated with the burned remnants of a large stump on the bank of a small stream fed by the Spring. The locality is on the eastern edge of a small pumice flat in ideal hunting country. A series of small, fairly open benches or flats on the steep mountain slopes makes the

stalking of deer from above very easy. Test pits, post-hole auger borings, and intensive search of the vicinity failed to turn up any further evidence. The scanty evidence did not warrant giving the locality a site designation.

The obsidian flake was found on the traffic island in the residence area on the western terrace bordering Munsen Creek. Two other artifacts of obsidian have been found in the vicinity, and it is entirely possible the area was a former campsite of the Klamath. Construction and maintenance of the Park Headquarters have completely eradicated any archaeological features that may have been present. The Headquarters area is the most suitable locality in the Park for short-term seasonal use. Blacktail deer and rodents are common. Deer could have been easily stalked, or driven into enclosures or ambushes along the rim. Wild onions and other edible plants occur in the bogs and marshes in Munsen Valley (Wynd 1930: 41-43), and the thin-leaved huckleberry (Vaccinium membranaceum) has its largest stand on the glacial moraine west of Headquarters. The stand of huckleberry is not very dense or extensive, nor are the plants very robust. The other food plants are also scarce. It is obvious that the region would not have yielded vegetal foods in sufficient quantities for winter storage. The valley was probably utilized for hunting forays.

Crater Lake surface finds:

The very scant artifact record of Indian use of the Park region has been found within the area along the rim between Lightning Spring and Discovery Point east to Garfield Peak and in Munsen Valley south to Godfrey Glen, with one exception. Ten chipped stone artifacts have been found since 1931. Four were found along the rim from Discovery Point to Garfield Peak, one on Mt. Scott near the Lookout, two at Park Headquarters, and three in Godfrey Glen. The specimens are described below in their Crater Lake National Park (CLNP) accession number sequence; they are stored at Park Headquarters (Fig. 1).

CLNP #852 Found on Garfield Peak trail by Leland Powell near the last switchback under surface overburden, July, 1931
Size, 37 x 18 mm.; tip and one barb missing; obsidian; pressure flaking; straight sides, basal notching, pointed base; made on a triangular, straight-based blank, no further modification of the base than that done by the basal notching.

CLNP #853 Found on first turn off highway south of rim village area under 2 feet of earth, September 15, 1931.
Size, 44 x 20 mm.; tang and one barb missing; obsidian; pressure flaking; one side slightly concave other side slightly convex.

CLNP #854 Found in Godfrey Glen by C. T. Henry.
Size, 65 x 15 mm.; obsidian; shaped by percussion flaking and indifferent pressure retouch; crudely made; convex sides, constricting stem to a straight base; notch on one edge due to clumsy workmanship.

CLNP #855 Found in Godfrey Glen by C. T. Henry.
Size, 28 x 11 mm.; obsidian; shaped by percussion flaking with indifferent pressure retouch; convex sides, constricted waist; expanded straight base; crudely made.

CLNP # 856 Found in Godfrey Glen by C. T. Henry.
Size, 36 x 7 mm.; obsidian; shaped by percussion flaking with transverse to oblique pressure retouch which produced a few ribbon spalls; convex sides, single shallow shoulder, convex base.

CLNP #857 Found by C. T. Henry two-thirds of the way up Garfield Peak trail.
Size, 37 x 26 mm.; obsidian; basal (?) fragment; oblique ribbon spall flaking. Possible base of a large, single-shouldered blade.

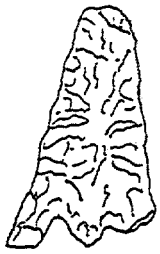
CLNP #858 Found by an unknown Park visitor near Discovery Point.
Size, 40 x 17 mm.; opaline; pressure flaking; straight sides; shouldered, lenticular cross-section, pointed base.

CLNP #859 Found on Mt. Scott by Louis J. Hallock at about 20 yards south of the lookout at the edge of the trail, May 8, 1953.
Size 19 x 9 mm.; tang missing; obsidian; pressure flaking; gently convex sides; shouldered (?).

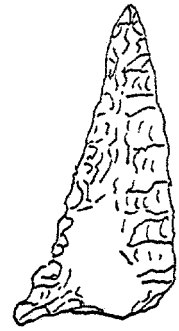
CLNP #860 Found by Jean Cummins on lawn of former Chief Ranger residence, May 16, 1958.
Size, 17 x 13 mm.; tip missing; obsidian; pressure flaking; straight sides, side notched, broad V-shaped base.

CLNP #861 Found by T. W. Broadbent on surface of traffic island in residence area, June 28, 1958.
Size 13 x 10 mm.; bifacially flaked fragment; obsidian (not illustrated).

The provenience of #860 is highly suspect, since it was found on well-tended, grassy lawn. It is possibly a Redding subtype of the Desert Side-notched Point class. Desert Side-notched points occur in post-1500 A.D.



CLNP 852



CLNP 853

CLNP854

CLNP 855

CLNP 856

CLNP 857

CLNP 858

CLNP 859

CLNP 860

Figure 1. Tracings of projectile points found in Crater Lake National Park. Approximately full size.

deposits in northern California (Baumhof and Byrne 1959:38, 50, 57, Map 3) and through central Oregon to the Columbia river (Cressman 1956; Chart 1; Ross 1963:102). CLNP #853 is probably a variant of the Gunther Barbed class of points which has a wide distribution in northwestern California and southern Oregon (Treganza 1958:14-16). #852 resembles a class of points found in the Deschutes and John Day drainage systems in central Oregon; the class consists of slender, triangular points whose only specialization is basalar notching. The Gunther Barbed class differs from this class in that the Gunther class is characterized by carefully shaped barbs. The opaline point, #858, falls within the size range of Cressman's Klamath Type 6B, from Level II, Kawumkan Springs, Cressman 1956:Chart 1, 414). Level II has an estimated age of 1500 to 500 B.C. (Cressman 1956:463-464), and the point may be of that age. However, pointed bases occur on specimens of a class of shouldered points that has wide distribution in Oregon, northern California and sporadically in the Basin and Plateau provinces during Protohistoric to Historic times (Cressman 1956; 1960-61; Leonhardy 1961:Table 1; Treganza 1963: Figure 1, n). #858 is of further interest because it is the only non-obsidian tool found at Crater Lake; deposits of opaline occur on Garfield Peak (Hans Nelson, Temporary Ranger-Geologist, personal communication).

The three specimens found in Godfrey Glen, Numbers 854, 855, 856, and the blade fragment from Garfield Peak, #857, chronologically could be quite old. The three Godfrey points fit Cressman's Klamath Type 11; #854 is Type 11A, #856 is Type 11B. The constricted stemmed point, #856, does not fit the classification, being an erratic form which is probably a single instance, but it is a product of similar techniques of manufacture and workmanship and most probably belongs in the general class represented by Type 11. The class has a long chronological history and wide distribution, occurring in the earliest cultural deposits throughout the Great Basin-Plateau provinces, and variants occur at every time horizon up to the Historic period (Cressman

1942; 1956; 1960). It is unfortunate that #857 is only a fragment. It represents excellent workmanship and control of the oblique flaking technique. Oblique flaking techniques which produce parallel, narrow ribbon spalls have s significant incidence in paleoindian assemblages (Wormington 1957:66, 105-7, 139) and has a widespread incidence at early time periods in Oregon (Cressman 1947:177-179; 1956:414, 416).

Culture Chronology:

Crater Lake is peripheral to regions having long culture chronologies. Cressman (1956:460) has summed up the evidence for antiquity of occupation. His summation is best quoted in full with bracketed interpolations of recently obtained dates where pertinent.

> ...To the north on the Deschutes River artifacts come from well below the Mount Mazama (Crater Lake) pumice giving a date well before 6,500 years ago. [Recent work on the Deschutes near Madras has provided minimum date of 6,000 B. C. for the initial occupation of the Deschutes-Metolius-Crooked river drainage (I-806, 7990 220 BP, Ross 1963:59).] At the east end of Odell Lake, some thirty miles further south near the summit of the Cascade Range, an occupation site extends some eighteen inches deep into the glacial till underlying the Mount Mazama pumice. At Fort Rock, northeast of the Klamath Lake Basin, sandals have a date of just over 9,000 years ago. In the Summer Lake caves five miles out from Paisley occupation occurs under Mount Mazama pumice and considerably earlier where it is associated in the latter case with the bones of Equus, camel, bison, and other animals. Some sixty miles south of Klamath Lake, in the bed of Lower Klamath Lake, artifacts are associated with the bones of Equus, camel, and probably mammoth. Our work in The Dalles dam reservoir on the Columbia River during 1953-54 has indicated human occupation of that area at the end of the Pleistocene, an estimate made on the best geological evidence so far available...[a magnitudinal date for the Early Period at The Dalles shows that occupation was certainly established 10,000 years ago (Cressman 1960:66).] Daugherty has reported a site in southeastern Washington dated at over 9,000 years..., while Cressman and Laughlin (1941), and Cressman (1947), have published on a probable early association of man with mammoth in the Willamette Valley. Thus, on all sides except the rugged area of the Cascade Range to the immediate west there is evidence of human occupation of a considerable antiquity.

The only archaeological excavation to the west of Crater Lake was done on the Rogue River near Gold Hill early in the history of archaeological investigations in Oregon, and before the significant advances in radiocarbon dating techniques were perfected. The observation that the associated implements,

burial goods and features recovered from Gold Hill indicate a close northwest California culture affiliation permits the assumption that the Gold Hill materials are of protohistoric age (Cressman 1933). The Chetco materials from the southern coast of Oregon are of equal age, or perhaps the deepest levels are somewhat older (Berreman 1944). A human skeleton was found in the pumice deposits south of Prospect, Oregon, (Williams 1942: Fig. 16) during construction of the Medford-Bend Highway. Cressman (1940b:301) writes that the position of the skeleton, with "no order to the bones," and its depth in the pumice, 6 feet, argues against aboriginal burial. The bones were in an excellent state of preservation, but no mention was made of charring, if the individual were overwhelmed by the avalanche. If the skeleton were that of an individual caught by the avalanche, then it attests the presence of people in the Rogue River Valley 6,500 years ago (see page 18). A date of 1500 A. D. for initial occupation of the Irongate site on the Klamath River just south of the Oregon-California border is projected from an average date of 455±75 B.P. (Leonhardy 1961:47). Four sequential culture components were distinguished by archaeological investigations of sites in the Lava Beds National Monument (Schwartz 1963). The two oldest components, I and II, are placed in Cressman's Laird's Bay Phase which terminated at about the beginning of the Christian era (Cressman 1942:102). The next component, III, is equated with the Lower Klamath Lake protohistoric period; radiocarbon runs on a house beam gives a date of A. D. 803±160 is held to be too early for this component by Schwartz (1963:109). The final component encompasses the post-contact period.

The cultural continuum established in the Klamath Basin is the most important population source for prehistoric occupation or use of Crater Lake National Park lands, on the basis of the evidence assembled to date. The Klamath Basin chronology has an antiquity probably in excess of 7,000 years. Sometime prior to 5,000 B. C., a generalized hunting and gathering culture with

Great Basin affiliations took up residence in the Sprague River area. At first, large game, rodents, birds, and carnivore were taken in roughly equal amounts, fish were of minor importance, and tubers, seeds, and other vegetable crops were gathered. The following millenia show increasing adaptation to riverine-marsh economy. Animals and birds were still utilized in similar proportions, but fish were increasingly important in the diet. Both the mano-and-metate and pestle-and-mortar milling implements were used to prepare a variety vegetable foods. Cultural orientation was still toward the Great Basin, but the area appears to have been relatively isolated.

By the first millenium B. C., the riverine-marsh economy had become set. Vegetable food preparation using Great Basin style utensils continued, but fish became the dominant protein food, birds were second in importance, and game was a "poor third." By A. D. 1, cultural influences from Northwest California and the Columbia river and plateau regions become apparent. The use of earth lodges is recorded at about 250 A. D., and the pattern of winter villages as the foci for local bands with autonomous political organization probably had its inception at this time. In the succeeding centuries the Klamath culture, derived from a basic substratum of Basin-Plateau traits with infusions of later traits from California, the Columbia River, and the Northwest Coast, chrystalized into the form recorded ethnographically (Spier 1930:233 ff.).

Fish and mussels had become the most important protein food supply, and were especially important during the winter. The seeds of the pond-lily (Nymphaea polysepala, Colville 1897:96), called wokas by the Klamath, had become the most important vegetable food. It was gathered in great quantities, processed, and stored for winter consumption. Specialization in the preparation of wokas led to changes in early style manos, or mullers, resulting in the development of the two-horned mano by 1500 A. D. (Cressman 1956:Chart 2). By this date, the village settlements, band groupings, family seasonal

subsistence activities, and possibly trade and intertribal hostilities and friendships, were established very much as they were at the time of White contact. At the time of White contact, the Klamath had the horse, and a superficial veneer of Horse Indian trappings acquired via their Sahaptin-speaking friends of the Columbia Plateau.

The Klamath:

The historic Klamath had three major population centers: the east side of Upper Klamath Lake, the Williamson and Sprague Rivers at the confluence of the Sprague with the Williamson, and the southern edge of Klamath Marsh. Band divisions followed the population divisions: "the winter locations are so fixed of habit as to give a measure of political separatism to the several localities" (Spier 1930:11). Political organization was weak, with non-hereditary political leaders. Chieftanship was acquired through personal ability and wealth. Social organization was weakly stratified. Social prominence was acquired through personal achievements. Slaves were captured, but were socially unimportant; they were held for sale to Columbia River tribes. Religion was based on individual power quests and shamanism. The dead were cremated. The Klamath were on peaceful terms with the Modoc to the south and maintained friendly trade relationships to the north. They warred with the Takelma, Shasta, and Paiute. Gatschet (1890:xxxvi) records that they "were filled with hatred" against the Molala (Molele), but Spier notes they were on friendly terms, meeting annually at the berrying grounds west of Crater Lake (Spier 1930:9, 160).

Concerning Klamath economic activities Spier (1930:10-11) writes,

> Early spring finds them leaving for favorable fishing stations where there are successive fish runs. Through the summer they move to the prairies to gather edible roots and berries or to the mountain and desert to hunt. During most of this time families are widely scattered and the winter villages quite deserted, but with the ripening of pond lily seeds in the marshes during August and September they again congregate...The families return in the

> fall, rebuild the earthlodges from the remains of the previous year's structure, and are all snugly housed by mid-December. The only permanent settlements are the winter villages. The summer residences are shifting, and while reoccupied from year to year, there is no feeling that particular camping localities belong to certain groups.

Hunting is perhaps the only activity which may have directly involved National Park land (see page 25). But Spier (1930:155) notes,

> While game is varied and plentiful in the Klamath country, the Klamath are not much given to hunting. As one informant phrased it, "We know very little about hunting deer." Their attitude is betrayed by the exaggerated value put on elk hides, although elk were plentiful. And while fish can be taken by anyone, success in hunting is assured only to one who has spirit power. In a word, the Klamath prefer the easier exploitation of stream, marsh, and prairie to invasion of the forest-clad mountains which invite only the solitary seeker after power.

Huckleberry picking on Huckleberry Mountain lying west of Crater Lake is responsible for ethnographic references to subsistence activities involving Crater Lake, and here the reference is to travel through the area in order to reach the berrying grounds from Klamath Marsh (Spier 1930:160). The Klamath place names, Maklaks Crater, Maklaks Spring, Maklaks Pass, and Tututni Pass, especially the latter two, undoubtedly refer to landmarks along former Indian trails which converge on Annie Spring and from there cross the divide to the Rogue drainage. The trails are still traceable; they were formerly maintained, judging by old indications of trail clearing, but are now overgrown and abandoned.

Crater Lake was claimed as part of the Klamath territory. It was rarely visited, and was held in religious awe as a locality of great supernatural power. Informants told the writer in 1952 that Crater Lake was formerly considered a very dangerous place best to be avoided, and that in the "old days" only a "very strong man" would dare approach it. A legend which refers to its discovery by a Klamath man relates that the people were afraid and camped away from the lake below the rim. The discoverer continued to visit the lake until the spirits finally killed him. Several origin myths of the Klamath deal with features of the lake. One particularly interesting myth discussed by

Ella Clark (1963) attributes the destruction of Mt. Mazama to a battle between supernatural beings of the earth and sky. The underground spirits were defeated, driven back underground, and the top of the mountain collapsed upon them. The battle was followed by a period of severe storms which deluged the area and filled the caldera with water. This myth has several interesting details that parallel the geologic events of the caldera formation and filling reconstructed by Williams (1942).

The Molala:

Two other tribes, The Takelma and Molala, occupied territories adjacent to Crater Lake, (Map 1) and could have visited the region, according to ethnographic sources. The Molala, or Molele (Gatschet 1890:xxxvi), "In former times... held all the northeastern slopes of the Willamet Valley, claiming possession of the hunting grounds...." Hardly anything is known about them, other than that they were hunters, and "people of the service-berry tracts." They occupied the headwaters of the Rogue and Umpqua Rivers, perhaps as far west as Trail on the Rogue. Gatschet (1890:xxxvi) locates a Molala village at "Flounce Rock," on the upper Rogue. The reasons for their occupation of this area has been the subject of some speculation (Berreman 1937; Ray and Others 1938: Spier 1927); their presence in historic times is clearly recorded, and in post-reservation days, at least, they were apparently on amicable terms with the Klamath (Spier 1930:9).

The Takelma:

Two tribal divisions of the Takelma are recognized: the Lowland Takelma and the Upland Takelma, or Latgawa. Oregon Caves National Monument falls within the historic southern boundary of the Lowland Takelma (see page 3), and the Cascade divide south of Crater Lake served as the boundary between the Upland Takelma and the Klamath. The two Takelma groups spoke dialects of a language that is not assignable to a known linguistic family. Both tribes were

virtually annihilated by disease, murder, and wars with White settlers. They are the "Rogues" of the Rogue River War. In 1884 only 27 survivors were counted at Siletz reservation (Sapir 1907:256).

The Takelma as a whole occupied the Rogue drainage from the Cascade divide west to the Illinois River (Sapir 1907; Berreman 1937). On the east their territory bordered the Klamath from roughly Crater Lake south to the northeastern slopes of Mt. McLoughlin. Their southern boundary took in the headwaters of Bear Creek, Applegate Creek, and the Illincis River; their southern neighbors were the Shasta Indians. In the west they claimed the middle Rogue as far as Leaf Creek, and probably at times extended as far as the mouth of the Illinois, where their western neighbors, the Chasta-Costa, had a large village. Their northern boundary followed the divide between the Rogue and Umpqua river drainages, with the exception of the upper course of Cow Creek, an Umpqua tributary held by them.

The Latgawa occupied the Rogue from the vicinity of Table Rock and Jacksonville east to the Cascade divide. Berreman (1937:Fig. 1) postulates that their eastern boundary formerly extended as far north as Diamond Lake, prior to 1750. The Southern Molala position on the upper Rogue and Umpqua rivers was thought by him to be due to encroachment on Takelma lands in reaction to hostile Paiute pressures. But it is equally possible that the Molala moved in after the Takelma and Upper Umpqua populations were severely reduced. The Latgawa were a vigorous, warlike group who seem to have fought with their neighbors, indiscrimantly. They raided the Takelma "for food and other valuables," captured Takelma were sold to the Klamath (Spier 1927:362). Both the Klamath and Takelma called them "enemies," or "enemy people."

The Lowland Takelma occupied the middle Rogue from Table Rock west, as described above. Sapir (1907:253) remarks, "So circumscribed were their boundaries and so sedentary their general habits that the Takelma proper

hardly ever heard of coast tribes such as the Coos or of the Kalapuya of the Willamette Valley."

Takelma culture closely resembled that of their southern neighbors, the Shasta, with whom they intermarried. Their social organization had a stratified Northwestern California wealth structure. Villages were autonomous, with a village chief. Their economy was based on hunting and gathering; tobacco was planted. Their main staples were fish and acorns. Camas, seeds and berries were important. A gruel or mush made from flour milled from manzanita berries was a favorite dietary item; the mush was eaten with a special spoon, a short stick with a squirrel tail wrapped around one end. Deer were driven into enclosures set with snares, and fish were taken with lines, spears, or nets. Most of their implements were made of horn, wood, or bone; basketry was highly developed. Chipped stone was used only for arrowheads, and stone pestles and hopper mortars were employed. They lived in semi-subterranean plank house with smoke-hole entrance, and used planked sweat-houses.

Upper Umpqua:

Brief field trips to the South Umpqua river north of Tiller has revealed extensive campsites along the river associated with pools and salmon spawning grounds. The archaeological evidence and testimony of local residents establish this region as the summer fishing grounds of the Upper Umpqua tribe (Map 1). Local traditions hold that the Upper Umpqua used to travel up into the High Cascades for berries, where they met "Modoc and Klamath" similarly engaged.

Geologic history:

The geologic events leading to the formation of the caldera containing Crater Lake summarized below are abstracted from the comprehensive study by Howell Williams (1942). The building up of a series of composite volcanic cones by eruptive vulcanism was the final stage in the formation of the Cascade Range. The volcanos extend from Mt. Baker, just south of the Canadian border,

to Mt. Shasta, in northern California. The volcano that existed before Crater Lake, called Mt. Mazama, was, like the other cones, composed chiefly of hypersthene andesites. In the final stages of eruption, the magma of the younger cones was differentiated into dacites erupted as pumice and viscous flows, and basalts ejected as scoria.

Mt. Mazama built up in the depression formed by two older shield volcanos, Union Peak and Desert Ridge. The attitude of various lava flows indicates that Mazama reached an altitude probably in excess of 12,000 feet above sea level. Its formation closely resembled those of Mts. Rainier and Shasta. Glacial moraines and tills interbedded with the lava flows indicate that the mountain was glaciated at intervals during its construction, and confirm its Pleistocene age. As Mazama matured, deep glacial valleys, Munson, Sun, and Kerr Valleys, were incised on its southern slopes and the northern slope was planed by ice sheets which decapitated the former volcano of Desert Ridge. Contemporary ice sheets on Union Peak smoothed the ridges and domes depending quaquaversely from the volcano and eroded away the pyroclastic cone capping the shield, and exposing the vent plug. After active construction of Mazama ceased, an arc of vents opened on the northern flank of the cone at about 7,000 to 8,000 feet. The parasitic scoria cones developed along radial fissures and vents on the flanks of the mountain indicates that Mazama had reached old age at the close of the Pleistocene period. Most of the scoria cones were formed after the last glacial epoch and the Mazama glaciers had retreated to about 6,500 feet. The central cone was in a state of quiescence, and a dormant period followed construction of the parasitic cones.

The dormant period was shattered by a progression of cataclysmic explosions that culminated in the formation of the caldera. The evolution of the caldera is graphically portrayed by Williams (1942:104, Fig. 29). Pumice was ejected by the initial series of explosions which increased rapidly in violence. Climatic explosions forced gas-impregnated pumice and, later, scoria, out of

the cone which poured down the mountain sides at tremendous speeds in the form of glowing avalanches (nuées ardentes). At the same time, voiding of the magma chamber was materially accomplished by reaction forces that injected large quantities of magma into deep fissures underlying the mountain. The roof of the chamber, located at a relatively shallow depth and weakened by the arc of vents, fractured and foundered, permitting the cone to collapse into the chamber, forming the caldera whose floor lies about 3,000 feet below the rim. Subsequent minor volcanic action has covered part of the floor and built up Wizard Island.

Most of the pumice ejected by the explosions was blown east and northeast of the Cascade divide by winds which apparently shifted from an easterly to northeasterly direction. The 6 inch pumice isopach extends north to the vicinity of Bend. The gas-charged avalanches of pumice and scoria fanned out for miles around. They plunged into the Rogue valley nearly to McLeod, 35 air-line miles from the point of origin; they sped a distance of ten miles beyond Diamond Lake; the flows spread eastward for distances of more than thirty miles; and they filled the southeastern glacial valleys, spewing out as far as Fort Klamath, or perhaps further. Weak, dying explosions ejected some additional pumice and fine ash settling after the passage of the avalanches added to the mantle of pumice and scoria that blankets pre-caldera land forms from a few inches to over hundreds of feet in depth.

The glowing avalanches destroyed the forests in its path. Species identification of carbonized logs buried in the deposits showed the presence of western white pine, whitebark pine, lodgepole pine, sugar pine, western yellow pine (ponderosa), white fir, and Douglas fir, permitting the inference "that when the pumice was laid down the climate was almost if not locally quite the same as that of today" (Williams, 1942:113). Charcoal samples submitted for radiocarbon analysis yielded an average date of 6453±250 years B. P. (C-247, Arnold and Libby 1951:117), or at about 4500 B. C.

Soils:

Pumice is the major parent material for soils within Crater Lake National Park. Obviously, most of the soilsare of post-Mazama age, with the exception of the soils around Union Peak, where the pumice is apparently from older eruptions (Williams 1942:71). Bog and marsh soils form a minute portion of the soil complex. Soils of till or morainal parent materials occur in areas glaciated at the time of the caldera formation, at Munson Valley from Park Headquarters to the rim, and at the heads of Sun and Kerr Valleys (Williams 1942:125-127). Observation indicates that soil formation is apparently very slow. In general, color changes due to weathering penetrate only 3 to 6 centimeters. Forest duff is thin and patchy throughout the Park. Only at lower elevations where there is a second story of ceonathus or manzanita brush is there a fairly thick layer of duff. Soils are being built up of bogs and marshes. The bog in Munson Valley south of Park Headquarters is building soil, many patches within the bog are raised above the surrounding marsh and are self-drained (Wynd 1930:41-42). Outside the bog areas no soil is being built up, nor do there appear to be any depositional processes other than talus slides in action.

Soil conditions within the Park are probably very similar to those studied on former Klamath Reservation lands (Anonymous 1958) and on Weyerhauser forest lands east of Lapine (Dryness 1960). The conclusions arrived at in those studies are probably valid for the whole area covered by the pumice mantle.

Crater Lake National Park soils are probably regosols of the "Western" Brown Soils Zone, and are probably similar to the Lapine, Shanahan, and Skellock soils series. Lapine and Shanahan soils are derived from pumice fall materials, wheras the Skellock soils are derived from pumice flow materials (Anonymous 1958:56-57; 157, 192, 200). The soils are very youthful, lacking textural development, and usually have A_1, AC, C soil horizon profiles; the

Lapine soils may also have a D horizon. Soil formation is from the surface downward, with surprisingly high carbon-nitrogen ratios but slow organic decomposition rates; the process is likened "to that occurring under anaerobic conditions" (Dyrness 1960:224, 176-177). The downward development of the soils is significant, indicating that post-Mazama archaeological evidence is confined to a shallow surface zone.

Pumice deposits would appear to be a good aquifer, since they are capable of holding water up to 30% of the total deposit volume (Dyrness 1960:177). Perhaps the absorption quality of the pumice mantle is the major contributor to what the writer considers an arresting feature of the regional drainage patterns. That is, in general the terrain contours resemble a mature drainage system in that the runoff channels are rounded and poorly defined, even on fairly steep slopes, until the permanent stream beds are reached, where they change abruptly to youthful appearing, sharp, steep-sided channels. The dendritric patterns one would expect to find etched into the loose, gravelly surface leading to the permanent stream channels appears to be entirely lacking. It would appear that most of the precipitation is taken up by the pumice and released slowly. Surface runoff is apparently negligible and erosion is reduced to a minimum, even in very sparsely vegetated areas. Williams (1942:68 ff) speaks of erosion altering the original pumice deposits. Undoubtedly, both wind deflation and water transport of materials, and perhaps gravitational movements have occurred. The thesis suggested here is that erosional alterations are minimal, that they occurred early in post-caldera history, and that surface conditions have become very stable.

The soils possess medium to low fertility values. Nitrogen appears to be the limiting nutrient. Greenhouse experiments showed little response to application of phosphorous and/or sulphur without accompanying applications of nitrogen. The presence of trace elements is also low with the parent material markedly deficient in Boron and perhaps Molybdenum (Dyrness 1960:177

passim). Soil Conservation Service agents at Klamath Falls (Messrs. Joe Cahoon, John Tribe, and Leroy de Moulin) noted that "white muscle Disease" among cattle in the Klamath area is an indicator of trace element deficiency. They also stated that bitterbrush (Pursha tridentata), a favorite deer forage, was not thrifty on pumice soils and was not heavily browsed by deer. Another factor affecting plant growth is the fact that while pumice has an enormous capacity to absorb water, up to 30% of the total volume of pumice, water does not migrate readily through the pumice. The water is thus not readily available to root systems once accessible water molecules are taken up (Dryness 1960: 162-167).

Climate:

Crater Lake National Park, lying at Lat. 43° N., Long. 122° W., is near the mid-point of the Sierra-Cascade Mountain Province of the Pacific Mountain System (Raiz 1957). The climate is characterized by cool summers and moist winters with heavy snowfall. At all elevations within the Park freezing temperatures may occur any month of the year. Traces of snow have been observed in July. The 27 year record at Headquarters has recorded a -18° F. low, and a 91° F. high. Special attention is given to weather conditions during July and August, as these are the months during which land use (or occupancy) was most likely. The figures for both Park Headquarters and Chemult are given in Table 1 are taken from Sternes' compilations (1963:Table 1). These readings give the range of weather conditions one may expect at any elevation within the Park during the two months.

An interesting peculiarity of the Park is the occurrence of colder minimums at the lower elevations in the eastern part of the Park. Sternes (1963:5) states that these conditions are "the result of three primary conditions: the formation of stagnant pools of cold air; the invasion of Arctic air from the northeast; the warming effects of marine air at higher elevations."

Table 1. Climatological summary for the months of July and August recorded at Park Headquarters and Chemult.

Crater Lake National Park, 1924-1961	Year	July	August
Mean daily maximum temperature (°F)	49.6	70.4	70.3
Mean daily minimum temperature (°F)	28.3	42.2	41.6
Mean monthly temperature (°F)	39.0	56.3	56.0
Mean precipitation (Inches)	67.24	0.63	0.56
Mean snow and sleet (Inches)	578.5	Trace	0.2
Mean number of days with precipitation .10 inches or more	110	2	1

Chemult, 1937-1961	Year	July	August
Mean daily maximum temperature (°F)	58.4	82.8	80.6
Mean daily minimum temperature (°F)	24.7	36.5	33.8
Mean monthly temperature (°F)	41.6	59.7	57.2
Mean precipitation (Inches)	26.26	0.58	0.56
Mean snow and sleet (Inches)	162.7	0	0
Mean number of days with precipitation .10 inches or more	66	1	1

> There is a greater variation of the average annual totals of precipitation in the different parts of Crater Lake National Park than there is in the entire northeastern quarter of the United States. The most rapid change takes place down the eastern slope of the Park. Here the average yearly total declines from over 65 inches at the crest to slightly more than 25 inches at the Park's lower edge. This sharp drop-off is due to the movement of practically all storms from the west. The large air masses they embody are cooled in ascending the western slopes of the Cascades, and much of their moisture precipitates out as a result. This leaves them with less moisture available for precipitation as they continue eastward down the other side of the mountain range. Also, as air moves to lower elevations its temperatures normally increase. Thus as it moves down these slopes rather than being in a condition of having to give up moisture it is steadily increasing its ability to retain it (Sternes 1963:6).

Subsistance:

In his surveys and excavations throughout Oregon and adjacent regions the writer has noted that wherever a fairly permanent archaeological record of seasonal occupation has been found, there generally occurs an association of projectile points with milling implements of one kind or another. Pro-

jectile points and flaking debris do occur without the association in contexts suggesting hunting camps, but more commonly are found at game lookouts or at quarries. The evidence suggests the thesis that the prevalence of food plants are more important than game in developing recurrent seasonal patterns of land use intensive enough to leave a cultural record of the activity at campsites in open country. Caves and shelters are more likely to preserve records of occupation by hunters only.

The absence of milling stones, eg., manos, metates, mortars, etc., throughout the Park and adjacent regions led the survey party to search for concentrations of plant foods suitable for human consumption. Only in Munson Valley in the vicinity of Park Headquarters was a concentration of contiguous plant communities containing edible species found, i.e., huckleberries, wild onions, and carex roots and stems. These foods may have been in sufficient quantities to supply daily dietary requirements, but are not in sufficient quantities to harvest for winter use. Only the dense stands of manzanita on Grayback Ridge and Crater Peak produced a food berry in quantity. We found no indication that these areas were visited.

As a further check on plant distributions, the survey party enlisted the aid of Mr. Ken Walchek, Seasonal Ranger-Biologist, who supervised plant community transects at Sphagnum Bog, the flats near Red Cone, Discovery Point, Red Blanket Creek near Bald Top, and Annie Creek about one-half mile north of the south entrance. Particular attention was paid to the relative abundance of ethnobotanic species listed by Colville (1897). These studies confirmed the hypothesis that the Park was very deficient in food plants. Mr. Walchek keyed out the plants collected during the study, and wrote the writer (August 19, 1963): "I should also point out that our survey was by no means complete and we do not have a thorough listing of all the plants present; however, I think that you have enough negative evidence to indicate that the Park is lacking in plants having a high carbohydrate composition suitable for

human consumption."

Comparison of the list of Park flora compiled by Wynd (1963) with the Colville list shows that 20 of the 88, 24%, species listed, by Colvills are present in the Park; 37, 42%, of the remaining species are matched by related Park species; and 29, 33%, are not present (the remaining species were not listed by Wynd). Nearly all the economically important plants, both food and as materials for textiles or other products e.g., pond lily, camass, arrow-head bullrush, tule, nettle, are missing from the Park environs. It is obvious that the most important factor for determining seasonal occupation or use is lacking.

The faunal distribution within the Park does not appear to have any unusual features. The dense colonies of golden-mantled ground squirrels and chipmunks at viewpoints throughout the park where they appear to be a greater attraction for tourists than the scenery gives a distorted picture of their relative numerical abundance, which is scarce. The black bear, Euraretos americanus, is a prominent member of the Park fauna, but whether its present population reflects prehistoric population densities is unknown. The Klamath Grizzly, Ursus horriblis var. U. Klamathensis Mirriam, and the Grey Wolf Canis lupus, are no longer present in Oregon. Gatschet reports (1890:xxiv) that the Klamath hunted mountain sheep and antelope, but Bailey (1936) does not include the Park within their ranges.

Black-tailed deer (Odocoileus virginianus) range throughout the Park during the summer. Mule deer (Odocoileus hemionus macrotis) of the inter-state herd range the eastern slopes of the Park in the summer months. The survey sighted several of these animals near the rim in the vicinity of Mt. Scott, but sighted only one west of the divide near Red Cone. A few individuals of the once-abundant elk, or wapiti, (Cervus canadensis roosevelti) range the heavily timbered areas around Union Peak. The survey party noted

fresh tracks throughout the region, and a Park employee reported a sighting from the Peak.

The chipped stone projectile points discussed above (pp. 6-9) indicate very strongly that hunting was the only aboriginal economic activity persued within the Park. It is quite probable that the deer and elk herds were the major attractions which drew hunters into the area. Hunting conditions within the Park are nearly ideal. The writer does not pretend to be a huntsman, yet he was able several times to close in on buck deer to within easy bowshot, 30 paces or less, by quietly approaching them upwind and from above; bucks were far more wary than the does, who seemed almost indifferent to human traffic.

Fishing could not have been important at any time, although the sources of many stream rise within the Park. The streams are small and swift, and the deep steep-walled canyons in which they are confined make access difficult. No migratory species of fish ascend the streams as far as the Park for spawning.

Very few ducks or other waterfowl visit the lake, and the hunting of these species was undoubtedly nonexistent.

Lithic resources:

The principle geologic members in Crater Lake National Park are formed from igneous domal extrusions, flows, or ejecta, and from glacial redeposition of igneous materials. The dominant lavas of the southern High Cascades are olivine-bearing basaltic andesites. The pre-Mazama lavas are predominantly of these materials. The Mazama laves are primarily hyperesthene andesites which Williams assigns to two classes, basaltic and dacitic (1942:130-147).

There are no known deposits of dense, fine-grained, homogeneous basalts, or obsidian, suitable for flaking stone artifacts anywhere within the Park or in adjacent areas. Experiments in the field indicate that the Mazama andesites are practically unsuitable for almost the entire range of stone working techniques. Fracture is indifferent and the extremely numerous and large

crystalline inclusions makes the material unmanageable. Williams (1942:137) states that the dacite forming Llao Rock "is mainly composed of black obsidian," but while glassy, the spherulitic dacite has indifferent, uncontrollable fracture. The same observation is true for the glassy dacites of Grouse Hill and Mazama Rock, and for the bands of "obsidian" bordering the dacite dikes (Williams 1942:143). A specimen collected from the "obsidian border" of the dacite dike beneath Llao Rock (Williams 1942: Plate 7, Fig. 2) contains numerous inclusions, the largest of which is about 1½ cubic centimeters in volume.

Intense solfataric action converted some of the lavas to "masses of milky opal and kaolin," and "here and there chalcedony occurs" (Williams 1942:136) but these forms rarely occur beyond the caldera. Artifacts can be flaked from the opal material, as shown by the specimen, CLNP 858, in the Park collection. The opal masses are generally very small, occurring as inclusions in the parent rock, and no deposits large enough to be mined are known (Hans Nelson, Seasonal Ranger-Geologist, personal communication).

The obsidian artifacts were obviously imported. Obsidian is obtainable in any quantity from vast deposits to the east which are to be found extending from Glassy Buttes, east of Burns, to Glass Mountain, in northern California east of Lassen Peak. In the Umpqua drainage to the west, fine-grained quartites, called jasper by rock collectors, were mined by local Indian tribes, and nodules of obsidian are found in gravel bars of the North Umpqua at Steamboat (H. L. Lilligren, Umpqua National Forest Service, personal communication).

Comparisons with equivalent regions:

Huckleberry Mountain is a ridge of westward-dipping lavas that possibly originated from a vent near the base of Union Peak (Williams 1942:23). The highest point, at 6370 feet elevation, lies about 2½ airline miles west of the Park boundary, and from whence the ridge decreases steadily in elevation

northwesterly toward the Rogue River a distance of about 6 miles where its slopes descend rapidly from an elevation of about 4500 feet to the valley floor. The ridge area, about 30 square miles, supports an optimal ecology for summer-early fall exploitation. A wide variety of fruits and berries are available in season. A partial list which includes the valley floor includes strawberries, black berries, chokecherries, blue elderberry, Oregon grape, salmon berry, thimble berry, black cap, service berry, gooseberry, and huckleberry. Dense tracts of huckleberry are found throughout the region between 5000 and 6000 feet elevation. Taken as a whole the contrast in relative abundance of edible species between Huckleberry Mountain and equivalent elevations around Crater Lake is dramatically sharp and distinct.

The writer is well acquainted with the region, and has talked with many of the members of the Klamath tribe who make the annual trip to Huckleberry Mountain to gather berries and also simply to enjoy the mountain locale. The area has been popular for years, so much so that during the 1920's a store and dancehall was maintained at Huckleberry City, the largest campground on the ridge. Several of the Klamath maintain that their families "have always" gathered huckleberries and hunted on the mountain every summer. One of my Klamath friends, now in her seventies, has not missed spending the summer there for 63 years. The attachment the Klamath have for Huckleberry Mountain is very strong, but how far back in time their territorial claims to the region extend is a moot point. In view of the enmity between the Klamath and Upper Takelma, journies to the area undoubtedly would have involved movement in strength sufficient for self-protection, at least. Before the introduction of horses, and of wagons later on, a visit to the mountain entailed between 30 and 40 miles of foot travel over mountainous terrain. Klamath claims of use of the region "since time immemorial" seem somewhat legendary.

Mt. Rainier National Park in northern Washington lies about 100 miles

south of the northern terminus of the Cascade Range. The mountain is a composite volcanic cone reaching a height of 14,408 feet above sea level. Its more northern position gives elevations within the Park an average temperature gradient equal to about 2,000 feet higher than those of equivalent elevations at Crater Lake National Park. A survey team under the direction of Dr. Richard Daugherty, Washington State University, found a stone pipe in a crack in the wall of a rockshelter and lanceolate projectile point in situ under a layer of Rainier ash dated at about 8800 years ago (Daugherty 1963). No other evidence of aboriginal use or occupation was found. Daugherty is of the opinion that the most optimum time for occupation would have been during the Altithermal, or Hypsithermal, period. The present essentially periglacial climatic conditions are not favorable for occupation. Rapid thermal spalling of roofs and numerous ash falls have buried any evidence of altithermal occupation under very deep deposits.

Lassen Volcanic National Park was surveyed for archaeological resources by Treganza (1963). The study showed an intensive history of vulcanism. The latest eruptions occurred during 1914 to 1917 and devastated some 30 square miles of terrain; ash from the eruptions fell as far as Reno, Nevada. Treganza is of the opinion that most of the prehistoric record is buried under volcanic ejecta. The material evidence found by the survey relates to historic and late protohistoric periods. Ten sites were found within the Park at elevations between 5500 and 6000 feet. The sites are located on stream banks or along lake shores.

The data shows that the Lassen Peak area yielded food surpluses sufficient to attract a few small groups into the area. The presence of manos and metates and bedrock mortars and the flake strewn campsites indicate the seasonal exploitation of both vegetal and animal foods by small groups, probably composed of related families. The presence of milling implements above the

acorn belt is interpreted as evidence for pine nut and manzanita berry processing. The locations along streams and lakes indicate a dependence upon fish. Occupation was during late summer and fall when streams were low and fish could be taken by hand, a method described ethnographically. Obsidian is not found in the region and was imported. The quantities of obsidian waste materials observed indicate that considerable time and effort was devoted to hunting.

Yosemite National Park is located in the central Sierras. The Park ranges in altitude from 3,000 to over 13,000 feet. It lies in the California biotic province. The life belts range from an oak and chaparral belt through montane and subalpine to alpine. (Dice 1943:47-48). With reference to life zones, the Upper Sonoran ranges up to 3,500 feet, the Transition ranges from approximately 3,500 to 6,500 feet in elevation, and the Canadian from roughly 6,500 to 9,000 feet. The shift from one zone to another is so gradual that the biotic districts above the Transition is lumped under the term, "Boreal," by Bennyhoff (1956:17).

In aboriginal times the territory was occupied by elements of the Penutian-speaking Central and Southern Miwok. Very little is known of the Miwok groups who occupied the mountain regions. Only one group has been positively identified with the Yosemite area, the Awanichi, who occupied Yosemite Valley and the Merced River down to the South Fork (Bennyhoff 1956:2). Early White accounts lump most the local groups under the term "Tuolumne Indians."

The higher altitude bands followed a hunting and gathering way of life very close to the subsistence level. Social organization was apparently not very elaborate, and cermonial life was minimal. Winter houses was the conical, bark-covered form. Brush shelters were used in summer. Sweat-houses were excavated, but the cover is not described. The bedrock mortar and pestle were the common grinding implements for food preparation. The dead were

cremated and the ashes buried.

> Occupation of most of this area / Yosemite National Park / of intermediate and microthermal climate had to be seasonal because of the heavy snowfall during the winter months. Certain favorable areas up to 4,000 feet elevation were occupied the year around though the winter population was considerably reduced. Each group had well defined territories for their exclusive use in hunting and gathering, but the higher elevations represented communal areas open to all groups, including Paiute and Washo Indians. Life was rather migratory, the families moving from place to place as seasonal food became available. Hunting and gathering forays into the higher altitudes were frequent from spring to autumn; women accompanied the men on any large trip. Surpluses of food were dried and stored whenever possible. Bulbs, clover, and other greens were important foods furing the spring, after the monotony of dried foods eaten during the winter. Hunting and fishing were daily pursuits, while roots, berries, seeds, and varied insect foods were gathered during the summer. In the late summer when the rivers were low, quantities of trout were taken by means of fish poison and weirs at elevations below the high waterfalls. As fall approached an increasing number of crops had to be harvested—fruits, berries, seeds, and nuts, particularly the acorn and pinenuts. During the winter, hunting was the major activity to add some variety to the dried foods,prepared the season before (Bennyhoff 1956:3-4).

A total of 401 sites were found the areas surveyed, and detailed information was obtained for 328 of the total. The sites were classified into 5 categories: large villages, small villages, house sites, large campsites, and small campsites. 55 of the 84 villages, both large and small, were located in the Transition Zone; 3 small villages were found in the Upper Sonoran, the remainder of the villages were located in the Boreal zone just above the oak belt. House sites paralleled the small village distribution. Campsites totaled 57.2% of all sites recorded, 80.5% of which are in the Boreal, some as high as 10,700 feet elevation. The campsites appeared to have been primarily hunting bases, their Boreal concentration coinciding with the summer range of the game herds (Bennyhoff 1956:14-19; Table 3, 4). The Transition Zone provided the most favorable habitat, from which the bands moved up into the higher elevations, splitting into smaller groups in order to best exploit available food crops, and to which they returned for the winter.

Summary

The study has shown that the Crater Lake National Park region was a suboptimal habitat with reference to aboriginal hunting and gathering economies. Comparison with other areas, especially the immediately adjacent Huckleberry Mountain, demonstrates that climate and altitude were not the only limiting factors. Soil conditions which restricted the proliferation of biotic communities, and hence limited the supply of edible vegetal foods, were equally important. The comparative material also indicated the increasing climatic limitations the higher latitudes impose on high-altitude occupation in the Sierra-Cascade Mountain Province. Further, this study has supported the thesis that the prevalence and relative abundance of vegetal foods determine recurrent patterns of seasonal exploitation of various biotic habitats, and therefore determine the locations of various kinds of archaeological sites.

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

OREGON
CRATER LAKE NATIONAL PARK AND VICINITY
15 MINUTE SERIES

MAP 2

AREAS SURVEYED

CRATER LAKE

UMPQUA NATIONAL FOREST

ROGUE RIVER NATIONAL FOREST

DIAMOND LAKE

Mapped by the Geological Survey
1886 1908 1909 and 1933

Scale 62500

Polyconic projection 1927 North American datum