AN ARCHEOLOGICAL SAMPLE SURVEY IN THE CACHE CREEK-LITTLE GRANITE CREEK AREA OF THE BRIDGER-TETON NATIONAL FOREST, WESTERN, WYOMING

by

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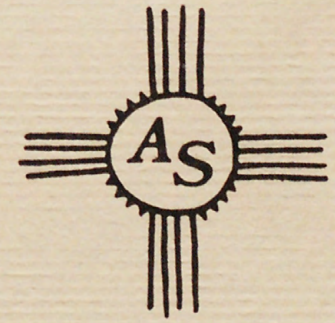

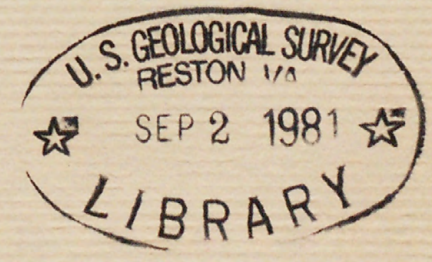

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by

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Project No. AS 80-WY-1634

OPEN-FILE REPORT 81-852

PUBLISHED BY: U.S. Geological Survey

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January 8, 1981

Conducted for

Land Management Services
Jackson, Wyoming
and
the Bridger-Teton National Forest

One can envision, for instance, our early cave-man ancestors squatting down in the dust to trace with sticks the shortest and safest path leading back to the cave. Although eminently helpful on occasion, models often suffer from overselectivity. Only some parts of reality are modeled at any one time, and sometimes the most important parts are inadvertently left out.....and in the meantime we can only grope like the proverbial blind man, attempting to "visualize" an elephant by touching now its trunk, then its legs, and finally its floppy ears. And in the process, we'll develop models that we optimistically believe will eventually enable us to comprehend past realities.

RICHARD M. RESTAK, M.D.
The Brain: The Last Frontier

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ABSTRACT

Archeological Services of Laramie, Wyoming, undertook a Class II archeological reconnaissance of a large tract of land in a proposed wilderness area in the Bridger-Teton National Forest. The findings were to be submitted for inclusion in an Environmental Impact Statement being assembled by Land Management Services of Jackson, Wyoming. The study area is being considered for possible drilling sites in the near future.

The project area lies on the southwest slope of the Gros Ventre Mountain Range in the Cache Creek-Little Granite Creek area in Teton County, northwestern Wyoming. A total of 16 prehistoric sites and isolated finds were recorded within or immediately adjacent to the study area boundaries. The total surface area covered amounted to 1857 acres (or 5.7%) of the 32,580 acres included in the study. An intensive surface evaluation was completed of all staked projects (well locations and access roads) in the survey area. Exploratory or evaluative testing is recommended for the Getty Reserve well location and in one area on the NCRA well access route. Some form of further evaluation is recommended at thirteen other localities.

Fieldwork was conducted during September, 1980, by archeologists from Archeological Services. Subsequent analysis included the application of a model of site predictability based on the statistical analysis of environmental factors, such as slope, aspect, vegetation, soils, fauna and proximity to water.

AN ARCHEOLOGICAL SAMPLE SURVEY IN THE CACHE-LITTLE GRANITE CREEK PROPOSED WILDERNESS AREA OF THE BRIDGER-TETON NATIONAL FOREST WESTERN WYOMING

INTRODUCTION

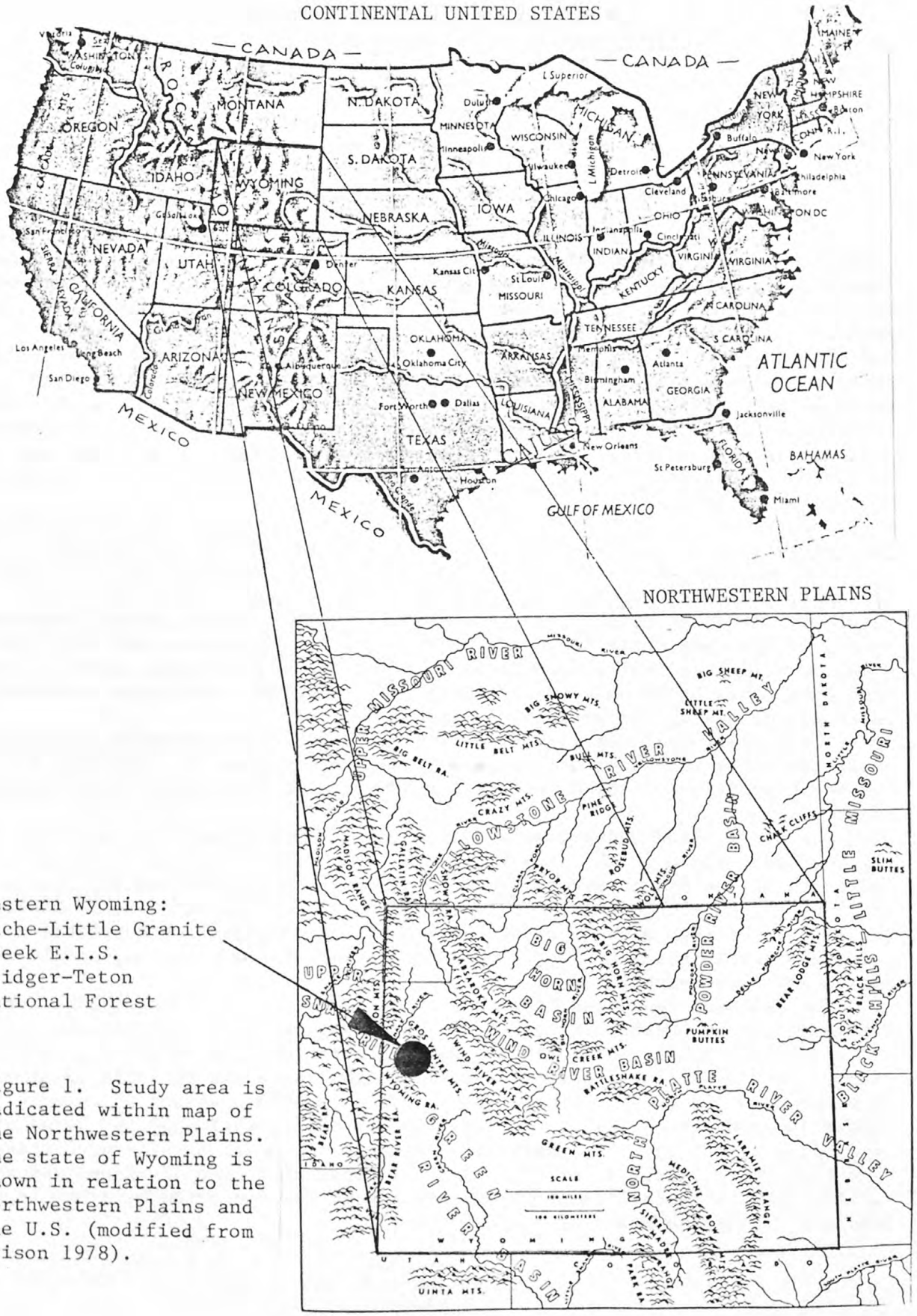
A large tract of National Forest land in the Cache Creek-Little Granite Creek area of the Bridger-Teton National Forest is being considered by mineral leaseholders for possible drilling sites in the near future. A contract was let in July of 1980 for the gathering of environmental data so that the Forest Service and USGS could jointly draft an Environmental Impact Statement considering and evaluating the possible effects of those planned future exploration, development, and production activities. Land Management Services of Jackson, Wyoming, was awarded the contract as project manager to conduct and oversee multidisciplinary inventories for the evaluation of energy exploration and access alternatives in the study area. Archeological Services of Laramie, Wyoming, was then subcontracted to conduct a cultural resource inventory and to construct a predictive model for the study area.

Other resource studies involved in the E.I.S. package were subcontracted, and information gained from these inventories were used in conjunction with the cultural resource evaluation. The other six subcontractors involved in the statement includes Dern Polk Consultants (soils), Chen & Associates, Inc. (geology), Bio/West (fisheries), Franz Camenzind (wildlife), Peter Jorgenson (engineering), and Wirth Associates (recreation). Vegetation and soil type maps, as well as wildlife (particularly big game) habitat maps, project location maps, and other background environmental data were made available to Archeological Services for use in the predictive model.

The project is located in Teton County, Northwestern Wyoming, beginning about six miles southeast of the city of Jackson (Figure 1). The area is under the administration of the Hoback Ranger District of the Bridger-Teton National Forest.

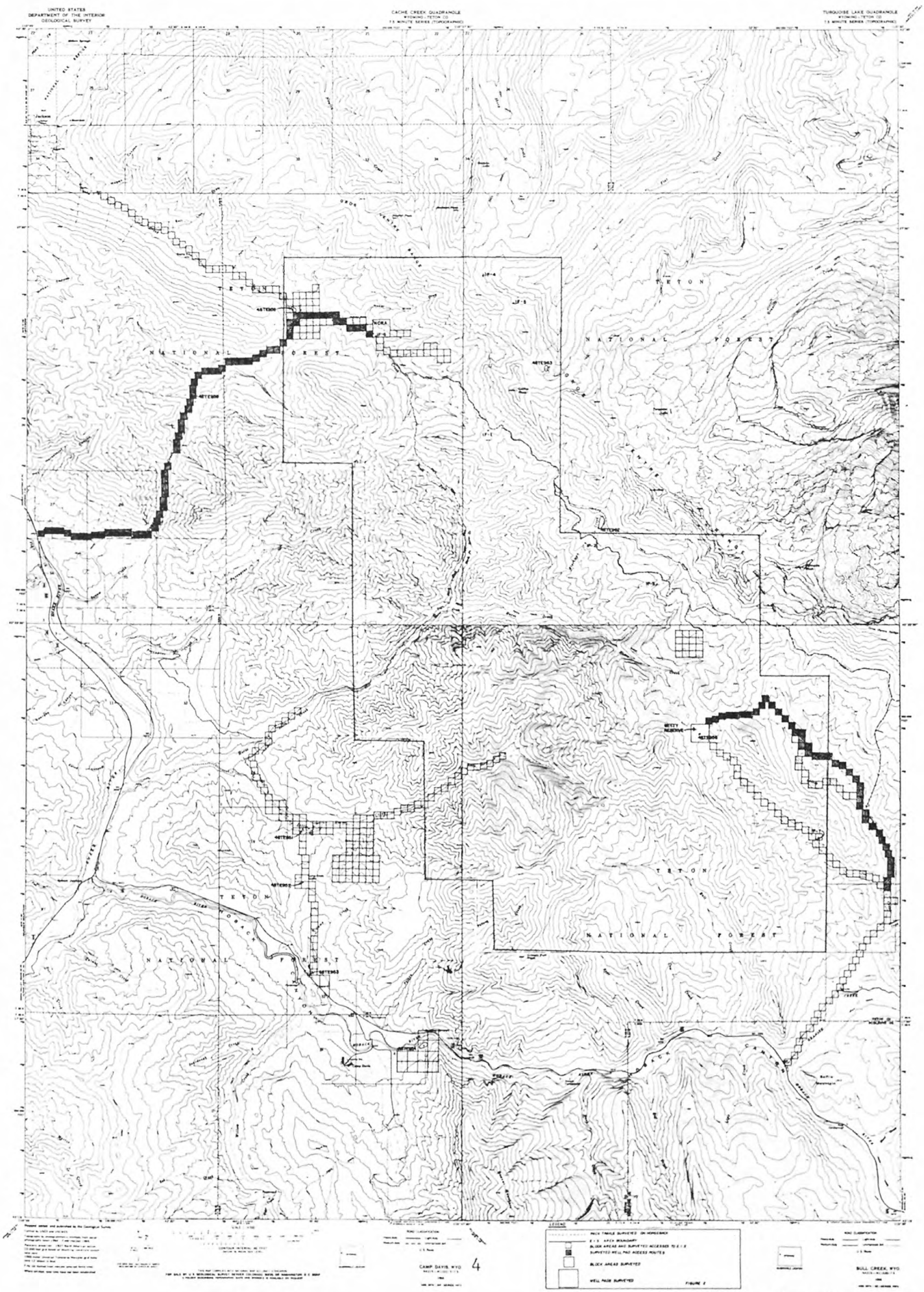
The public land under consideration covers 32,580 acres (51 Sections) on the southwest slope of the Gros Ventre Mountain Range, east of the Snake River and north of the Hoback River. This is a heavily forrested, mostly roadless tract of rugged mountain uplands ranging from 6400 to 10,920 feet in elevation. Access to the study area is severely limited with approaches restricted to roads and trails running along the major drainage valleys, Cache, Little Granite, Horse, and Game creeks.

The cultural resources inventory for this project included a 100% surface survey of the 40 acres surrounding the Getty Reserve well location and the 40 acres surrounding the Getty Reserve well location and the 40 acres around the proposed NCRA well location. The staked access route for the NCRA location was surveyed to a 200 ft R/W (Figure 2 enclosed in envelope at end of report). The sample inventoried totalled 5.7% (1857 acres) of the entire 32,580 acres of land within the project boundaries. A statistical model of site predictability centering on the analysis of environmental constraints was developed and applied to this sample. Actual sampling and field work was conducted by Archeological Services during the month of September, 1980.



Western Wyoming:
Cache-Little Granite
Creek E.I.S.
Bridger-Teton
National Forest

Figure 1. Study area is indicated within map of the Northwestern Plains. The state of Wyoming is shown in relation to the Northwestern Plains and the U.S. (modified from Frison 1978).



(SEE MAP IN BACK POCKET)

DESCRIPTION OF PROPOSED IMPACT

The impact area for the Getty Reserve well location (SW/SW Sec.8-T39N-R114W) in the Bear Thrust Unit should be relatively minimal, as the well is staked on a broad saddle. Only a moderate amount of cutting to the east and filling on the north and south should be required to level the drill pad (est. 400 x 400 ft). An access road to this location was not staked at the time of the survey, so no specific route was surveyed. The road will probably be routed, however, from the small campground in the NE/NE Sec.27-T39N-R114W, and follow a pack trail up Little Granite Creek. In the NW/NW Sec.9-T39N-R114W, the road will probably switch back to the SW and go up a steep, narrow draw to a broad saddle. The road will then probably skirt the north slope of a high peak and enter the pad area from the NE. The total length of access needing new construction will probably be about five miles.

Only one well location is presently in the planning stage in the Cache Creek Unit. The well was not staked at the time of the survey, but will probably be built on the north side of Cache Creek in the NW/NE Sec.16-T40N-R115W. This is very steep, rugged terrain due south of Nowlin Peak, and levelling the drill pad (est. 400 x 400 ft) will require a significant amount of construction.

The access road for the NCRA well location will be via the Game Creek/ Cache Creek trail. This route begins at Highway 187 and goes through Game Creek Canyon. The road ends in the SW/SE Sec.13-T40N-R116W and the proposed access (which was staked from this point on) continues NNW for about ¼ mile along a pack trail on the west side of a marsh created by beaver dams along Game Creek. The access then turns NE and ascends a steep, deeply cut draw to the crest of the Game/Cache Creek divide. The road then descends the divide still following the pack trail, crosses Cache Creek, and meets up with the jeep trail following the north bank of Cache Creek. The access will follow this trail ESE for about 1 mile, then turn NE and enter the well location from the SW. The total length of the staked access road is about 3½ miles.

METHODOLOGY

Conceptual Framework

Archeological Services is applying a model of predictability to the fifty-one sections of Forest Service land being considered for possible future mineral extraction. The model will allow prediction of site locations within the given area once preliminary sampling has been completed.

The predictions are based upon the assumption that there is a finite set of constraints and variables within the environmental setting which determine the location of archeological sites. The constraints and variables which are deemed important for this project are the following critical (environmental) factors: slope, aspect, elevation, drainage patterns, proximity to water, fauna, plant communities, soils, and weather. These factors have been assigned mathematical values and each locality has been analyzed in terms of these factors. This data will be analyzed statistically to determine the relative importance of the various factors.

1980 Field Work

Surface reconnaissance in the study area took place between September 1 and September 30, 1980. The field crew consisted of Carlos Caraveo (project director), Stephen Lau, Jeff Bundy, and Albert Ortiz. This work entailed walking linear or (depending on the terrain) zigzag transects along drainage bottoms and terraces, and on benches, hilltops and ridges. The nature of the study area, with its steep, rugged mountain topography, precluded the use of systematic linear transects to cover territory. Areas with 15% slope or less were given priority but were not surveyed exclusively. Topographic maps were used to pinpoint flat, rolling and less sheer terrain, and to route the surveyors through passes and along trails. Complete coverage was given to projects that were staked in the study area, and these were surveyed with strict transects irregardless of the terrain. The Getty Reserve well location in the Bear Thrust Unit was surveyed with multiple transects with an average spacing of approximately 15 meters. The access route to the NCRA well location was surveyed with six longitudinal transects covering a total R/W of 60 meters. Similar intensive coverage was given to areas where projects were not staked but where the field crew predicted site locations.

Several constraints placed on the survey crew affected the overall efficiency and completeness of the field work. Perhaps the greatest of these constraints was the poor ground visibility found throughout the project area, particularly along creek bottoms or in areas of maximum exposure to the sun (increasing the density of vegetation), or a combination of both. Areas heavily watered with good exposure to the sun rapidly build thick, humic deposits supporting dense, matted plant cover.

Logistical constraints encountered during the survey included the strict time limits imposed on field work, and the severely limited access to the study area. Timing of the field study to occur during the fall hampered the location of berry patches, camas meadows, and other areas with edible plants. Also, the commencement of the field work closely coincided with the beginning of elk hunting season (September 10), and the presence of such a field crew in the back country was not appreciated by at least two hunting parties.

Access to the area, already limited to the major canyons draining the area, was further restricted by a locked Forest Service gate on Cache Creek, and a rancher on Horse Creek who would not allow the passage of the survey crew through the twenty acres he owned on the valley bottom. This necessitated packing into areas from the edges of the survey boundary through areas already surveyed, thereby duplicating some of the field work. The trails and high country area along the SW slope of the Gros Ventre were surveyed on horseback, and this alleviated somewhat the duplication of effort.

Sites were recognized by the presence of obsidian flakes or other raw material debitage. All sites, with the exception of IF-7 (a fragmentary bison skull), contained chipped obsidian or finished broken tools. Sites were numbered in the field according to the topographic map covering the area (TL for the Turquoise Lake quad, BC for the Bull Creek quad, CC for the Cache Creek quad, and CD for the Camp Davis quad) and in the order in which they were found. Later, state numbers were obtained from the State Archeologist's Office in Laramie, Wyoming for the sites and isolated find designations were assigned in the Archeological Services office. All materials collected during field work were curated and analyzed in the Archeological Services lab and offices in Laramie, Wyoming. All artifacts collected during field work will be returned to the Forest Service.

SUMMARY OF FINDINGS

IF-1 (Loc. TL-1) (NE/NE/NE Sec.22). An isolated obsidian decortication flake was found in a saddle on the high, open Horse-Cache Creek divide at the SW foot of Cache Peak. The saddle is covered with tall, thick grasses and the surface is stabilized. A small erosional cut on the SE slope of the divide revealed top soil deposition capable of containing buried cultural material. Exploratory or evaluative testing is recommended if the site is to be disturbed by construction activities.

IF-2 (Loc. TL-2) (SW/NE/NW Sec.36). An isolated obsidian interior flake was found in an open, densely gravelled meadow on the east side of Blackman Creek, about 1500 ft (460 meters) SW of site 48TE962 (TL-3). The site is on a gradually sloping bench which begins to descend rapidly to the south, dropping over a distance of about 1 mile to the Horse Creek Valley bottom. The surface of the meadow is badly disturbed by animal burrowing, sheetwash, and frost action. There may be deeply buried cultural materials, and exploratory or evaluative testing is recommended if the site is to be disturbed by construction activities.

48TE962 (Loc. TL-3) (W/SW/NW Sec.25). A moderate lithic scatter with obsidian flakes, a projectile point fragment, and a crude biface was found on the east bank of Blackman Creek at the foot of Gros Peak. About 50 flakes, both primary and interior, a small arrowpoint fragment, and a crude biface were found in the open, gradually sloping alpine meadow adjacent to the cascading stream. There was no evidence of core samples or of nucleation of cultural materials. The surface at the site appears to be firm and stable, so there is a good chance for buried cultural materials. If future construction projects threaten to disturb the area, it is recommended that extensive subsurface testing and subsequent analysis be conducted to preserve information from the site.

IF-3 (TL-4) (SE/NE/SW Sec.31). Two obsidian cortex flakes were found in a sparse stand of conifers adjacent to a northern tributary of Horse Creek. The site area is gently sloping to the west and a layer of humus covers densely gravelled sandy soil. The creek near the site is a cascading runoff channel of exposed, stream-rolled quartz and igneous cobbles. It is recommended that limited exploratory and evaluative testing be conducted at the site prior to construction activities to determine the presence or extent of cultural deposits.

IF-4 (TL-5) (NW/SE/NE Sec.10). An isolated obsidian interior flake was found on a flat, open bench at the base of a nearly vertical, talus-littered slope between Jackson and Cache peaks. The bench is on the east face of the divide between Noker Mine Draw and Flat Creek. The surface of the bench is a boggy, exposed humus vegetated by thick clumps of short grass surrounded by stands of conifers. The flat, unwashed bench may contain buried cultural materials. It is recommended that limited exploratory and evaluative testing be conducted on the bench prior to construction activities to determine the presence or extent of cultural deposits.

IF-5 (TL-6) (SW/NE/SW Sec.11). An isolated obsidian cortex flake was found in a clearing in a spruce grove at the edge of a broad, grassy bench on the east slope between Jackson and Cache peaks. The site is on the Flat-Cache Creek divide. The flake was found in the backdirt of an animal burrow on the otherwise heavily vegetated (thick grasses, low shrubs), boggy bench. Due to the stabilized nature of the bench, there is a good chance of buried cultural materials. It is recommended that limited exploratory and evaluative testing be conducted at the site prior to construction activities to determine the presence or extent of cultural deposits.

48TE963 (Loc. TL-7) (W/NE/SE Sec.14). A light scatter of flaking debris and tools was found on a low ridge overlooking a small marshy pond at the head of a major tributary of Flat Creek. The site is in a cirque basin at the foot of Cache Peak at an altitude of 9600 ft (2926 meters). About thirteen flakes, a corner-notched arrowpoint, and three other tools were found in an open meadow on the ridge at the edge of a spruce grove. The soils at the site are loose silt and gravels and appear to be disturbed through animal burrows and frost action. However, considerable deposition appears to exist at the site, and the lithic raw material is quite varied, including obsidian, quartzite, basalt and porcelanite. If future construction projects threaten to disturb the area, it is recommended that extensive subsurface testing and subsequent analysis be conducted to preserve information from the site.

48TE951 (Loc. CD-1) (NE/SW/NW Sec.20). A very sparse scatter of obsidian flakes was found in the backdirt of animal burrows along the north side of the pack trail in Little Horse Creek valley. Four flakes were exposed on the south edge of the marsh at the confluence of the creek and an intermittent runoff channel, near where the Camp Creek and Little Horse Creek trails join. There is a considerable deposition of humus at the site, which may contain cultural materials. It is recommended that limited evaluative testing be conducted at the site prior to construction activities to determine the presence or extent of cultural deposits.

48TE952 (Loc. CD-2) (NW/NE/NW Sec.29). A light scatter of obsidian flakes was found in a saddle on the divide between two runoff courses feeding Little Horse and Camp creeks. The site was just east of the Camp Creek trail on the SE slope of the saddle, just below the crest. The site integrity appears to be fair with only minor erosion disrupting the site surface. It is recommended that exploratory and evaluative testing be conducted prior to any construction activities.

48TE953 (Loc. CD-3) (SW/SE/NW Sec.32). A light lithic scatter, nine obsidian flakes and a projectile point fragment, was observed in building construction backdirt in the lot behind the Camp Creek Inn, a restaurant just off Highway 187 on the north side of the Hoback River. The site is on a gradual, SW-facing slope above the Hoback Valley floor and is situated east of Camp Creek just before it turns north to empty into the river. The site has been partially destroyed by construction of buildings and roads. This site, not located within the E.I.S. study boundaries, was recorded for the purpose of adding information to the archeological model used in the survey. Since the site lies outside the study area, no further work is recommended for this study project. If future work is planned for this area limited evaluative testing would be recommended.

IF-7 (Loc. BC-1) (NW/SE/NE Sec.21). A badly decayed, fragmentary bison skull was observed partially exposed to the surface in a boggy area about 25 m east of the west fork of Little Granite Creek. The area is densely vegetated, and the skull is buried in a matrix of wet, spongy humus. No cultural materials were observed on the surface and it is unknown if any cultural material is buried with the rest of the skull as the surface visibility is near 0% because of the tremendous plant growth. Soil deposition at the site appears to be significant and fairly stable. It is recommended that the site be given limited evaluative testing prior to any future construction activities that might impact the site to determine the presence of cultural materials.

48TE956 (Loc. BC-2) (C/SW/SW Sec.8). A light scatter of obsidian was found eroding from the crest of the high drainage divide between the headwaters of a western fork of Little Granite Creek and Horse Creek. The site is located c. 150 m SW of the proposed Getty Reserve well centerstake. A dart point fragment, a biface, and a cortex flake were found on the steep south face of the saddle between two high granite peaks. The crest of the saddle may have been the original site surface and the topsoil at the crest is presently stabilized somewhat by dense sage and brush growth. The site is outside the drill pad impact area, but limited evaluative testing on the proposed well location is recommended prior to construction to determine the presence or extent of cultural materials in that area.

IF-6 (Loc. CC-1) (SE/NE/NW Sec.16). An isolated obsidian interior flake was found c. 45 m ENE of a confluence of Cache Creek and a perennial tributary. The site is just north of a marshy, wooded swamp on the open, gradually sloping north bank of Cache Creek. The surface at the site is irregular and dissected by erosion, but considerable deposition may cover buried deposits. The flake was found in an area that may be impacted by access road construction. This site should receive evaluative testing if proposed construction projects threaten to impact the area.

48TE958 (Loc. CC-2) (N/SE/SW Sec.8). A sparse scatter of four obsidian interior flakes was found on a bench and gently sloping area north of Cache Creek, west of a small runoff channel. The site is in an open area north of the dense woods following the bottom of the deep, narrow stream valley. The site was reported during an earlier survey by Western Wyoming College (WWC) for a well location and access road along Cache Creek. Subsurface tests were made at the site during the summer of 1979 by WWC, and no significant deposits or cultural features were encountered. Two test pits revealed only six small chert and obsidian flakes ranging in depth from between 0 cm to 35 cm. Since no significant buried cultural materials were encountered during these tests, no further work is recommended.

48TE959 (Loc. CC-3) (SW/SW/SE Sec.13). Three small obsidian interior flakes and one large quartzite interior flake were found on the bottom of the Game Creek valley at the north terminus of the Game Creek vehicle trail. The site is located just south of a marshy area at the confluence of Game Creek and a small runoff channel. The integrity of the site appears to be poor due to vehicle activity and significant water erosion. The valley floor north of the site is a boggy marsh created by a beaver dam. Cultural material is scattered widely over densely gravelled areas in the road cut. No further work is recommended at this site.

48TE954 (Loc. CD-4) (SE/SE/NE Sec.4). A sparse lithic scatter was found on an irregular terrace on the south side of Hoback River just east of Camp Davis. The site is on an open, grassy field adjacent to the densely wooded, steep northwest slope of Beaver Mountain. Obsidian flakes, angular obsidian debitage, a chopper, and fragments of a metate and projectile point were observed. Erosion is moderate on the top and face of the terrace, and there is a high probability of buried cultural materials. It is recommended that evaluative testing be conducted prior to any construction activities. North of the site on a lower terrace, a tipi ring site was reported by the caretaker of Camp Davis. The number of rings was unspecified, and little information about the site was obtained. Evidently the rings were destroyed by the construction of the bridge over the Hoback River when Highway 187 was rerouted from the north.

NATURAL SETTING

The study area is part of the Wyomide group of mountain ranges, which includes the Gros Ventre, Snake River, Big Hole, Hoback, Salt River, Wyoming and Teton ranges. Physiographically the extensive Gros Ventre and Hoback ranges, with an elevation of up to 11,000 ft, are less dissected and not as high as the Teton Range. They are also less heavily forested, with the lower slope stands more strongly confined to northern aspects (Steele et al. 1979:15-16).

The survey area is located southeast of Jackson Hole on the steep, often unstable southwest slope of the Gros Ventre Range, east of the Snake River and north of the Hoback River. The Gros Ventre Range consists of several uplifted and faulted inclines in a northwest-southeast alignment, and is composed of Paleozoic sedimentary rocks around areas of Precambrian granites and gneisses. The highest peaks of the range, which rise a mile above the flat valley floor of Jackson Hole, are in massive limestones. Canyons dissecting the range are deep and sheer and have undergone intensive glaciation. Erosion has carved out cirque basins and horseshoe-shaped valleys (Parsons 1978:68-69).

The climatic conditions in the area vary within the Jackson Hole region due to the extreme differences in elevation and exposure. Humid to sub-humid conditions prevail in the survey area due to the barrier to weather fronts imposed by the mountain range. The summer is short and cool, and the winter is long and severe. The town of Jackson averages 16 inches in annual precipitation, so the average yearly precipitation for adjacent higher elevations may be two to four inches higher. Temperatures recorded in Jackson Hole range from summer highs in the low 90's to winter lows of -30°F (Love 1975:9-10).

The study area is within four biotic provinces, or life zones: Upper Sonoran (4500-6500'), Transition (6500-8000'), Canadian (8000-9500'), and Hudsonian (9500-11,500') (Metcalf et al. 1978). Much of the range itself is above timberline, so vegetation is typically high-altitude flora, including sedge grasses, forbs, lichens and mosses, and a variety of stunted fir or spruce. Below the alpine zone, spruce and subalpine firs dominate, followed by dense conifer stands (fir, spruce, pines) peculiar to the eastern side of Jackson Hole. Aspen stands border the conifer forests. A wide variety of edible plants, berries, roots and tubers common to the Central Rockies are found throughout the study area in locations dictated by soil conditions (and underlying strata), elevation, precipitation, and exposure (Wright 1978).

Game abounds in the study area, and all big game animals hunted by prehistoric hunters are available today, with the exception of bison. Moose, hunted today, is probably a recent adaptation (Love 1975:12-14). Other big game animals include wapiti (elk), bighorn sheep, antelope, and mule deer. Although animal density was not as high as adjacent Wyoming and Idaho basins, it was apparently sufficient enough to have had a determination in the movements and selection of sites of the prehistoric inhabitants of the region.

VARIABLES USED IN PREDICTIVE MODEL

	FIELD AND PERMANENT NO'S. / VARIABLES:	1. SLOPE	2. SOIL	3. ASPECT	4. VEGETATION	5. DRAINAGE HIERARCHY	6. FAUNA	7. CLIMATE	8. TOPO-ELEVATION	9. PROX. TO WATER	10. TYPOLOGY OF C.M.	11. ENVIRON-MENTAL ZONES
1	TL-1 IF-1	30%	10	308°	(61-62), 212, 26, 710.72, (78-77), 78, 23, 27, 71-72	4	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2706.6m 8880'	335 m. E	OBSIDIAN ISOLATE	CANADIAN
2	TL-2 IF-2	2%	10	144°	61, 27, 26, 22, 211	2	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2584.7m 8480'	15 m. W.	OBSIDIAN ISOLATE	CANADIAN
3	TL-3 48TE962	7%	10	205°	27, 61, 211, 710	2	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2646m 8680'	10 m W.	OBSIDIAN SCATTER	CANADIAN
4	TL-4 IF-3	10%	19	99°	710, 51, 71-73, 71-72, 26, 22, 211-212	2	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2631.9m 8635'	15 m. S.	OBSIDIAN ISOLATES	CANADIAN
5	TL-5 IF-4	2%	10	175°	76, 212, 72-71, 71, 51, 211	3	SUMMER: MOOSE SHEEP	37°F / R=16"	2936.7m 9635'	490 m. E.	OBSIDIAN ISOLATE	HUDSONIAN
6	TL-6 IF-5	10%	10	218°	51, 211, 212, 71, 710	5	SUMMER: MOOSE SHEEP	37°F / R=16"	2926 m 9600'	50 m. SW.	OBSIDIAN ISOLATE	HUDSONIAN
7	TL-7 48TE963	11%	10	237°	71, 710, 51, 211	4, 2	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2926 m. 9600'	60 m N, 300 m. E	BASALT. OBSIDIAN. PORCELANITE, QUARTZITE SCATTER.	HUDSONIAN
8	CD-1 48TE951	13%	16	230°	64	2, 4	SUMMER: MOOSE SHEEP WINTER (COMB): ELK/DEER	37°F / R=16"	1951 m. 6400'	15 m N, 15 m, W	OBSIDIAN SCATTER	UPPER SONORAN/ TRANSITION
9	CD-2 48TE952	12.3%	16	279°	64	4, 2	SUMMER: MOOSE SHEEP WINTER (COMB): ELK/DEER	37°F / R=16"	1975 m. 6480'	450 m. SE, 1067 m. S.	OBSIDIAN SCATTER	UPPER SONORAN
10	CD-3 48TE953	4.4%	12	228°	64	1, 2	SUMMER: MOOSE SHEEP WINTER (COMB): ELK/DEER	37°F / R=16"	1940 m. 6040'	300 m. SW, 20 m NW	OBSIDIAN SCATTER	UPPER SONORAN
11	BC-1 IF-7	-10%	17	128°	(11-77), 26	4	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2134 m. 7000'	10 m W.	SKULL	TRANSITION
12	BC-2 48TE956	27%	12	162°	(71-73), 22, 28, 78, 26, 23, 710, (71-74) 212, (23-74) 27	5	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2585 m. 8480'	380 m. S.E.	OBSIDIAN. PORCELANITE SCATTER	CANADIAN
13	CC-1 IF-6	21%	17	248°	22, 11, 26, 61-62, 35, 72-71, 34, 72-74, 23, 62	1, 2	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2207 m 7240'	61 m. W. 15 m. S.	OBSIDIAN ISOLATE	TRANSITION
14	CC-2 48TE958	16%	12	200°	26, 11, 35, 63, 34, 72-74	1	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2158 m 7080'	0-50 m. S.	OBSIDIAN SCATTER	TRANSITION
15	CC-3 48TE959	15%	12	252°	64	1, 3	SUMMER: MOOSE ELK/DEER SHEEP	37°F / R=16"	2268 m. 7440'	61 m E. 30 m N.	OBSIDIAN, QUARTZITE SCATTER	TRANSITION
16	CD-4 48TE954	5%	12	150°	64	1	SUMMER: MOOSE SHEEP SUMMER/WINTER BORDERLINE: ELK/DEER	37°F / R=16"	1877 m. 6160'	183 m. N.	QUARTZITE, OBSIDIAN, SANDSTONE (METATE) SCATTER	UPPER SONORAN

Table 1. Environmental Variables of Cultural Localities.

Elevation and Slope Measurements as Possible Selective Variables for the Location of Archeological Sites

Topographic elevation is one geophysical characteristic that determines ecological conditions for a given region. These elevations help to determine life zones or ecosystems relevant to animal as well as plant communities. Although plant communities at different elevations may consist of the same species, they ripen at different times of the year.

Because elevation is concomitant to ecological zones, the lower elevations, 1800 to 2000 m, belong to the Upper Sonoran life zone characterized by plant life of sage, grasses, brush, and possible quaking aspen with an abundant and variant animal community of mammals, birds, and possibly fish. The next range, 2000 to 2300 m, is within the Transition life zone and is characterized by grasses, brush, and pine trees of sporadic densities with a smaller animal population (Brown et al. 1958:56-61). It is in the upper levels of this life zone and the lower levels of the Canadian zone, from 2300 to 2600 m, that no archeological proveniences were located. This buffer zone is characterized by the beginnings of Douglas fir, white pine, and lodgepole pine plant populations with marginal animal populations that fluctuate according to the environmental factors of temperature and moisture. From elevations 2600 to 2800 m, the Canadian life zone is populated by the plant ecosystem described above. This condition continues up to an elevation of 2900m. At this elevation the Hudsonian life zone begins, with a plant community characterized by alpine fir forest, and, in the Bridger-Teton area, actual granite outcrops with numerous scars of glaciation.

Insofar as the elevation of the area is concerned, the highest density of sites appears to be at the lower elevations, those between 1800 and 2000 m, with a density of four sites and no isolates. The next highest density comes at elevations between 2000 and 2300 m with a density of two sites and two isolates, while elevations between 2300 and 2600 m contained no proveniences. In the elevations between 2600 and 2800 m the density of isolates increases to four while the density of sites remains at two. At the highest elevations, 2800 to 3000 m, there is one site and two isolates.

The slope or the angle of declination of a given area in relation to the horizon is an obvious selective variable for the location of archeological sites. One can almost predict that no settlement could be established at an angle of declination greater than 45^{o} from a horizontal level. This condition could, of course, be ignored if a settlement has complex architectural undertakings; however, naturally level areas were selected at different elevations for the prehistoric and early historic settlements of this region. If the soil profiles given in Table and the slope range for each category are of the total surveyed area, the density of discreet ranges of slope tend to break up in the following manner: range one, from 10^{o} to 20^{o}, is equal to 31.80%, range two, from 20^{o} to 30^{o}, is equal to 18.18%, range three, from 30^{o} to 40^{o}, is equal to 48.84%, while range four, from 40^{o} to 90^{o}, is equal to 19.31%. The location of proveniences breaks down as follows: in range one there are six proveniences, in range two there are no proveniences, in range three there are four proveniences, while in range four there are six proveniences. Of the six proveniences of slope range of 10^{o} to 30^{o}, five are archeological sites and one is an isolate. In contrast, the four proveniences in the range 30^{o} to 40^{o}, two are sites and two are isolates, and of the six remaining proveniences

in the range 40^{o} to 90^{o}, five are isolates and one is a site. It was determined from this information that the highest concentration of archeological sites, as opposed to isolates, were within the range including the 10^{o} to 20^{o} slopes. Site density diminished in the ranges of 20^{o} to 30^{o} slopes (two sites) and 30^{o} to 40^{o} slopes (one site). The reverse sequence is true for the location of isolates. The data suggests that early human occupation of this area shows a preference of slopes in the 10^{o} to 20^{o} range for the location of their settlements, while the slope ranges from 20^{o} to 30^{o} and 30^{o} to 40^{o} were seemingly used more often as activity areas, probably for hunting or the processing or retouching of tools (Table 2 and Figure 3).

In conclusion, there tends to be a correlation between the variables of slope and elevation (Figure 4.). The majority of sites show a selection of 10^{o} to 20^{o} slopes in areas of elevation no greater than 2300 m.

Table 2. Statistical Analysis of Slope.

SLOPE	0	E
-10 * -6	1	2
-5 * -1	0	2
0 * 4	3	2
5 * 9	2	2
10 * 14	5	2
15 * 19	2	2
20 * 24	1	2
25 *	2	2

SLOPE	0	E
-10 * -1	1	4
0 * 9	5	4
10 * 19	7	4
20 *	3	4

$$\frac{1^2+2^2+1^2+0^2+3^2+0^2+1^2+0^2}{2}$$

$$= \frac{1+4+1+0+9+0+1+0}{2}$$

$$= \frac{16}{2} = 8.0 = X^2_7$$

P - 0.27

$$\frac{3^2+1^2+3^2+1^2}{4}$$

$$= \frac{9+1+9+1}{4} = \frac{20}{4} = 5 = 7^2_3$$

P - 0.19

Conclusions: Localities are concentrated on slopes of 10^o to 20^o.

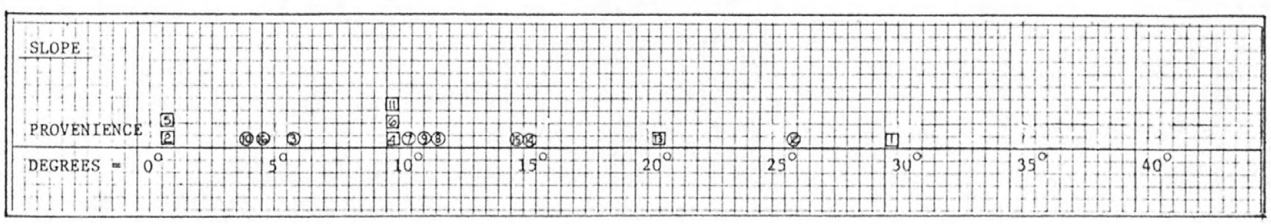


Figure 3. Clustering profile.

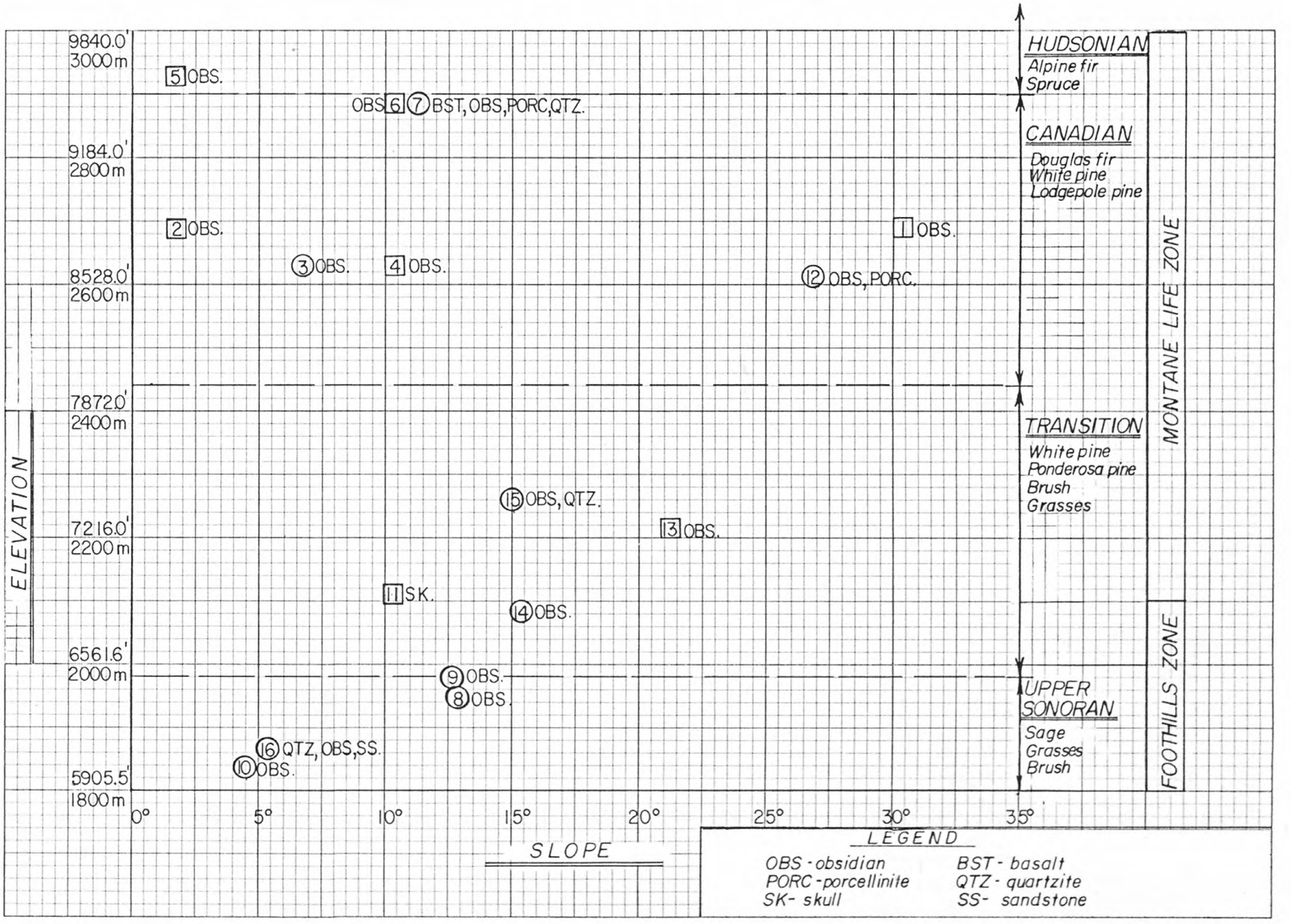


Figure 4. Clustering of localities according to elevation, slope, and life zones.

Surface Soil Classification as a Selective Variable for the Location of Archeological Sites

Generally speaking, the Bridger-Teton National Forest belongs to the Taiga climatological zone of high moisture that promotes high leaching, combined with relatively low temperatures resulting in a relatively low rate of organic matter decomposition (Figure 5). These climatological conditions are characterized by the soil orders of spodosols, alfisols, and mollisols. These orders of soils are usually formed on the borderline between the Tundra climatological zone and the Taiga or Boreal Borest zone. The average annual precipitation for this type of environment is 500-700 mm (19.68 to 27.55 inches) with an average annual temperature of 6 degrees centigrade (Birkeland 1974:217). Specifically, the Bridger-Teton National Forest has an average annual precipitation of 407 mm (16 inches) with an average temperature of 3 degrees centigrade (Bradley 1976).

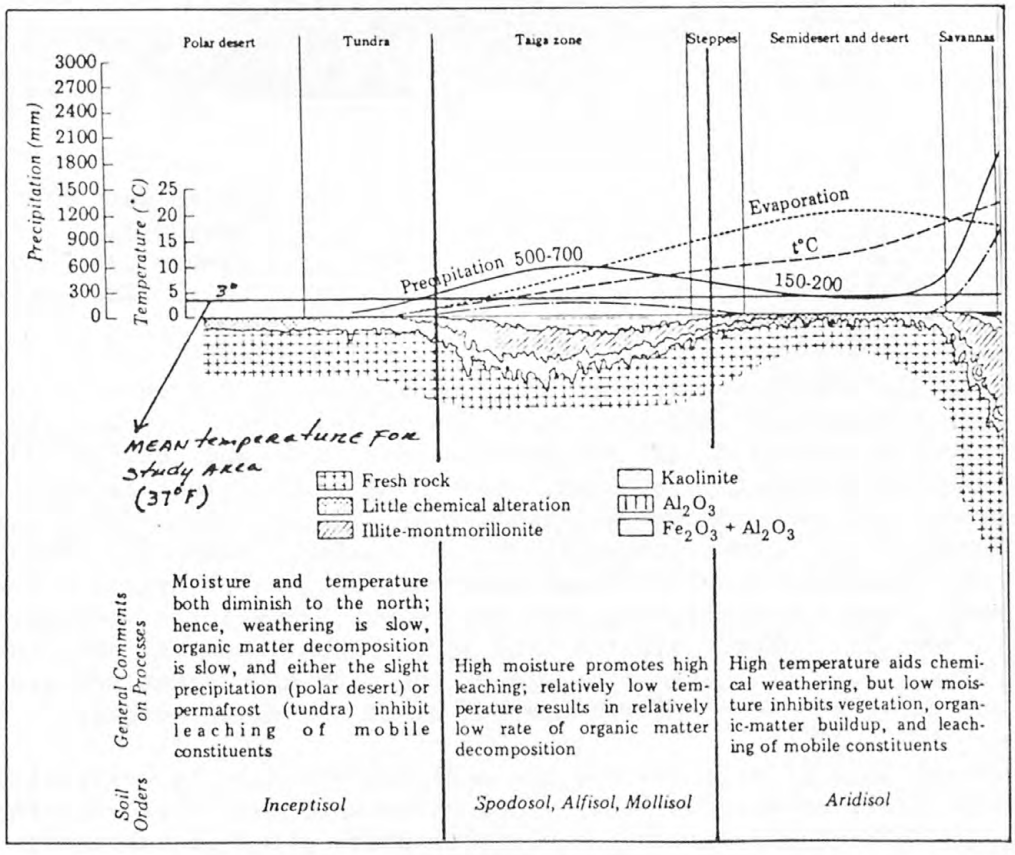


Figure 5 . Climatological zones shown in relation to precipitation, temperature, and soil orders. (Birkeland 1974).

Of the three soil orders listed above, alfisols predominate in surveyed area. Alfisols (A2S) are composed of cryoboralfs, with borolls, cryochrepts, cryorthods, typified by rock outcrops and a general steep topography, (Foth and Schafer, 1980:39). In the Mountain zone of the Rocky Mountains, of which the Bridger-Teton region is part, the typical soils at the higher elevations are the aquepts which are classified as cryaquepts in cool to cold climates. Most of the quepts, of which cryaquepts are a part, have formed sediments of the Wisconsin age. As the elevation decreases, the aquepts are replaced by spodosols and then by boralfs (see Figure 6).

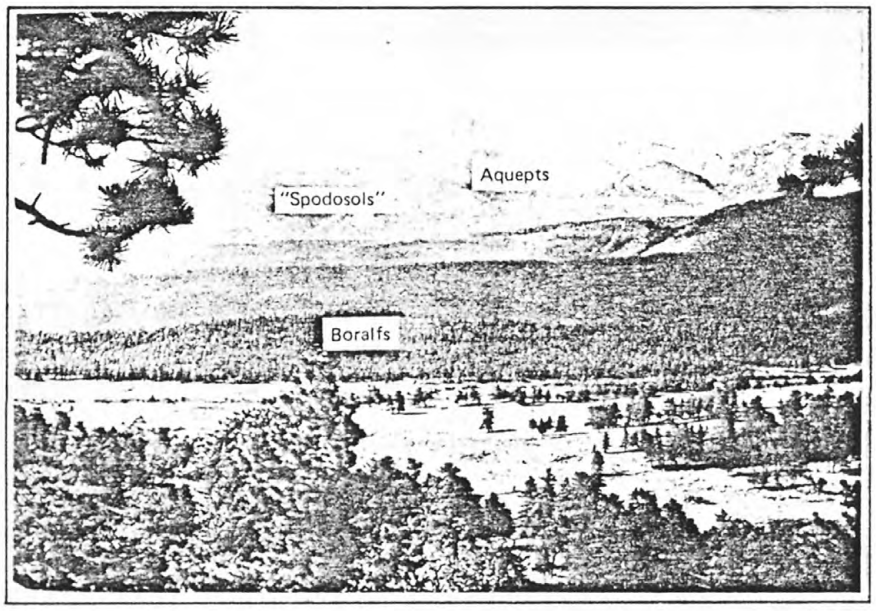


Figure 6. Boralfs are common in the montane zone of the Rocky Mountains and Inceptisols are weak Spodosols that are common in the subalpine zone. In northern Colorado the altitude of the montane zone is about 2100 to 2800 meters.

The spodosols are those soils which have developed under conifer forest vegetation (Foth and Schafer 1980:203-204), with low natural fertility usually vegetated by spruce-fir forests of the subalpine 2 zone (Foth and Schafer 1980:146). The boralfs soils are mostly forested, where coniferous forest is the dominant vegetation, and occur on thick sediments of glacial origin; deer and elk use the areas for summer browse (Foth and Schafer, 1980:147). "Many Boralfs in the Rocky Mountains occur on thick sediments of glacial origin. Steep slopes are common, and there are many rock outcrops. Summers are warm but short (frigid region). Nearly all the land is in forest, and virtually none of it is cultivated. Some of the gentler slopes and more open areas are grazed and are used for pasture. Deer and elk use the areas for summer browse." (Foth and Schafer, 1980).

In the case of this survey, the analysis of soils is qualitative rather than quantitative; that is, only those observable qualities of surface character are taken into consideration. A vertical pedological or Paleosoils analysis is needed to do justice to a correlation of soils and archeological sites. Only then can a statement be made as to the fluctuating cycles of the environment and the possible association of human activities in prehistoric, as well as, early historical times.

The soil classification used here is that of Mr. William Glenn. It was prepared as part of the general EIS statement for the Cache Creek-Little Granite Creek area of the Bridger-Teton National Forest (Table 3 and Figures 8,9,10). The original intent of this survey was to use a null hypothesis to test the influence of topsoil character on the location of archeological sites. This hypothesis in turn was suggested by Grady (1980) and Hurlett (1976).

The null hypothesis postulates on the one hand, "if the distribution of soils exerts an influence upon the location of archeological sites, archeological evidence will tend to cluster around discrete topsoil characters" (modified from Grady 1980:171).

Table 3. Legend of Soil Identification in the Cache-Little Granite Creek E.I.S. Survey Area (Modified from Glenn 1980).

Localized topographic classification number	Slope in degrees	Localized topographic classification	Pedological classification of topsoils
C10	40-90	alpine glaciated lands	1. Lithic Cryorthents, loamy-skeletal, mixed 2. Typic Cryoborolls, loamy-skeletal, mixed 3. Rock Outcrop
C11	10-70	glacial troughs	1. Lithic Cryumbrepts, loamy-skeletal, mixed
C12	10-60	rolling forb meadowlands	1. Argic Pachic Cryoborolls, fine-loamy, mixed 2. Argic Cryoborolls, fine, montmorillonitic 3. Typic Cryoborolls, loamy-skeletal, mixed
C13	20-60	moderately dissected forested slopes	1. Mollic Cryoboralfs, fine-loamy, mixed 2. Typic Cryochrept, loamy-skeletal, mixed
C14	20-60	moderately dissected forested slopes with scattered landslides	1. Typic Cryoboralfs, loamy-skeletal, mixed 2. Typic Cryoboralfs, fine, montmorillonitic
C15	30-75	moderately dissected forb meadowlands	1. Argic Pachic Cryoborolls, fine-loamy, mixed 2. Lithic Cryorthents, loamy-skeletal, mixed 3. Typic Cryoborolls, loamy-skeletal, mixed
C16	30-75	strongly dissected forested slopes	1. Typic Cryochrepts, loamy-skeletal, mixed 2. Lithic Cryoborolls, loamy-skeletal, mixed 3. Typic Cryoborolls, loamy-skeletal, mixed
C17	30-75	strongly dissected open slopes	1. Typic Cryoborolls, loamy-skeletal, mixed 2. Lithic Cryoborolls, loamy-skeletal, mixed 3. Pachic Cryoborolls, coarse-loamy, mixed
C18	40-75	talus slopes	1. Talus 2. Typic Cryochrepts, fragmental, mixed
C19	10-40	rolling glacial deposits, forested	1. Typic Cryoboralfs, loamy-skeletal, mixed 2. Typic Cryoborolls, skeletal, mixed

As a result of this survey, it was found that there was a certain clustering of archeological sites favoring discrete topsoil characters. However, a word of caution must be inserted. The size of the sample is too small for a greater degree of probability to be reached.

A statistical analysis of soils was carried out using the Chi-square formula in the manner shown in Table .

Soil type	Site density (O)	E	$\frac{(O-E)^2}{E}$	% Localities
10	6	1.6	12.10	43.60
11	0	1.6	1.60	5.76
12	5	1.6	27.225	26.03
13	0	1.6	1.6	5.76
14	0	1.6	1.6	5.76
15	0	1.6	1.6	5.76
16	2	1.6	0.1	0.36
17	2	1.6	0.1	0.36
19	1	1.6	0.225	0.81
			27.75	99.96

Chi-square= X^2_9 27.75

p .005

Table 4 . Soil Type and its Effect on Archeological Localities.

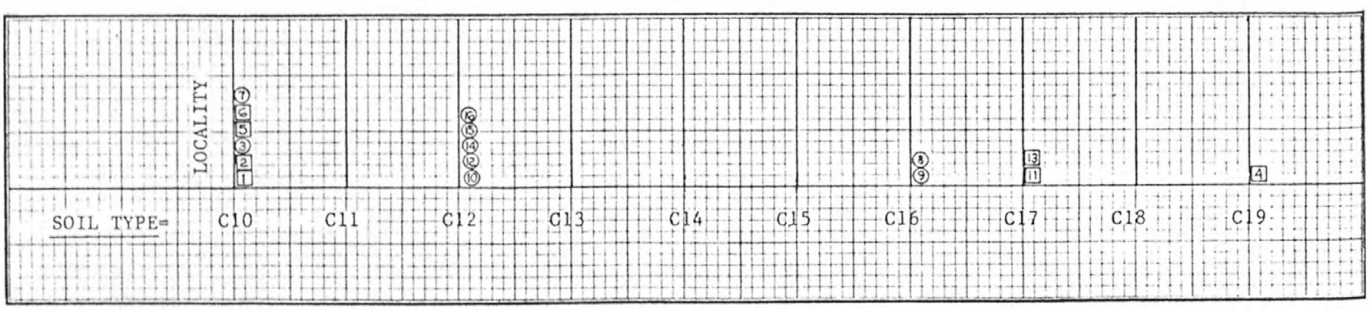


Figure 7 . The clustering of localities as related to soil types.

The highest concentration of localities occurred under soil type 10, located on the alpine glaciated lands. The second highest concentration occurred where there was soil type 12 or rolling forb meadow lands. On the rolling glaciated deposits, type #19, only one site was reported or 0.81% of the total sites. This was followed by only 0.36% for each soil types 16 and 17, or strongly dissected open slopes.

In soil type 10, of the 6 reported proveniences, only 2 are sites; site 48TE962 an obsidian scatter, and site 48TE963 a basalt, obsidian, porcelanite, and quartzite scatter. The topsoil composition is lithic cryorthents, loamy skeletal mixed, and typic cryoborolls with rock outcrops exposed, supporting vegetation communities of subalpine fir, blue huckleberry, quaking aspen-lovage, and subalpine fir-whitebark pine. For details of vegetation cover and percentages, see the vegetation cells with the locality forms in Appendix A.

In soil type 12, of the 5 proveniences reported, all are sites. This soil is typified by lands located at 10° to 20° slopes, composed of argic pochic cryoborolls of fine loamy mixed, montmorillonic, typic cryoborolls and loamy skeletal mixed. This type of soil supports the following vegetation communities: limber pine-spike fescue, Douglas fir-white spiraea, a mixture of lovage, rose shrub and giant hyssop, subalpine fir-mountain maple, subalpine fir-mountain arnica, a mixture of lovage, rose bush, arnica and goat chicory, subalpine fir-mountain grouseberry-white bark pine, alpine fir-blue huckleberry, pine grass, Douglas fir, with a highest concentration of flox, camas, wild onion and wild grasses; again for absolute percentages and relationships of vegetation communities, see vegetation cells with one of the locality forms in Appendix A.

With the third highest concentration, less than 1% occurred on soil type 19, composed of rolling glacial deposits, ususally forested and located on lands of 10° to 20° slopes, made up of typic cryoborolls, loamy skeletal mixes. Soil 16 supports a mixture of flox and camas, with sage, wild onions and grasses. On the other hand, soil 17 supports limber pine-spike fescue, blue bunch wheatgrass-Idaho fescue, subalpine fir-mountain maple, quaking aspen-lovage-cow cabbage, Douglas fir-white spiraea, lovage-rose shrub-cow cabbage-lungwort, Douglas fir-pine grass, Douglas fir-mountain arnica. There seems to be a discrepancy as to the nature of soil type 16 and soil type 17 and the vegetation communities that they support. One would expect to have these vegetation communities interchanged, that is the mixture of flox, camas with sage and wild onions along with wild grasses, belong to strongly dissected open slopes rather than strongly dissected forested slopes. It is possible that in this case it is a mistake in observation rather than true accountability. On the other hand, the accountability of the vegetation communities is a generalized one, using divisions on aerial photographs and other maps. It is possible that by using this process, highly concentrated ecological niches may be overlooked.

Figure 8 . Topographic zones used for pedological classification. These are taken from aerial photographs (provided by Glenn, 1980).

Figure 9 . Topographic zones used for pedological classification. These are taken from aerial photographs (provided by Glenn, 1980).

Figure 10. Topographic zones used for pedological classification. These are taken from aerial photographs (provided by Glenn, 1980).

Vegetation as a Selective Variable for the Location of Archeological Sites

Vegetation is suspected to be the barometer of mountainous environments. Its ecological juxtaposition can be altered by the slightest change in temperature or moisture or a combination of the two. When these changes occur, vegetation adjusts itself either in its altitudinal or its longitudinal location. That is, vegetation lines can travel up and down the side of a mountain or disappear altogether and have a resurgence in later times. Archeologically, this condition plays a vital role in the dynamics of food procurement either directly, in the case of plant gathering societies, or indirectly, in the case of hunting societies, where game follows vegetation bringing hunting societies into the area. A combination of the two is found with hunting and gathering societies. In effect, these observations can be extrapolated back into prehistoric and early historic times as there is evidence in recent studies (Bradley 1976:58) that climatological and environmental conditions of the Bridger-Teton National Forest have changed somewhat in the recent past. Bradley suggests a fluctuating weather cycle of warm-moist (1055-1130 A.D./820-895 B.P.), warm-dry (1130-1430 A.D./520 B.P.), cool-moist (1550-1840 A.D.), and warm-moist (1850 onward). He further suggests that in the so-called altithermal climatological period (4430-7700 B.P.) prehistoric occupation began (and hence exploitation of vegetation) at higher elevations (2438 m or 8000+ ft) and terminated in the 15th Century (Frison 1978:41-43; Wright 1978:113; Ranere 1970:56). However, pollen sequences from the Late Quarternary sediments in Yellowstone Park suggests a warming trend starting from 11,550 $\pm$ 350 B.P. to the present with subsequent average temperature changes from $\overline{26}^{\circ}$F to those of 32.8°F (27°F in the Jackson Hole area) at the present (Baker 1970:1450). These changes in turn have caused a fluctuation of timberlines and overall vegetation in relation to the topographic features of the area.

In the case of this sampling survey, kind and classification of vegetation was felt to be a critical factor for the location of archeological sites. Vegetation was analyzed by making an environmental cell with a 1 km radius for each locality found. These vegetation zones were taken from a vegetation map prepared by Steele et al. (1979). Once the cells had been prepared, a grid of 100 squares/square inch was used to determine the percentage of cover of each species as identified by the map. These percentages were equated with the density of specific plant communities within the locality areas (Table 5 and Figure 11 in back pocket).

In the case of 48TE951, 48TE952, 48TE953, 48TE954, and 48TE959, the vegetation classification could not be taken from the map. The classification given to these localities was #64. This type is based on an ethnographic account (Haines 1965:18) and field crew observations of vegetation types existing along these specific drainage bottoms.

If the distribution of vegetation is a selective variable for site location in prehistoric times, and assuming that vegetation has not changed radically through time/space, and assuming that such vegetation indeed belongs to the food procurement chain, either directly or indirectly; then archeological sites will be distributed over the landscape in discreet areas, favoring certain types of vegetation. The criteria suggested here are similar to those hypotheses proposed by Grady (1980: 172-173, 186-187).

Should there be random distribution of archeological sites favoring no discreet vegetation areas, then archeological sites and vegetation are not related.

Table 5. Vegetation Dominance by Species.

Vegetation Category Number	Common Name Species Nr. 1	Common Name Species Nr. 2	Common Name Species Nr. 3
11	limber pine	spike fescue	———
21	subalpine fir	white spiraea	———
23	subalpine fir	mountain arnica	———
24	subalpine fir	baneberry	———
25	subalpine fir	ninebark	———
26	subalpine fir	mountain maple	———
27	subalpine fir	blue huckleberry	———
28	subalpine fir	grouse whortleberry	———
210	subalpine fir	grouse whortleberry	———
211	subalpine fir	whitebark pine	———
212	subalpine fir	mountain grouseberry	white bark pine
71	lovage	rose shrub	larkspur
72	cow cabbage	lungwort	———
73	giant hyssop		———
74	arnica	goat chicory	———
77	blue bunch wheatgrass	Idaho fescue	———
78	sage brush	mountain snowberry	———
79	alpine		———
76	golden avens		———
710	rock talus		———
31	douglas fir	ninebark	———
32	douglas fir	ninebark	———
34	douglas fir	pinegrass	———
35	douglas fir	white spiraea	———
41	pedicularis	sweetscented bedstraw	———
51	whitebark pine	grouse whortleberry	———
61	quaking aspen	lovage	———
62	quaking aspen	cow cabbage	———
63	pine grass		———
64	flox/camas	sage	wild onion, wild grasses

A computer cluster analysis, BMDP2M (Health Services Program cases), was used at the University of Wyoming computer center to test this hypothesis. (Appendix B) The end results are as shown in Table 5.

Table 6. Listing of Vegetation Means.

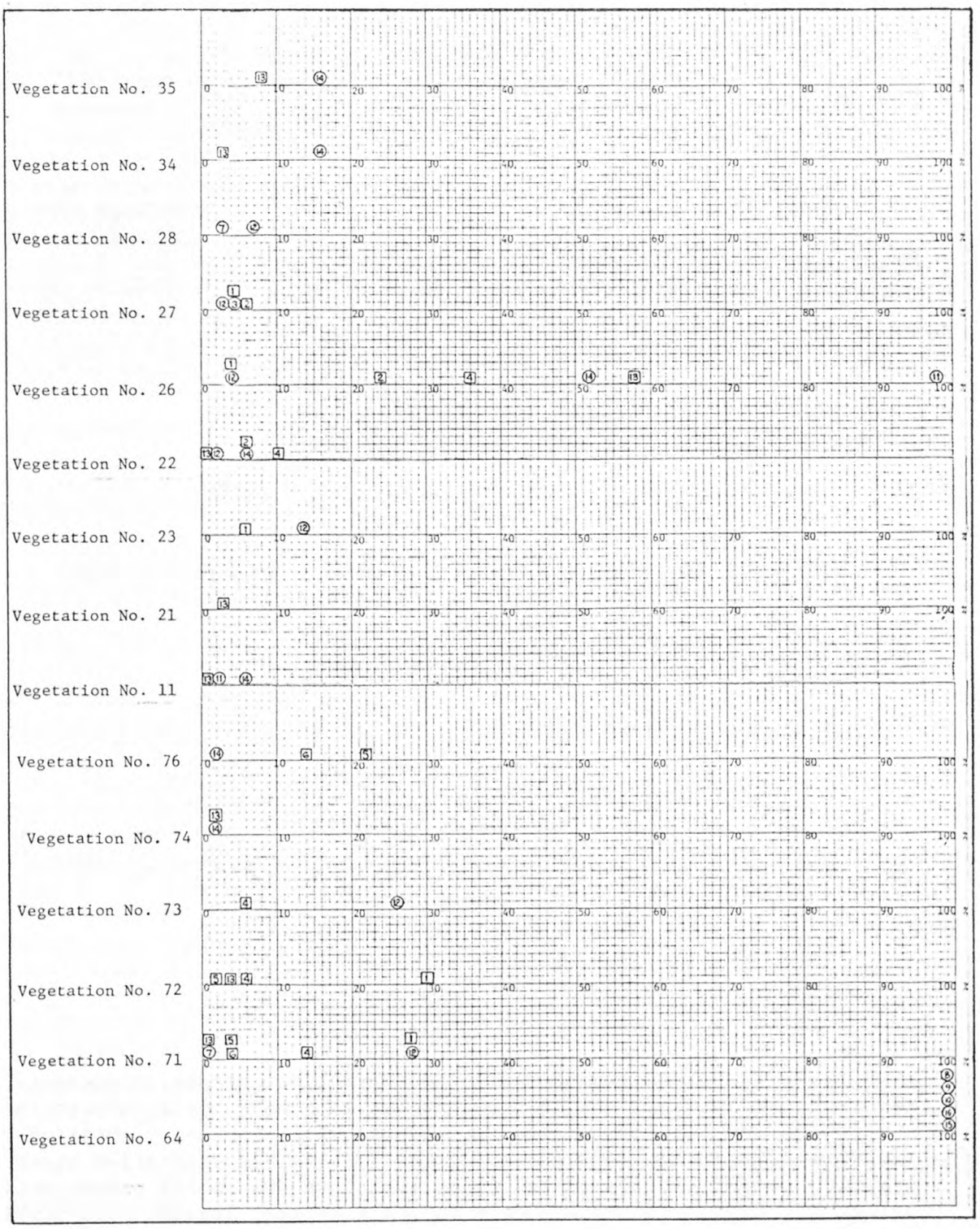
Vegetation Category	$\bar{x}$ in % (n)	
No. 11	2.367 (3)	2/1
No. 21	3.000 (1)	0/1
No. 23	9.150 (2)	1/1
No. 22	4.640 (5)	2/3
No. 26	39.514 (7)	3/4
No. 27	3.550 (4)	2/2
No. 28	3.150 (2)	2/0
No. 34	9.650 (2)	1/1
No. 35	11.750 (2)	1/1
No. 51	32.750 (4)	1/3
No. 61	9.475 (4)	1/3
No. 62	6.000 (2)	0/2
No. 64	100.000 (5)	5/0
No. 71	11.086 (7)	2/5
No. 72	10.550 (4)	0/4
No. 73	15.600 (2)	1/1
No. 74	5.733 (3)	2/1
No. 76	13.100 (3)	1/2
No. 77	1.750 (2)	1/1
No. 78	2.000 (2)	1/1
No. 211	26.833 (6)	2/4
No. 212	11.017 (6)	2/4
No. 710	13.833 (6)	3/3

On the above distribution of specific vegetation types within the data base, taking as a total the number of 16 localities and the specific catchment of one kilometer radius for each locality, the following conclusions were reached concerning the distribution of specific vegetation types as shown under the headings in Table 7.

Table 7. Distribution of Specific Vegetation Types.

Traces only (<30%)	Entire range (100%)	Mid range (50%)	High range (most dominant)	Low range (less dominant)
No. 11	No. 26	No. 51	No. 64	No. 61
No. 21	No. 211			No. 71
No. 23				No. 72
No. 22				No. 73
No. 27				No. 76
No. 28				No. 212
No. 34				
No. 35				
No. 62				
No. 74				
No. 77				
No. 78				
No. 710 (except area 7)				

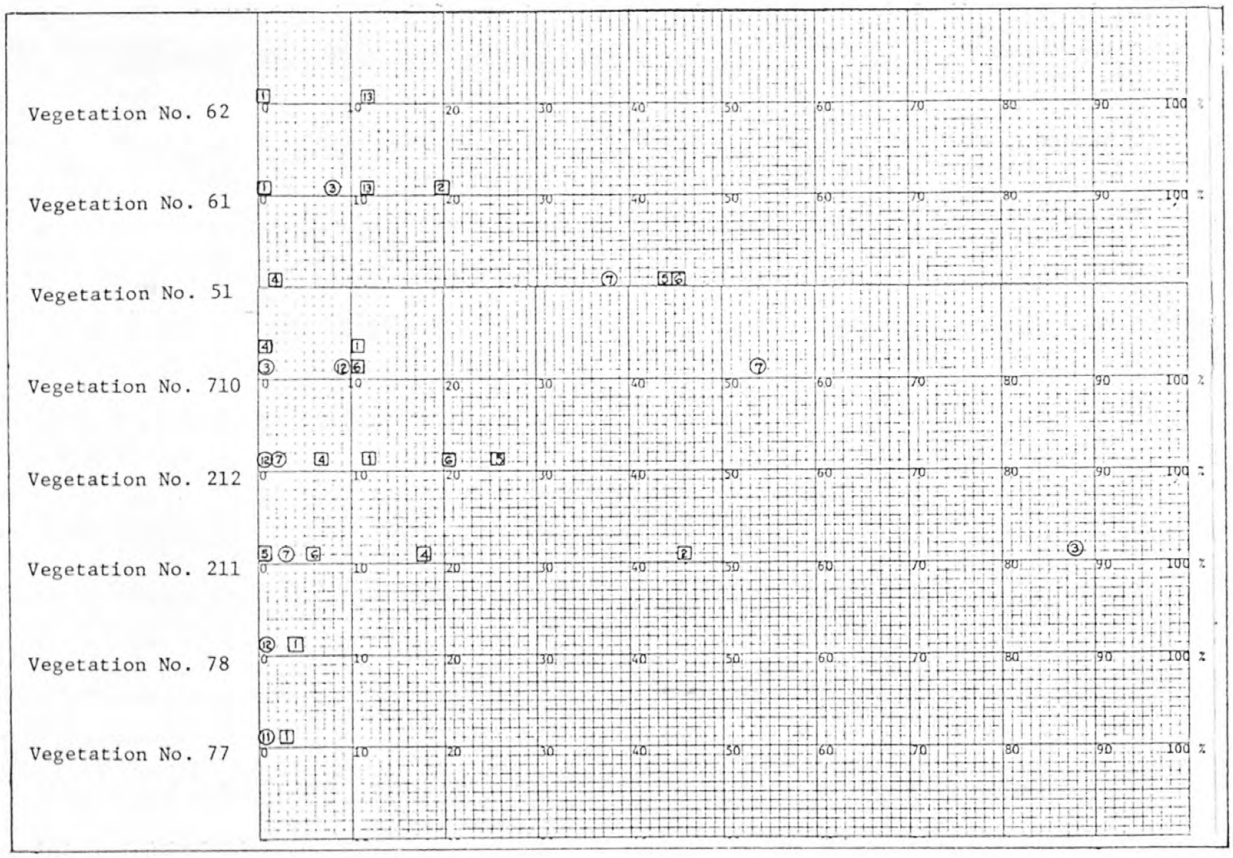
Figure 12. Percentage of vegetation in relation to each locality.



○ = SITE

□ = ISOLATE

Figure 12. Percentage of vegetation in relation to each locality.



○ = SITE

□ = ISOLATE

The computer program used all the vegetative categories presented in Table 7 and analyzed all 16 proveniences located in this sampling survey, including those identified as sites as well as those identified as isolates. The conclusions were: of the 23 possible vegetative ecozones present, 12 categories appeared to be less than 30% to all proveniences. Category 710 (rock talus) was only slightly present indicating a higher degree of ground visibility due to less vegetative cover. This visibility factor added one more constraint in locating sites. Other ecozones indicate a lesser degree of ground visibility due to dense vegetative cover.

Ecozones 26 (subalpine fir and mountain maple) and 211 (subalpine fir and whitebark pine) appeared to be present on the entire range of 16 possible localities. Ecozone 51 (whitebark pine and grouse whortleberry) appears to be the average vegetation found in all localities while 64 appears to be the highest possibility for site location. A statement as to the biases of this category must be inserted at this time. Ecozone 64 (flax/camas, sage, wild onions, and wild grasses) was selected to indicate all open valley bottomlands, an area almost restricted to outside the mountainous region. It appears in this sample, that this 100% possibility of locating archeohistorical sites in vegetative ecozone 64 is a reflection of the most favorable topographic conditions for the location of sites, rather than a favoring of this vegetation type by early inhabitants of the area. Again, the problem is the inadequate sample size. It became evident that the clustering of variables as indicated by vegetative ecozones was limited in significance by the sample size.

Fauna as a Selective Variable for the Location of Archeological Sites

Seasonal visitation for the purpose of hunting and gathering by prehistoric and early historic peoples in the Bridger-Teton National Forest has been suggested before. Gary Wright, (1978:13) closely relates the botany and fauna of the montane zones to what he calls the high country periodical adaptation of prehistoric and early historic people of the Northwestern Plains and in particular the Teton mountain area of the State of Wyoming. He concludes that these people's seasonal visitation started in late spring and lasted through late summer with movement into higher elevations by late summer as plant productivity began to decline on the valley floors (6,000-6,800 ft.). Environmentally, vegetational zones follow favorable ecological belts, advancing in both their vertical and horizontal extents in relation to the topography. The dynamics of these movements are determined by rain and temperature. Vegetation is follows by the animal species that feed on the plants, and then by human beings in quest of food, either plant or animal (Frison 1978:8-13).

In the Gros-Ventre Range the same plant species suspected to be food for large mammals ripen earlier on the valley floors and later at the higher elevations, those between 2,438 and 2,743 m (8,000 and 9,000 ft). This is especially true in the alpine meadows where large mammals such as elk, timber buffalo, antelope, and bighorn sheep take residence later in the year (Wright 1978:12-13; C. Love 1972:12). By the latter part of the fall, most of these big game animals begin to move to lower elevations.

During the sampling survey of this area, it was found that the average elevation of all localities encountered is 2,397 m (7,864 ft) and the overall range is between 1,841 and 2,937 m (6,040 and 9,635 ft), well within the limits suggested above. Insofar as the interaction of this biotic community and the human species is concerned, according to ethnological accounts, a branch of the Eastern Shoshoni, the Sheepeaters, are known to have inhabited the area. The aforementioned big game animals represent the primary sustenance of these eastern Shoshone Indian tribes (Fox 1976:3).

Although no range maps are available for most of the animal species, three animal distribution maps are included in Figures 13,14, and 15. These maps show the ranges of elk, bighorn sheep, and moose. During this survey several beaver ponds were sited, particularly in the subalpine and montane ecological zones. No antelope have been reported in this area for a long time. However, there is one historical account of a kill by early fur traders a few miles from the junction of the Hoback River and the Snake River (Anderson 1958:16).

On the archeological record, buffalo (Bison bison) remains appear to be common in the Bridger-Teton National Forest, and particularly in the Gros-Ventre River valley. These are found in archeological contexts and naturally buried. This is attested to by the Goetz site, a bison trap on the northest end of the National Elk Refuge, where remains were found dating 1480 $\pm$ 115 A.D. Buffalo bones were also found in the archeological site of Astoria Hotsprings located in the Snake River Canyon, southeast of the surveyed area. These bones were associated with some pieces of shell dating 11,940 $\pm$ 500 A.D. During this survey, remnants of a bison skull were found (IF-7) about a mile from the Ranger Station on Little Granite Creek, up the left tributary. This is about three miles from the Boulder Creek-Hoback River junction. Although bison have existed on the American continent for over 40,000 years, probably a better

estimate of bison as a quarry of man would start around 8,000 B.C. and culminate with the elimination of bison in the area prior to 1840 (Schult 1972:147).

Elk are known to have been native to the area for a long time (Love 1972:12) with numerous historical accounts of early European settlers that date back to 1811 substantiating this (Anderson 1958:15). In ethnohistorical times, the Eastern Shoshoni came into the area to hunt elk, deer, mountain sheep, timber buffalo, and probably small mammals such as rabbits to supplement their diet. Occasionally timber buffalo were also hunted during this time by driving them into deep snow where they could be more easily killed (Fox 1978:4). However, after 1840 elk probably became the primary target of hunting activities; mountain buffalo had disappeared from the mountain region west of the Tetons (Fox 1978:3-5). In contrast, hunting in the late spring and early summer would focus on the western slopes of the numerous mountain areas such as the Wind River Range, Grand Tetons, and possibly the Gros-Ventre Range.

The bighorn sheep is suspected to have been part of prehistoric man's diet in this area for as long as 5,000 years, and perhaps longer (Love 1978:14). The early Indian population encountered in the vicinity of Jackson Hole, were known as the Sheepeaters presumably because they hunted and subsisted on bighorn sheep (Wright 1978:119).

When the fluctuations in the overall vegetation communities of the Jackson Hole region (see vegetation section) are correlated with the fluctuations of the animal communities of the same region, one can see a dependency relationship. Certain animals are known to be native to this area, including bison, bighorn sheep, elk, mule deer, rodents, beaver, black bear, coyotes, bobcats, porcupines, numerous bird species, and some fish (Blaisdell 1964:5-7; Brown et al. 1958:45). Regarding the prehistoric exploitation of rodents, it is possible that the prehistoric as well as the historic inhabitants of the area relied heavily upon them, as is attested by Lodge Creek site (48BH499) in the Big Horn Mountains.

Moose were not utilized by the prehistoric and the early historic inhabitants of the area. Moose came into the region after the 1850's (Love 1975:12). The appearance of moose in the area and their subsequent adaptation needs further study. It can be postulated that the moose probably came out of Canada during the beginning of the warm-moist ecological cycle beginning in the early 1850's.

No attempt was made to use this information as a critical factor in site location other than to state that part of the reason for the existence of archeological sites in this region is the long-standing animal habitation and therefore a fertile hunting ground both historically and prehistorically. As to establishing the particular cultural affinities of these archeological sites in relation to the fauna, particularly butchering techniques and the like, actual excavation of the sites is needed.

Table 8 . Guideline for Mapping Wildlife Distribution.

TYPE	DESCRIPTION	SYMBOL
Summer	The general geographic area occupied by a migratory herd during summer months. (Approximately June 1 - October 31)	_____S
Winter	The general geographic area occupied by a migratory herd during winter months. (Approximately November 1 - May 31)	_____W
Migration Routes	Definable route followed during seasonal movements year after year.	Mr
	a. General area of movement	→→→
	b. Specific movement corridors	→→→
Parturition Areas	Geographic area consistently used for birth of young.	-.-.-.-P
Breeding Areas	Geographic area consistently used for breeding by the majority of a population.	--·--·B
Display Areas	Sites consistently used by the male segment of game bird populations during courtship (e.g., strutting grounds, dancing grounds, drumming sites, etc.)	
	a. censused	●
	b. uncounted	⓪
	c. abandoned	✖
Year-long	Geographic area occupied by all or a portion of the population for the entire year.	_____Y
Combination	Range where animals occur during more than one season.	_____S/Y _____W/Y
Critical	That range that is present in minimum amounts and is the determining factor in the potential for population maintenance and/or growth. This will usually be represented by a winter concentration where most members of a population are forced during periods of maximum snow cover each year or where most members of a population are concentrated during periodic severe winters. The critical range may also be represented by late fall water source or other resources in short supply (e.g., cover for breeding, nesting, fawning, etc.). The degree of criticalness is related to a specific herd and is not related to the density of animals relative to any other herd.	

(Guidelines and accompanying maps supplied by the Wyoming State Game and Fish Department in Cheyenne, Wyoming.)

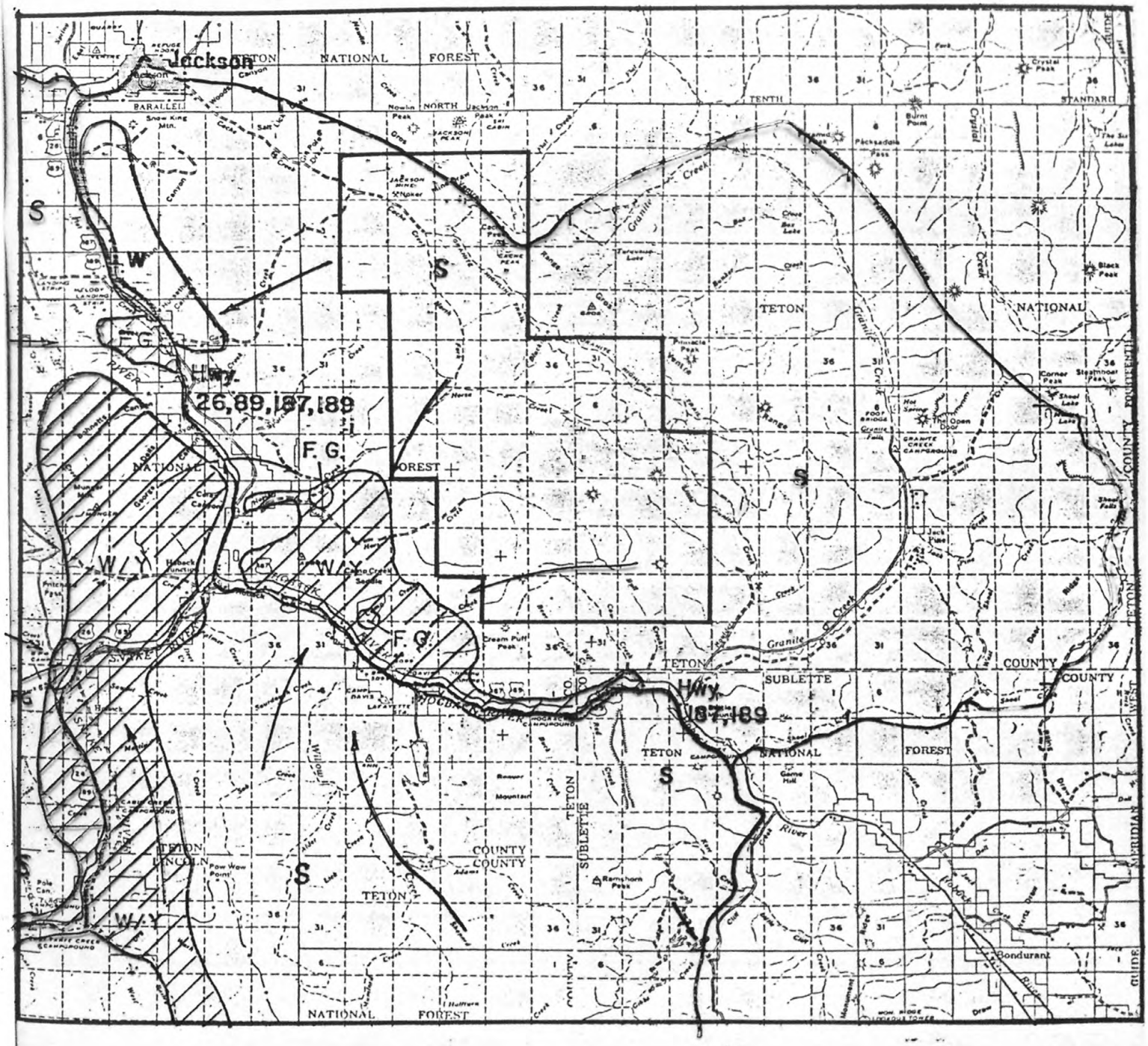


Figure 13. ELK - FALL CREEK, #84,85 DISTRICT 1. REVISED 8/31/78

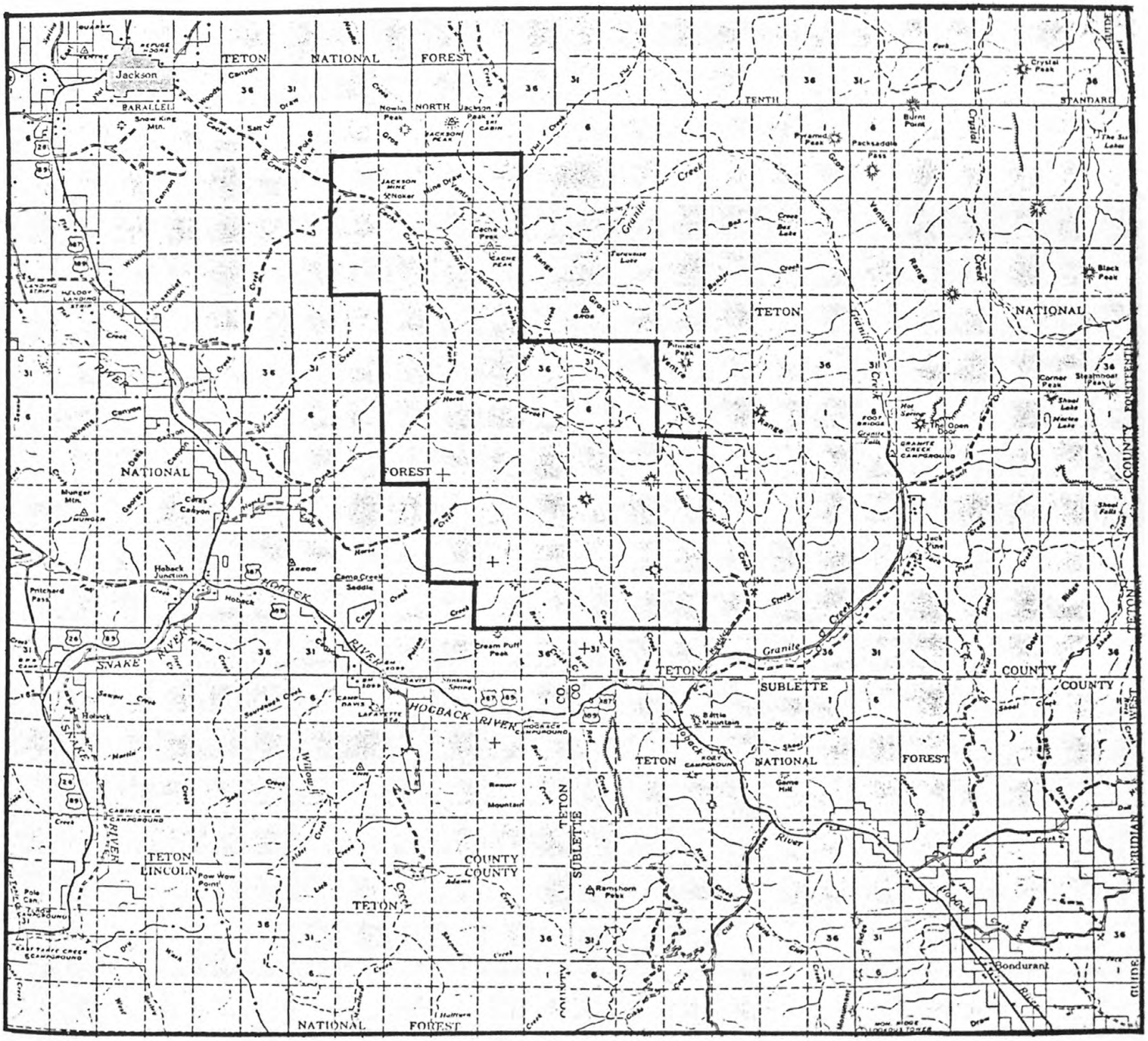


Figure 13. ELK - FALL CREEK, #84,85 DISTRICT 1. REVISED 8/31/78

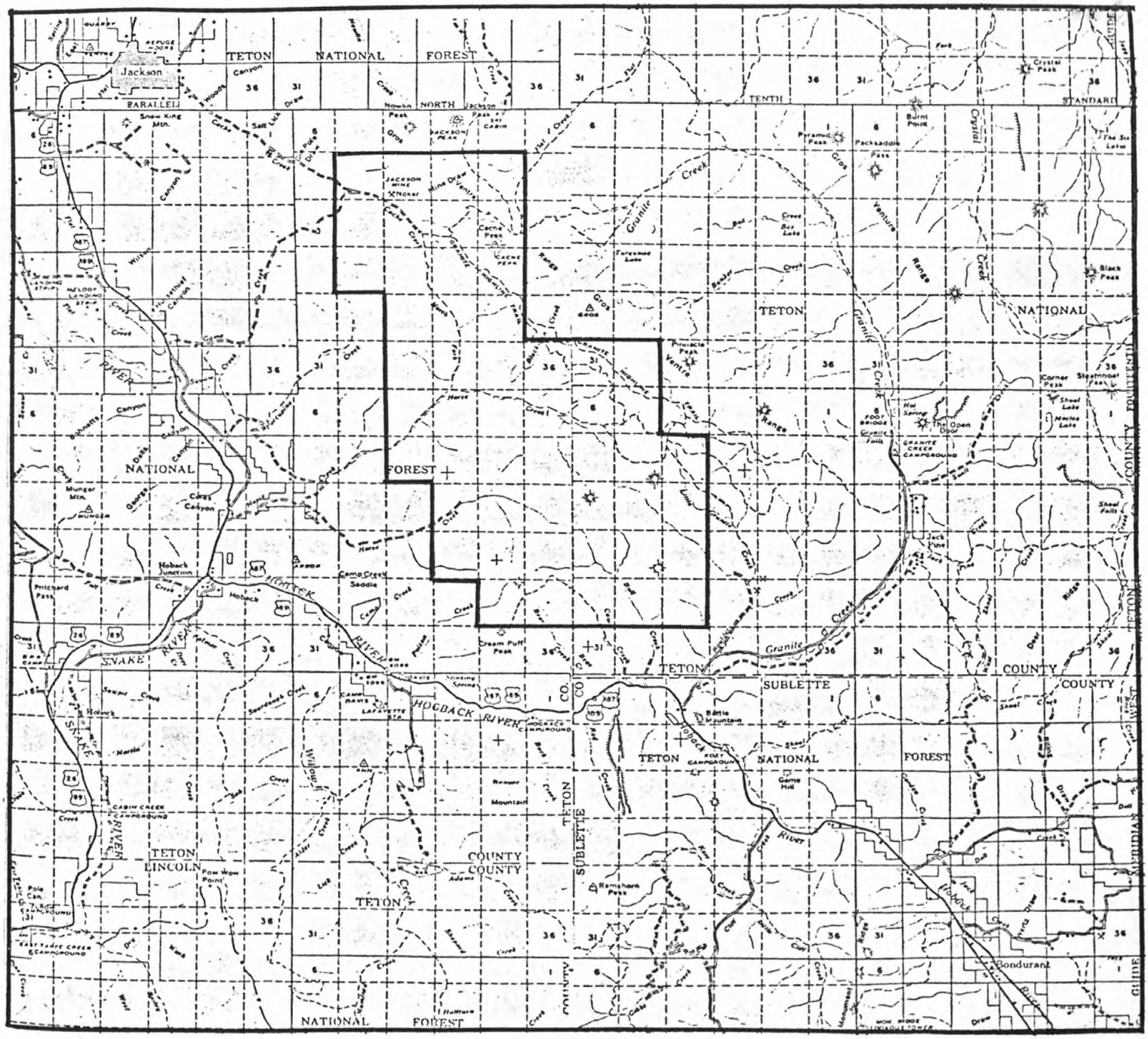


Figure 14. BIGHORN SHEEP - JACKSON, #7, DISTRICT 1. REVISED 8/30/79.

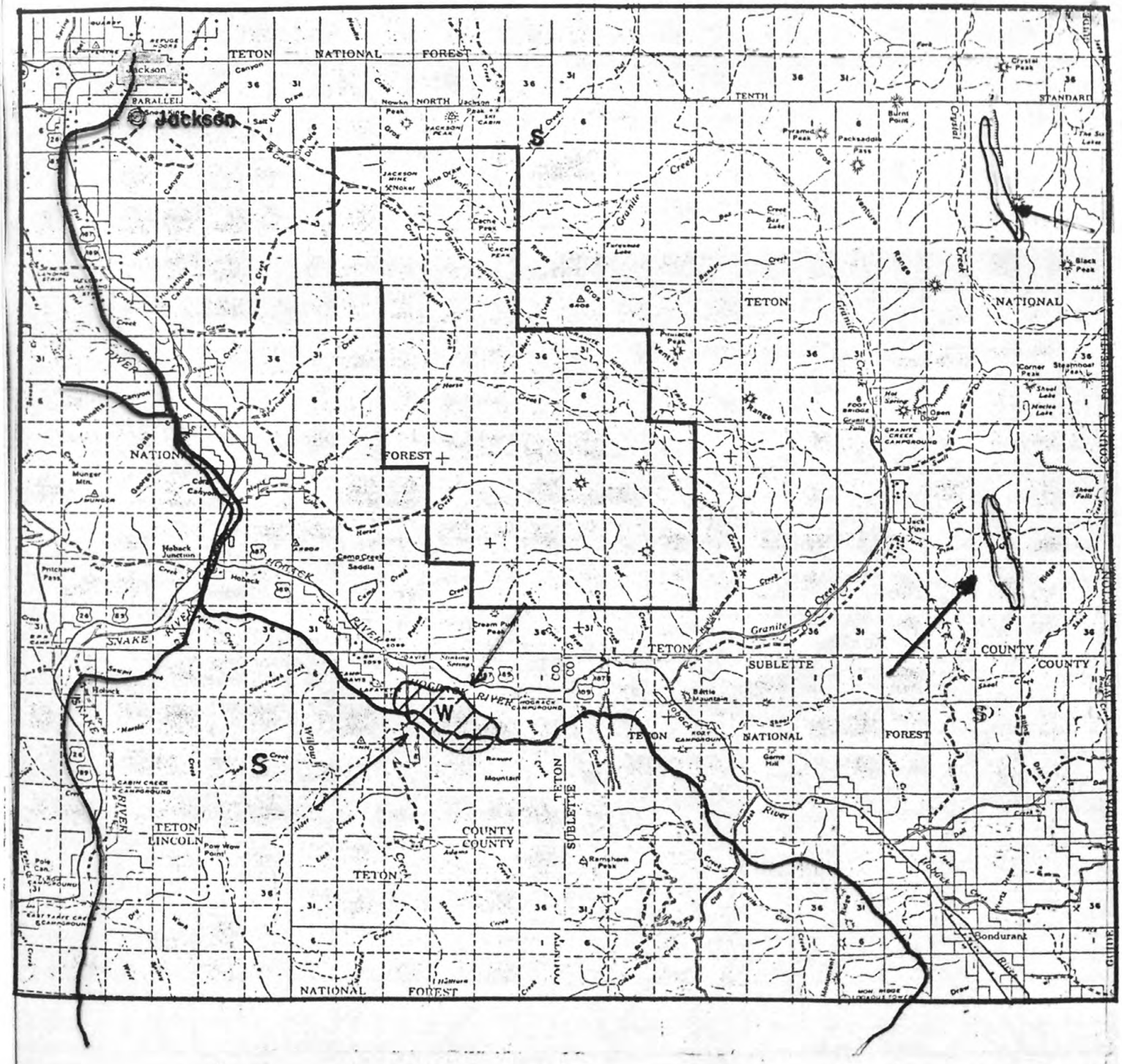


Figure 14. BIGHORN SHEEP - JACKSON, #7, DISTRICT 1. REVISED 8/30/79.

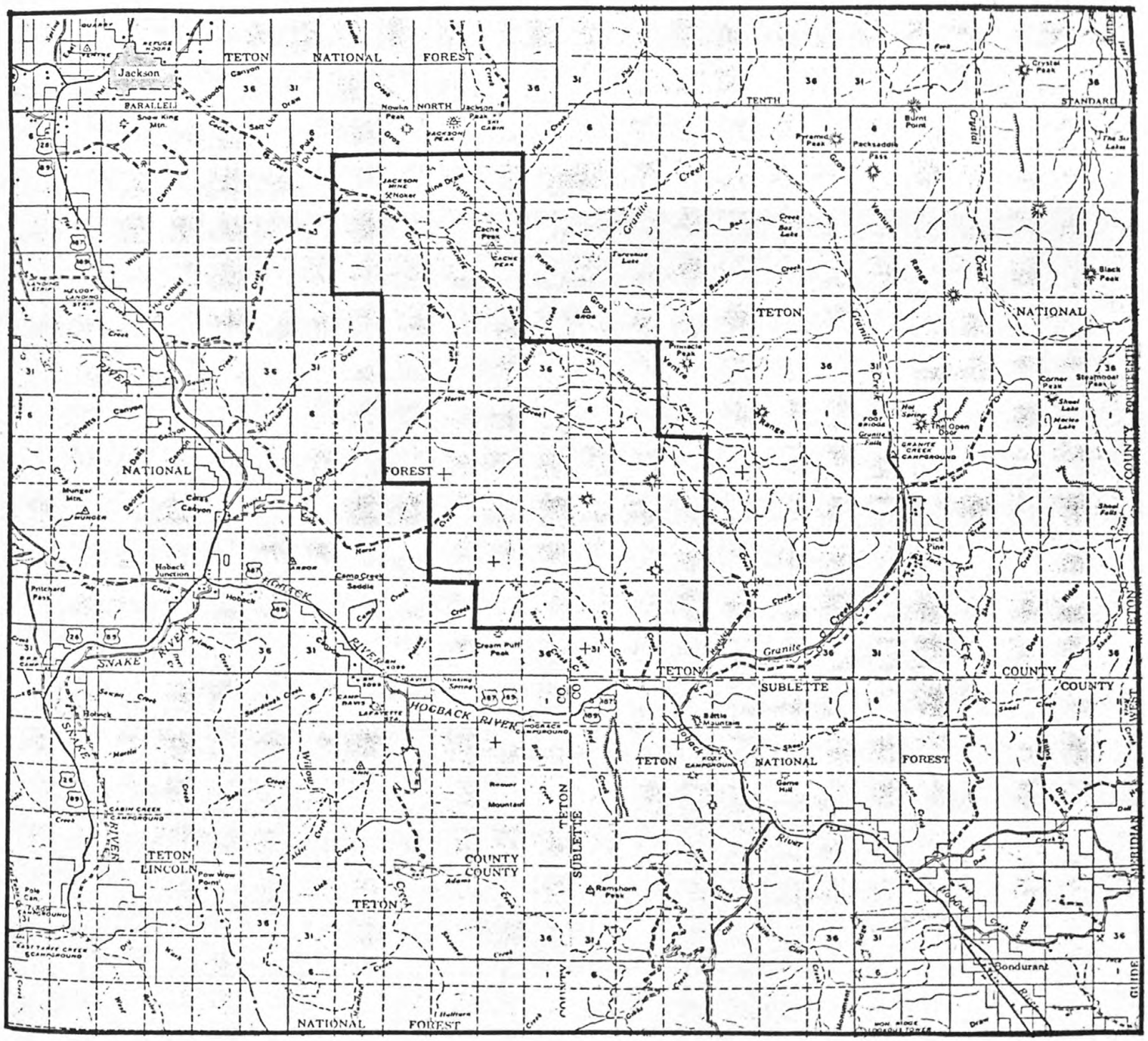


Figure 15. MOOSE AREA DISTRIBUTION MAP, #10,21, HOBACK DISTRICT #1. REVISED 8/30/78.

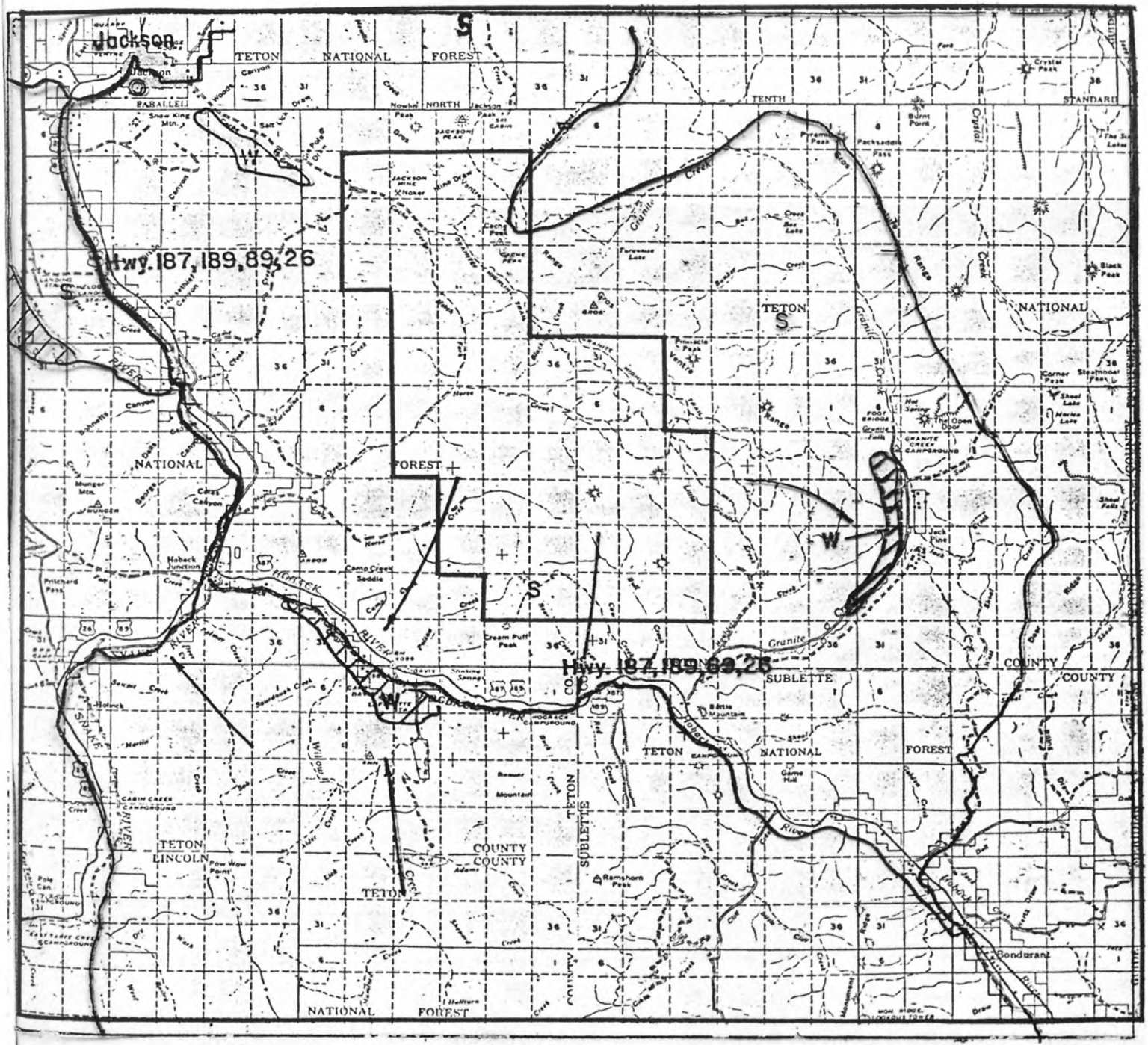


Figure 15. MOOSE AREA DISTRIBUTION MAP, #10,21, HOBACK DISTRICT #1. REVISED 8/30/78.

Stream Hierarchy and Proximity to Water as Selective Variables for the Location of Prehistoric and Early Historic Sites

A scheme to rank streams from bottom valley lands to mountain tops was established for the Bridger-Teton National Forest area. This ranking was established on a hierarchichal basis of main water arteries such as the Snake River numbering its tributaries going up in elevation in a dendritic pattern, ranking streams in order of junction. For example, the Snake River is number zero, any other stream feeding it would be number one, and streams feeding number one would be number two and so on.

The distribution of sites and isolates in relation to the ranking of streams and proximity to water is shown in Figure 16 below.

Statistical Analysis: Proximity to Water

Chi Square

Results:	Meters	O	E
	0 - 125	12	4
	126 - 250	1	4
	251 - 375	1	4
	376 - 500	2	4

$X^2_3 = 17$ P .005

Conclusions:

Localities were found to be close to water.

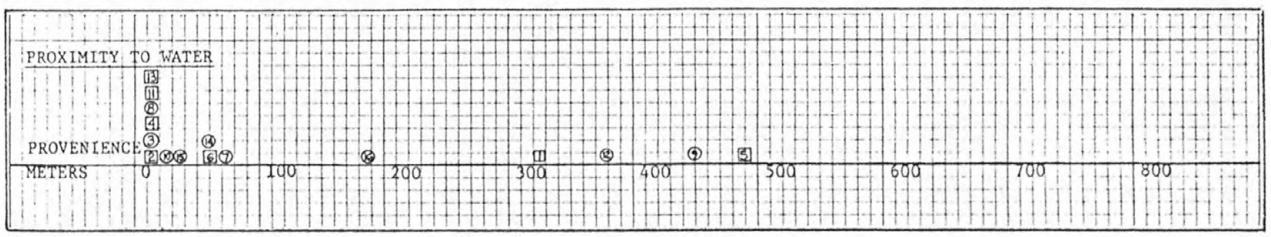


Figure 16. Statistical analysis and scatter diagram of proximity to water.

When stream hierarchy was taken as the prime controlling variable, an interesting pattern became evident. The highest concentration of proveniences clustered around hierarchy number two streams as is shown in Figure 16.

Table 8 . Distribution of Sites and Isolates According to Stream Hierarchy and Proximity to Water.

Stream hierarchy number	Elevation in meters	Environmental zone	Locality number	Proximity to water in meters	Aspect in degrees	Soil zone	Vegetation community	Materials
1	2158	Transition	48TE958	50	200	12	26,11,35 63,34,72,74	obsidian
1	2207	Transition	48TE954	183	150	12	64	quartzite, obsidian, sandstone
2	2585	Canadian	IF-2	15	144	10	61,27,26, 22,211	obsidian
2	2646	Canadian	48TE962	10	205	10	27,61,211,710	obsidian
2	2632	Canadian	IF-3	15	99	19	710,51,71-73, 71-72,26,22, 211-212	obsidian
2	1951	Transition	48TE951	15	230	16	64	obsidian
2	1975	Transition	48TE952	450	279	16	64	obsidian
2	1840	Upper Sonoran	48TE953	20	228	12	64	obsidian
2	2207	Transition	IF-6	15	248	17	22,11,26 61-62,35, 72-71,34, 72-74,23,62	obsidian
3	2937	Hudsonian	IF-4	490	175	10	72,212,72-71, 71,51,211	obsidian
3	2268	Transition	48TE959	30	252	12	64	obsidian, quartzite
4	2707	Canadian	IF-1	335	308	10	61-62,212,26, 710,72,78-77, 78,23,27,71-72	obsidian
4	2926	Hudsonian	48TE963	60	237	10	71,710,51,211	basalt, obsidian, porcelanite, quartzite
4	2134	Transition	IF-7	10	128	19	11-77,26	skull
5	2926	Hudsonian	IF-5	50	218	10	51,211,212, 71,710	obsidian
5	2585	Canadian	48TE956	380	162	12	71-73,22,28, 78,26,23,710, 71-74,212, 23-74,27	obsidian, quartzite

It was found that there is a selective process or clustering as to the preference of streams. In stream hierarchy number one, immediately adjoining the main water artery, in this case the Snake River, there are two localities, 48TE954 at a distance of 183 meters from the stream and 48TE958 at a distance of 50 meters. On the other hand, stream hierarchy number two, adjoining stream number one, shows the major clustering of proveniences. 48TE962 was found 10 meters from a number two stream, 48TE951 at a distance of 15 meters, 48TE952 at a distance of 450 meters, and 48TE953 at a distance of 20 meters. IF-2, IF-3, and IF-6 were also found in the proximity of number two type streams, all at a distance of 15 meters from water. On rank number three streams only one site and one isolate were found. 48TE959 lies at a distance of 30 meters and IF-4 at a distance of 490 meters from water. In the vicinity of hierarchy number four streams, 48TE963 and isolate numbers one and seven were found at distances of 10, 60, and 335 meters respectively. In proximity to hierarchy number five streams, the last rank on this schematic hierarchy, one site was found as well as one isolate. 48TE956 was found at a distance of 380 meters while IF-5 was found at a distance of 50 meters.

Aspect as a Selective Variable for the Location of Archeological Sites

Aspect is an environmental variable which is used to measure maximum exposure to the sun. If exposure to the sun is as important as it is presumed to be, sites will be expected to cluster within a given exposure range. In considering environmental constraints and the periodic maximization of favorable environmental conditions for occupation or use by prehistoric and early historical inhabitants as well as migratory mammals, maximization of exposure to the sun would be of even greater importance in this particular region because the climate tends to be extremely cold during the winter months and cool/moist during the height of the summer.

Aspect, often loosely described as site exposure, is an important criterion for site selection. It is defined as the direction which a slope faces, or the downhill orientation expressed as a compass heading. Aspect is calculated from USGS topographic quadrangles by taking a reading perpendicular to the contours of the site area. In clockwise rotation from the magnetic North Pole. Because of the eliptical nature of the sun's orbit, the earth is closest to the sun on January 3, and farthest from the sun on July 4. As the earth moves through its orbit, the axis of rotation is always inclined at 66.5^{o} from a line perpendicular to the equator, and the polar axis always points to the same spot in the heavens. Because of this constant inclination of the axis, the North Pole of the earth will be tilted 23.5^{o} away from the sun on December 22 (winter solstice). On June 21 (summer solstice) the North Pole will be tilted 23.5^{o} towards the sun. On March 21 (vernal equinox) and September 23 (autumnal equinox) the North Pole is perpendicular to the sun. Thus, the vertical rays of the sun will continually change position, moving through a span from the Tropic of Cancer 23.5^{o} north to the Tropic of Capricorn 23.5^{o} south. This progression of the vertical sun rays is the basis for the seasons of the earth. In addition to these astrophysical and geophysical dynamics, there is also the curvature of the earth along with the altitudinal dimensions of particular land forms which also influence sunlight/caloric intake of a particular region.

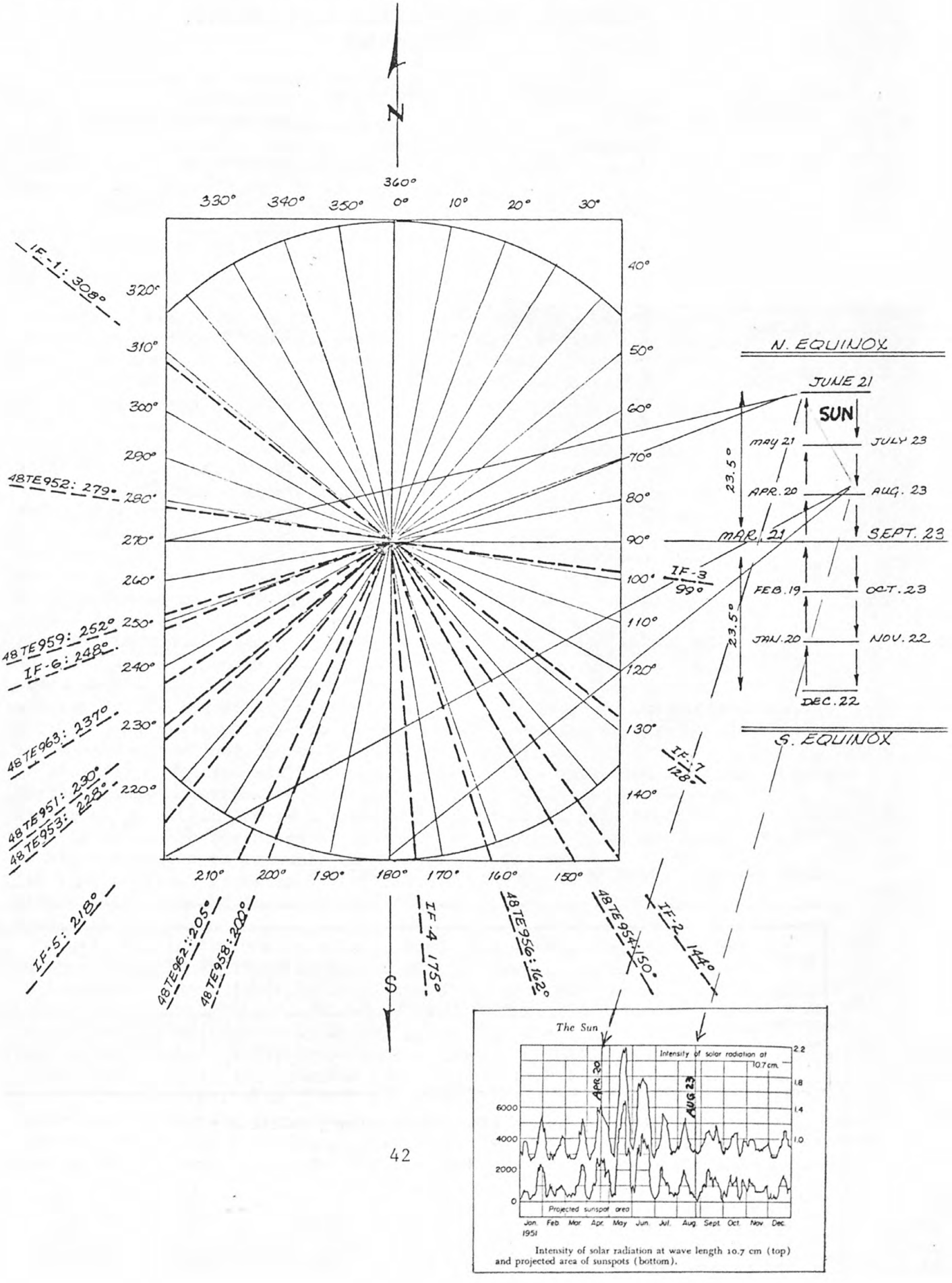
For the purposes of this analysis, maximum exposure to the sun is defined as the period of maximum intensity of sun radiation corresponding with the calories from the sun, hence, growing season. This maximum intensity correlates with the sun's equinox or the yearly movement of the sun on the horizontal plane, between points of 23.5^{o} to the north and 23.5^{o} to the south of the equator. This information may be used to indicate seasonality of occupation; in other words, archeological sites are expected to be located on south, southwest, and west-facing slopes or benches if their season of occupation is during the height of the summer.

The Bridger-Teton National Forest area of northern Wyoming is located between $43^{o}15'$ and $43^{o}30'$ latitude which means that the sun's rays are perpendicular to the equator on the 21st of March and the 23rd of September. The sun's rays are hitting the Bridger-Teton area at an angle of $46^{o}45'$ at this time. The sun's heating power is about 0.29 calories per square inch per minute at the equator (Kiepenheuer 1960:46) and 0.14 calories per square inch per minute in the Bridger-Teton National Forest. Translated to the 23.5^{o} of the June 21 or summer solstice, the caloric intake of the area would be 0.19 calories per square inch per minute. This caloric intake would be further re-

duced by altitudinal variations of the localized topography. In terms of the actual intensity of radiation from the sun, it appears that between April 20 and August 23, the sun goes through its highest intensity of activity and maximum exposure of sun spots (Kiepenheuer 1960: 146).

It was found that prehistoric and early historical inhabitants as well as migratory mammals of the northern plains indeed visited the Tetons during the summer months (Figure 17). The majority of the localities (six sites, two isolates) were found to occur on southwest-facing slopes and benches and, to a lesser degree, on the southeast-facing slopes and benches (two sites, four isolates). Two localities (one site, one isolate) were found on northwest-facing slopes and benches. Those sites located on southwest-facing slopes and benches appear to be directly correlated to the summer solstice at which time, the caloric intake of the area is at its highest. This conclusion is based on the aspect of sites as well as those of the isolates. It should be noted that the isolates could be located at random without any pattern as to the seasonality as reflected by the aspect. Localities IF-1 and IF-3 (Isolates TL-1 and TL-4) were found at 308^{o} and 99^{o} respectively, outside of the preferred aspect. It follows that when the angles of aspect of each provenience were subjected to a statistical manipulation of chi-square, the following results, shown on Table 10 and Figure 18, were obtained.

Figure 17. Correlation of aspect with equinox and solar radiation.



Intensity of solar radiation at wave length 10.7 cm (top) and projected area of sunspots (bottom).

Table 10. Statistical Analysis of Aspect.
(Chi-Square)

First Distribution			Second Distribution		
Degrees	O	E	Degrees	O	E
0-45	0	2	0-90	0	4
46-90	0	2	91-180	6	4
91-135	2	2	181-270	8	4
136-180	4	2	271-360	2	4
181-225	3	2			
226-270	5	2			
271-315	2	2			
316-360	0	2			

$\frac{(O-E)^2}{E}$

$\frac{2^2+2^2+0^2+2^2+1^2+3^2+0^2+2^2}{2}$

$= \frac{4+4+0+4+1+9+0+4}{2}$

$= \frac{26}{2} = 13 = X_7^2$

P - .075

$\frac{(O-E)^2}{E}$

$\frac{4^2+2^2+4^2+2^2}{4}$

$= \frac{16+4+16+4}{4} = \frac{40}{4} = 10$

$= X_3^2$

P - .013

Conclusions: There is a clustering by quadrant.

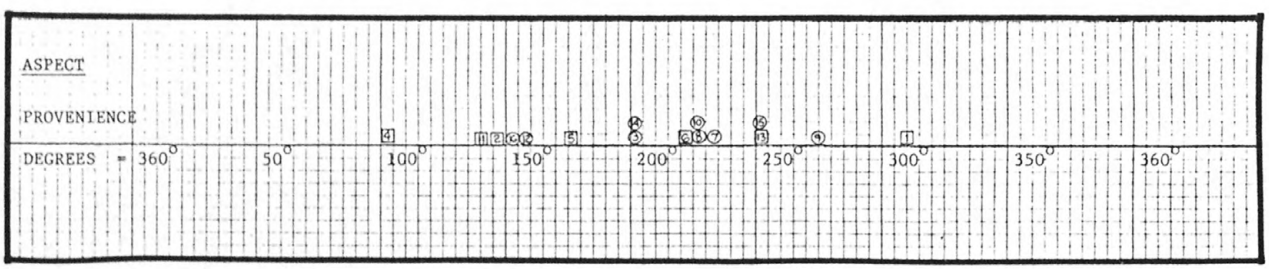


Figure 18. Clustering profile.

CONCLUSIONS

During the application of the proposed statistics model several conclusions became evident. The variables proposed here as possible tools of predictability are indeed valid, provided a larger sample of the Bridger-Teton area is obtained. Conclusions drawn from mathematical relationships of 16 cultural localities from a 5.7% sample of more than 32,580 acres proved to be unreliable.

An analysis of the variables of slope and elevation showed that a clustering of sites did exist when lower elevations and level areas coincided. It is impossible to determine the function of these sites (due to insufficient amounts of diagnostic cultural material) and how long they may have been occupied. Certainly the ecology of the area offers opportunities for both extended and brief visits. The conclusions reached from the measuring of the aspect, vegetation, and fauna variables was that such occupations were seasonal. Site 48TE963 shows that there is a correlation between site location and migratory routes of elk, deer, bighorn sheep, and possibly timber buffalo (J.D. Love 1980: personal communication). The presence of obsidian and quartzite debitage at all localities suggests tool manufacture/retouching activities more than plant processing. The evidence found at at least one site (48TE963) suggest kill-butchering activity. Excavation of selected sites is necessary to interpret socio-economic site types.

Site 48TE963 is located on the northeast side of Cache Creek, on the mountain pass connecting the west drainage of the Cache Creek to the east drainage of Granite Creek. This site contains several types of lithic material such as obsidian, basalt, porcelanite, and quartzite. Basalt, as cultural material, was not found at any other locality. Excavation is needed to determine the site function. At site 48TE954, in addition to obsidian and quartzite, a fragment of a sandstone metate was found. The presence of ground stone may indicate a plant processing site. With the exception of four probable side-notched projectile points, it is virtually impossible to give any temporal designations to the localities found during the survey. Even if obsidian hydration analysis was performed, the fact that they are surface finds makes positive dating unlikely. Most of the localities appear to be within the Late Archaic-Early Historic periods.

Based on the hierarchy of stream types and proximity to water, localities tended to concentrate near streams of types 2, 1, and 3 (in that order). In terms of proximity to water, it was found that almost all sites and isolates were indeed located within 100 m of a permanent water source.

Soil was found to play an important role in the location of sites in this area. Soil types 10 and 12 are followed by types 16, 17, and 19 in order of importance to locality selection. For the most part, type 12 offered the best location of the archeological sites, followed by type 10. Soil type 12 is mainly found in the bottomlands at lower elevations, while type 10 is primarily located in uplands at 2600 to 3000 m in the Hudsonian-Canadian buffer zone.

The statistical study performed by the Statistics Department at the University of Wyoming suggested no preference as to vegetation types. However, due to the creation of vegetative type 64 for those localities outside of the vegetation map, a false trend is suggested -- the appearance

of a preference for type 64.

An aspect or degree of exposure to the sun was established for each locality during the survey. A definite preference was indicated for the southwest-facing aspect during the summer equinox, at the time of the highest caloric intake of the area, which could indicate seasonality.

In conclusion, it was found that localities were most likely to occur on bottomlands within the Upper Sonoran life zone between 1800 and 2400 m of elevation. The data suggests that when and where these variables occur in tandem, the probability of the occurence of sites increases. Whenever these ideal conditions exist in proposed impact areas, on-site evaluation should be made by a qualified archeologist.

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APPENDIX A:

LOCALITY FORMS

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-1 State # IF-1

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12; 531080 mE 4806800 mN

NE/NE/NE (2375 FSL, 300 FEL) Sec. 22 -T 40N -R 115W

The isolate is located on an interdrainage divide c. 70 m south of the Granite Highland Trail and c. 1180 m SW of Cache Peak.

Environmental zone Canadian (8000-9500')

Soil zone Alpine glaciated lands

Vegetation zone Montane/Subalpine (see p.)

Distance to water 335 m; Water type perennial Name N. Fk. Horse Creek

Elevation 2706 m 8880 ft; Gradient of slope 30 . %; Aspect 308°

Physical appearance The isolate was found in a NE-SW trending saddle on a high interdrainage divide between the waters of Horse and Cache creeks. The divide is grass-covered and the slopes are somewhat stabilized.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm

Horizontal: 0 m (isolate)

Cultural materials observed

01: utilized, secondary decortication flake of black obsidian (not collected)

Prehistoric features none

Historic features The Granite Highline Trail passes c. 75 m NE of the locality.

AS 80-WY-1634 Site # TL-1 (IF-1)

Site description An isolated obsidian flake was found in a saddle on the high inter-drainage divide separating the Horse Creek and the Cache Creek drainage systems. The saddle is covered with tall, thick grasses and the surface is stabilized. A small erosional cut on the SE slope of the divide revealed a topsoil deposition possibly containing buried materials.

Suggested use/function of site temporary camp along migration route*

Suggested age or period prehistoric

Integrity of site Fair. No significant erosion has affected the site area, so buried deposits could exist.

Research potential: ____good, XX fair, ____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ____stratified deposits

? camp design, ? component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; ____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

XX Limited evaluative testing

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES *(Love: personal communication)

XX photos; No collection (____items); samples ____

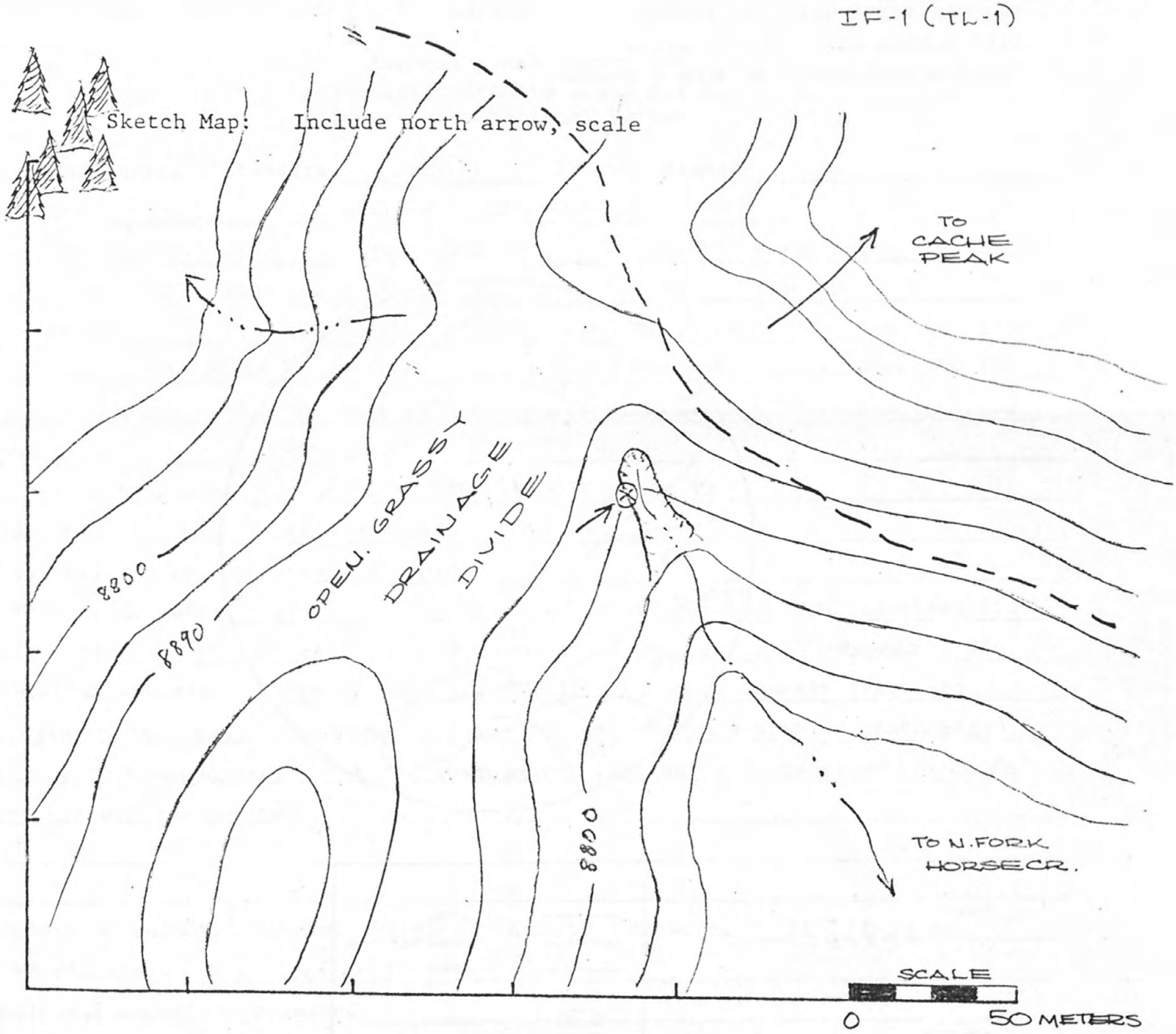
Appended pages: ____discussion, ____tool inventory, XX maps

Recorder A. Ortiz, J. Bundy

Date 9/15/80

AS 80-WY-1634
IF-1 (TL-1)

Sketch Map: Include north arrow, scale



⊗ = OBSIDIAN CORTEX FLAKE

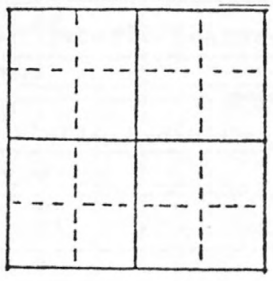
= EROSIONAL CUT

= GRANITE HIGHLINE TRAIL

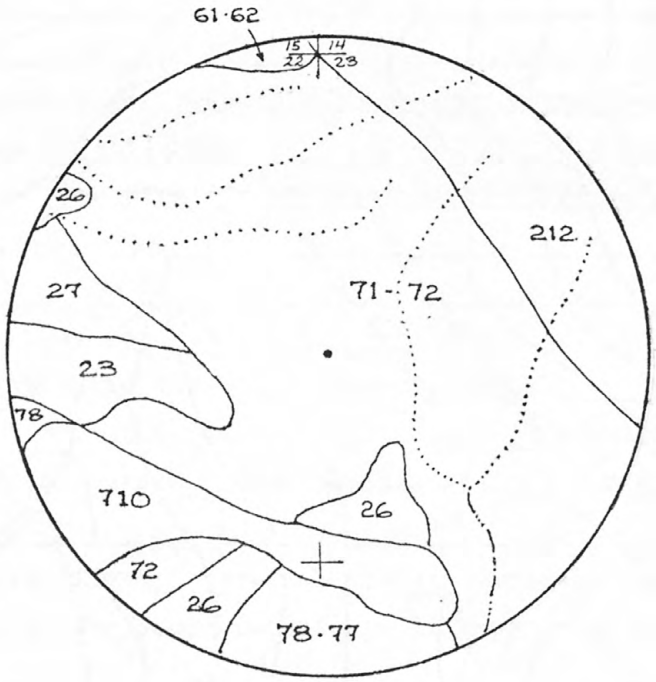
S. Lee

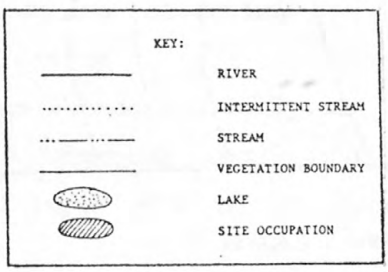
N

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-1 (FIELD #TL-1)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
23	SUBALPINE FIR, MOUNTAIN ARNICA	5.44
26	SUBALPINE FIR, MOUNTAIN MAPLE	4.99
27	SUBALPINE FIR, BLUE HUCKLEBERRY	3.66
61-62	QUAKING ASPEN, LOVAGE, COW CABBAGE	0.88
71-72	LOVAGE, ROSE SHRUB, LARKSPUR, COW CABBAGE, LUNGWORT	55.77
72	COW CABBAGE, LUNGWORT	1.66
77-78	SAGEBRUSH, MOUNTAIN SNOWBERRY, BLUEBUNCH WHEATGRASS, IDAHO FESCUE	5.11
78	SAGEBRUSH, MOUNTAIN SNOWBERRY	0.44
212	SUBALPINE FIR, MOUNTAIN GOOSEBERRY, WHITEBARK PINE	12.77
710	ROCK TALUS	9.22

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-2 State # IF-2

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 534770 mE 4804280 mN

SW/NE/NW (800 FNL, 1900 FWL) Sec. 36 -T 40N -R 115W

The isolate was found in an open, sloping field east of Blackman Creek c. 245 m SW of where the southern route of the Granite Highline Trail crosses Blackman Creek.

Environmental zone Canadian (8000-9500')

Soil zone Alpine glaciated lands

Vegetation zone Montane/Subalpine (see p.)

Distance to water 15 m; Water type perennial Name Blackman Creek

Elevation 2584 m 8480 ft; Gradient of slope 2 . %; Aspect 144°

Physical appearance The isolate was found in an open, densely gravelled, sloping meadow east of Blackman Creek. The site is on a sloping bench which begins to descend rapidly to the south, dropping over a distance of 1.6 km to the Horse Creek bottom.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm

Horizontal: 0 m (isolate)

Cultural materials observed

01: small interior (micro) flake of black obsidian (not collected)

Prehistoric features none observed

Historic features The Granite Highline Trail passes c. 215 m NE of the locality.

AS 80-WY-1634 Site # TL-2 (IF-2)

Site description An isolated obsidian flake was found on an open, densely gravelled meadow on the east side of Blackman Creek. The site is on a gradually sloping bench which descends to the Horse Creek Valley to the south. Although the first 10 cm of soils have been disturbed, there may be buried cultural materials at greater depths.

Suggested use/function of site Unknown

Suggested age or period prehistoric

Integrity of site Fair. The surface at the site is badly heaved and loose from severe frost action and sheet erosion. It is unlikely that the first 10 cm of soil contains undisturbed deposits.

Research potential: ____good, XX fair, ____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ____ component identification, ____ subsistence data,

? paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; ____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

XX Limited evaluative testing

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES

____photos; No collection (____items); samples ____

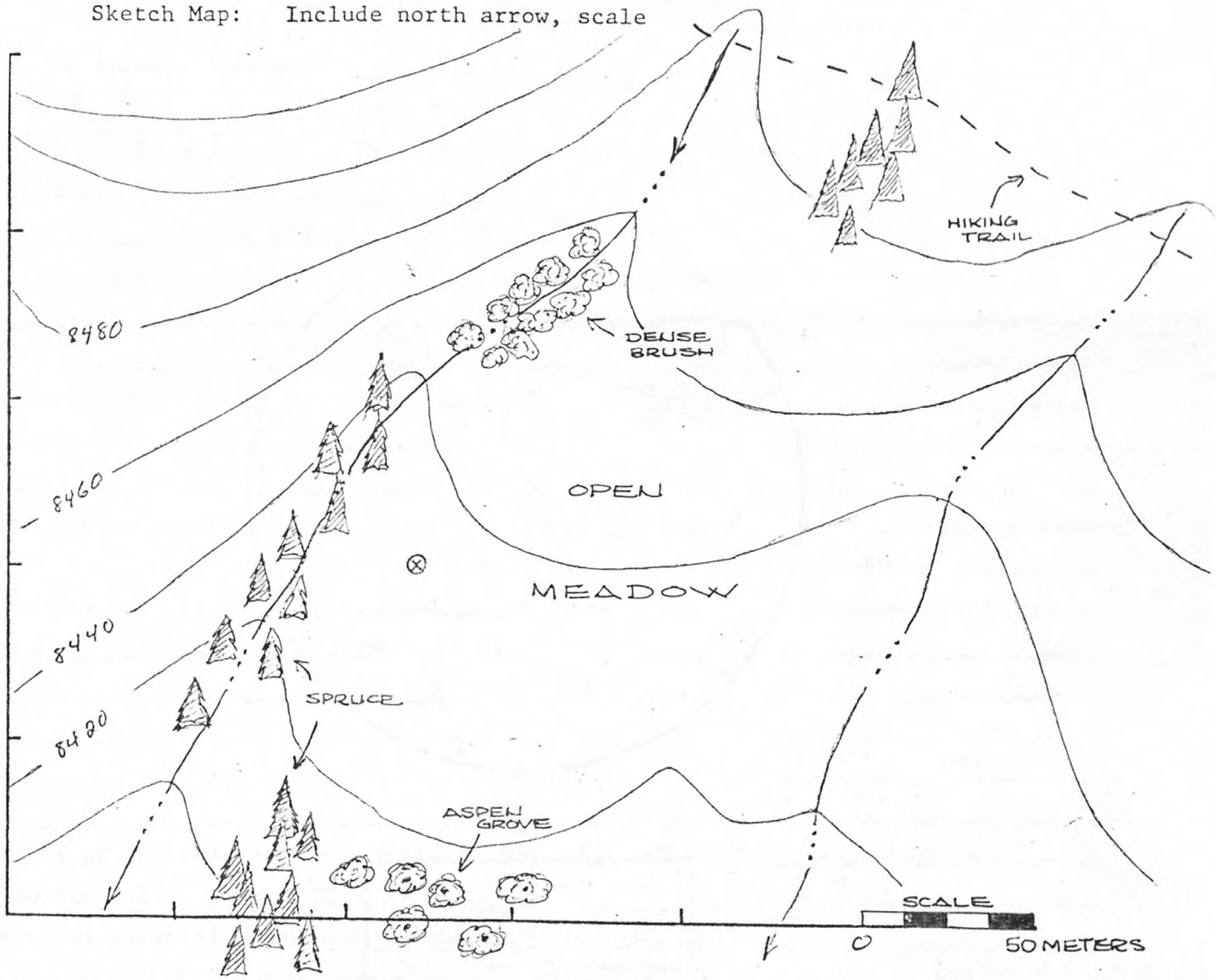
Appended pages: ____discussion, ____tool inventory, XX maps

Recorder A. Ortiz, J. Bundy

Date 9/16/80

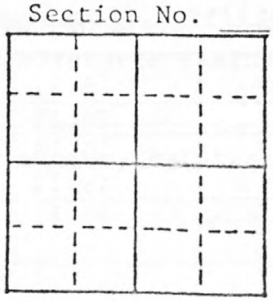
AS 80-WY-1634
IF-2 (TL-2)

Sketch Map: Include north arrow, scale

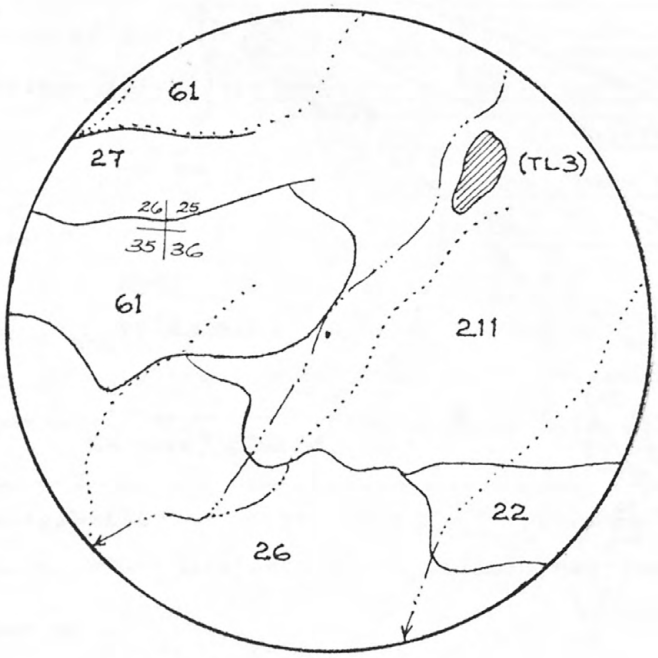


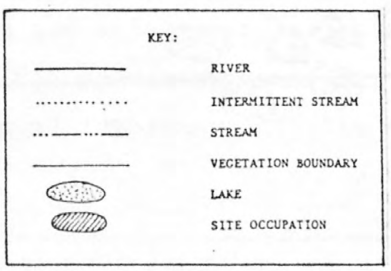
S. Lau

Location
Section No. ____



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-2 (FIELD #TL-2)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
22	SUBALPINE FIR, MOUNTAIN SWEETROOT	5.11
26	SUBALPINE FIR, MOUNTAIN MAPLE	24.55
27	SUBALPINE FIR, BLUE HUCKLEBERRY	6.11
61	QUAKING ASPEN, LOVAGE	19.11
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	45.11

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-3 State # 48TE962

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 534410 mE 4804700 mN

W/SW/NW (850 FSL, 2100 FEL) Sec. 25 -T 40N -R 115W

The site begins c. 10 meters east of Blackman Creek and c. 40 meters SW of the Granite Highline Trail.

Environmental zone Canadian (8000-9500')

Soil zone Alpine glaciated lands

Vegetation zone Montane (see p.)

Distance to water 10 m; Water type perennial Name Blackman Creek

Elevation 2646 m 8680 ft; Gradient of slope 7 . %; Aspect 205°

Physical appearance The site is on a gradually ascending, sloping meadow at the foot of the sheer, rocky Gros Peak.

Extent of cultural debris: Vertical (est. XX measured): 0-30 cm

Horizontal: 300 m NS x 150 m EW

Cultural materials observed (SEE CONTINUATION SHEET)

01: utilized flake with cortex on ventral side (28 x 35 x 11 mm) of black obsidian (collected)

02: crude biface (?) (31 x 29 x 12 mm) of black obsidian (collected)

03: unifacially worked side-notched projectile point fragment (17 x 15 x 3 mm) of black obsidian (collected)

04: utilized secondary decortication flake (23 x 23 x 3 mm) of black obsidian (collected)

05: small, utilized interior flake (15 x 14 x 3 mm) of black obsidian (collected)

Prehistoric features none

Historic features The Granite Highline Trail passes c. 30 m NE of the locality.

AS 80-WY-1634 Site # TL-3 (48TE962)

Site description A moderate lithic scatter with obsidian flakes, a projectile point fragment, and a crude biface was found immediately east of Blackman Creek at the foot of Gros Peak in an open, gradually sloping alpine meadow. There was no evidence of core sampling or of nucleation of cultural materials.

Suggested use/function of site hunting camp

Suggested age or period Late Prehistoric (?)

Integrity of site Good. The surface at the site seems to be firm and disturbed very little. Therefore, there seems to be a high potential for buried deposits.

Research potential: XX good, ____ fair, ____ no.

XX age (____ C14, XX obsidian, XX diagnostic tools), ? stratified deposits

? camp design, ? component identification, ? subsistence data,

? paleo-environmental data, ? chronological info.; other ____

National Register eligibility: ____ probably; ____ probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

____ Limited evaluative testing

XX Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES

XX photos; XX collection (5 items); samples tools, obsidian flakes

Appended pages: ____ discussion, XX tool inventory, XX maps

Recorder Carlos Caraveo, Stephen Lau

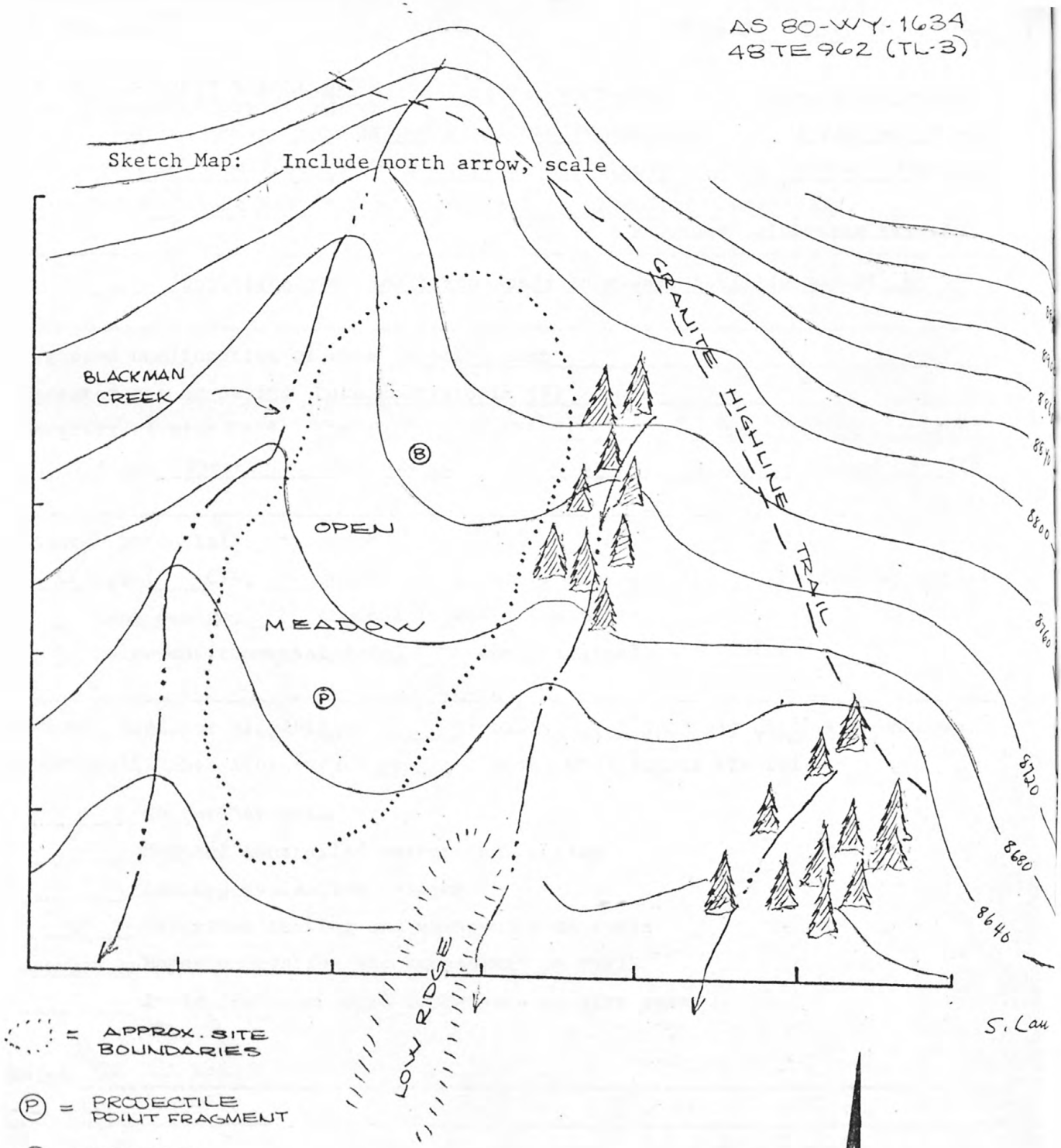
Date 9/21/80

Cultural Materials Observed:

c. 50 non-utilized flakes of black obsidian (not collected)

AS 80-WY-1634
48TE962 (TL-3)

Sketch Map: Include north arrow, scale



= APPROX. SITE BOUNDARIES

Ⓟ = PROJECTILE POINT FRAGMENT

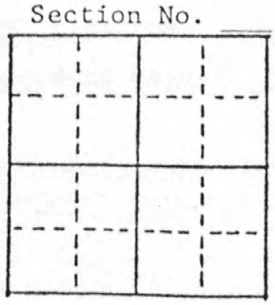
Ⓑ = BIFACE

N

SCALE

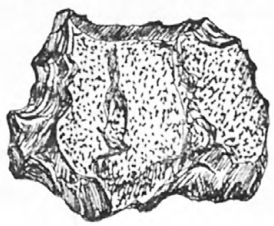
0 75 METERS

Location
Section No. ____



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48 TE 962

01



Utilized Flake with Cortex
Black Obsidian

ER

02

Crude Biface (?)
Black Obsidian

ER

03

Projectile Point Fragment
Black Obsidian

ER

04

Decortication Flake
Black Obsidian

ER

05

Utilized Interior Flake
Black Obsidian

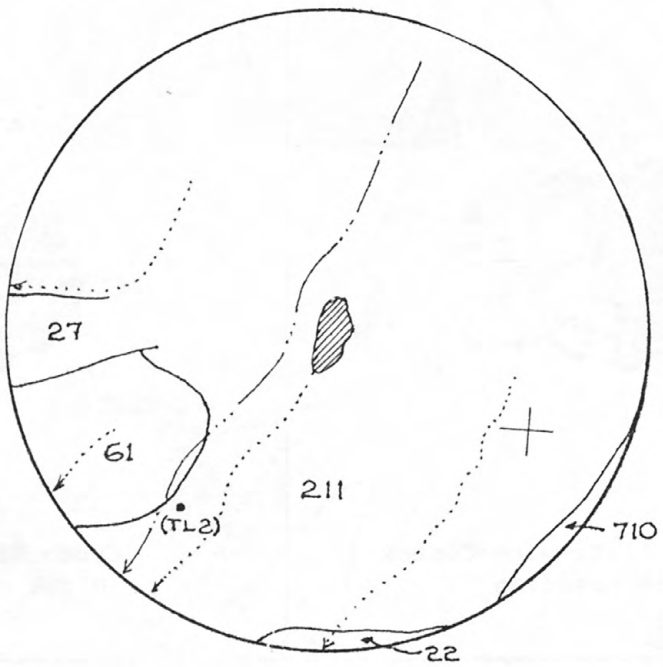
ER

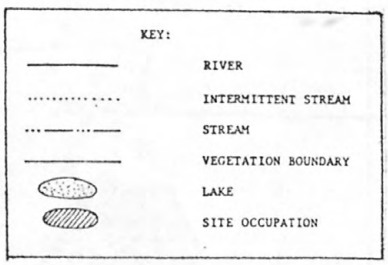
E Rosenberg

0 1 2 3 4 5
5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE962 (FIELD #TL-3)

Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
27	SUBALPINE FIR, BLUE HUCKLEBERRY	3.0
61	QUAKING ASPEN, LOVAGE	7.2
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	88.8
710	ROCK TALUS	0.8

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-4 State # IF-3

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 535140 mE 4803280 mN

SE/NE/SW (1400 FSL, 1900 FWL) Sec. 31 -T 39N -R 115W

The isolates are located just north of an unnamed northern branch of Horse Creek in a wooded, sloping area 335 m WSW of the point where the south route of the Highline Trail crosses the creek.

Environmental zone Canadian (8000-9500')

Soil zone Rolling glaciated deposits, forested

Vegetation zone Montane (see p.)

Distance to water 15 m; Water type perennial Name none

Elevation 2632 m 8635 ft; Gradient of slope 10 . %; Aspect 99°

Physical appearance The locality area is wooded and slopes gently to the west. It borders a perennial, rapid running tributary of Horse Creek. The surface is covered with a layer of humus from the forest and is densely gravelled with quartz and igneous cobbles.

Extent of cultural debris: Vertical (est. XX measured): 0-30 cm

Horizontal: 1 m

Cultural materials observed

01: secondary decortication flake of black obsidian (not collected)

02: secondary decortication flake of black obsidian (not collected)

Prehistoric features none

Historic features none

AS 80-WY-1634 Site # TL-4 (IF-3)

Site description Two obsidian cortex flakes were found in a wooded area adjacent to a northern tributary of Horse Creek. The site area is gently sloping to the west and a layer of humus covers densely gravelled sandy soil. The surface is stabilized and buried deposits seem to be indicated.

Suggested use/function of site temporary hunting camp

Suggested age or period prehistoric

Integrity of site Fair. Surface is stabilized by humus cover from forest.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES

_____photos; No collection (_____items); samples _____

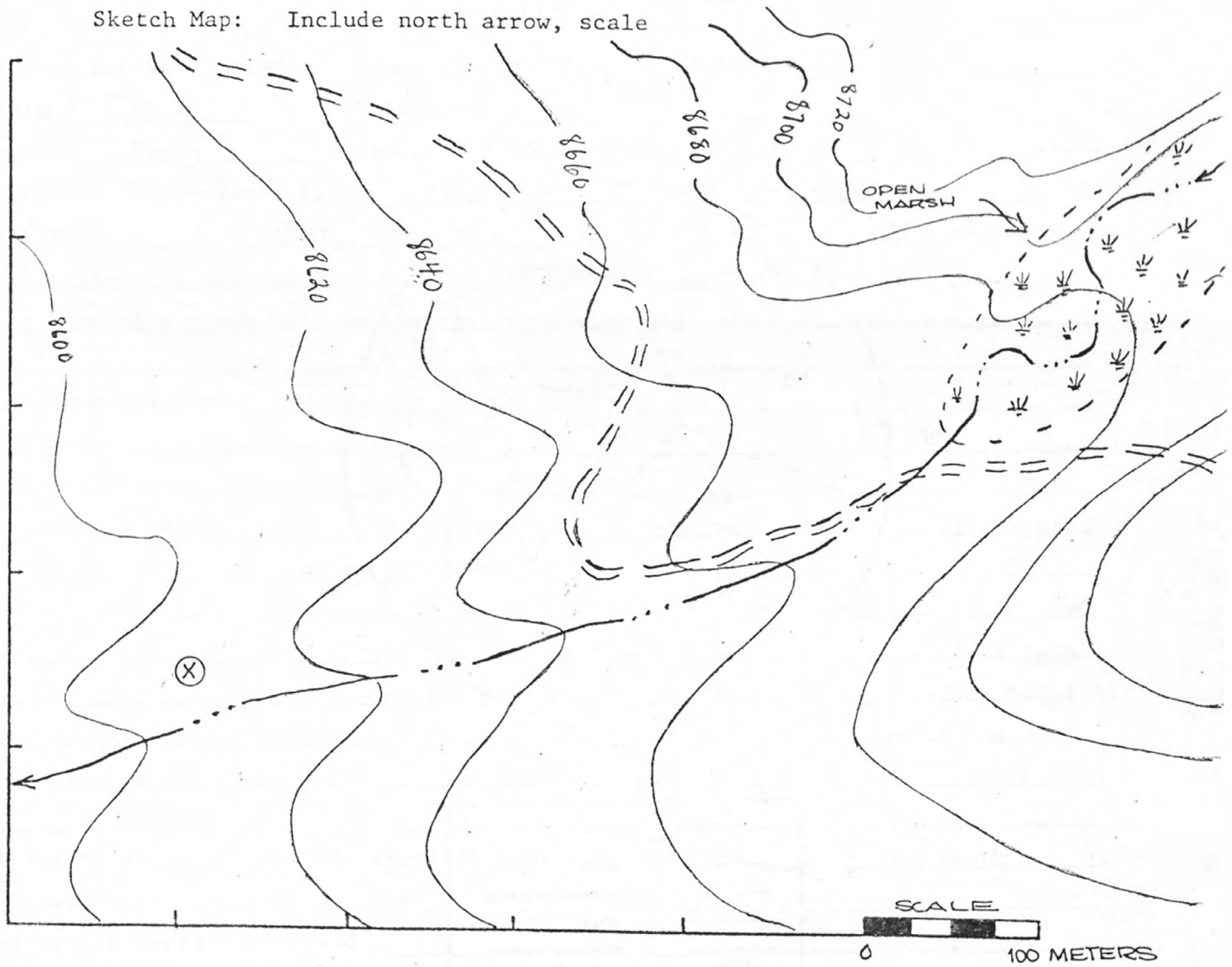
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Albert Ortiz

Date 9/19/80

AS 80-WY-1634
IF-3 (TL-4)

Sketch Map: Include north arrow, scale



= GRANITE HIGHLINE PACK TRAIL

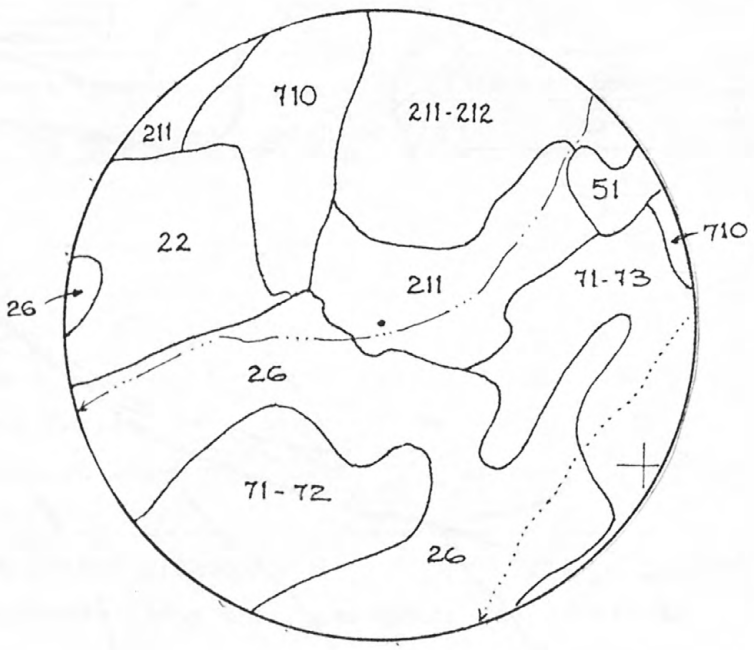
⊗ = OBSIDIAN FLAKES

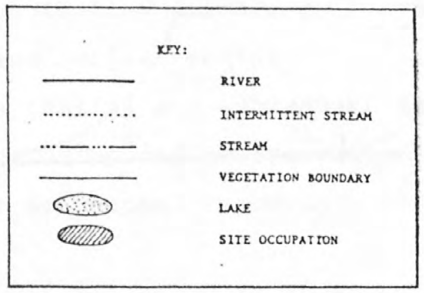
S. Lan

N

Location
Section No. ____

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-3 (FIELD #TL-4)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
22	SUBALPINE FIR	10.11
26	SUBALPINE FIR, BLUE HUCKLEBERRY MOUNTAIN MAPLE	36.00
51	WHITEBARK PINE, GROUSE WHORTLEBERRY	1.88
71-72	LOVAGE, ROSE SHRUB, LARKSPUR, COW CABBAGE, LUNGWORT	13.77
71-73	LOVAGE, ROSE SHRUB, LARKSPUR, GIANT HYSSOP	12.44
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	11.33
211-212	SUBALPINE FIR, GROUSE WHORTLEBERRY, MOUNTAIN GOOSEBERRY, WHITEBARK PINE	13.88
710	ROCK TALUS	0.55

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-5 State # IF-4

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 531210 mE 4810310 mN

NW/SE/NE (1500 FNL, 750 FEL) Sec. 10 -T 40N -R 115W

The isolate is located just west of the Goodwin Lake-Cache Peak Pack Trail at the base of a steep hill on the divide between Flat and Nowlin creeks.

Environmental zone Hudsonian (9500-11500')

Soil zone Alpine glaciated lands

Vegetation zone Montane (see p.)

Distance to water 490 m; Water type headwaters Name Flat Creek

Elevation 2937 m 9635 ft; Gradient of slope 2 . %; Aspect 175°

Physical appearance The isolate was found on a flat, open bench at the foot of a sheer, talus-littered slope. The bench is bound on the west by a cliff face, on the east by a low, tree-covered hillock, and on the north by a nearly vertical drop. The surface of the site is a boggy, exposed humus vegetated by thick clumps of short grass. Forest surrounds the site area.

Extent of cultural debris: Vertical (est. XX measured): 0-1 meter

Horizontal: 0 m (isolate)

Cultural materials observed

01: small interior flake of black obsidian (not collected)

Prehistoric features none

Historic features modern fire hearth. The Goodwin Lake-Cache Peak Pack Trail passes c. 45 m SW of the locality.

AS 80-WY-1634 Site # TL-5 (IF-4)

Site description An isolated obsidian interior flake was found on a flat, exposed bench area at the base of a sheer, talus-littered slope between Jackson and Cache peaks. The surface of the bench is a boggy, exposed humus vegetated with thick clumps of short grass. Stands of conifers surround the bench. The flat, unwashed bench may contain buried materials.

Suggested use/function of site hunting camp

Suggested age or period prehistoric

Integrity of site Good. Flat, unwashed bench area probably contains intact buried deposits.

Research potential: ____good, XX fair, ____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ? component identification, ? subsistence data,

? paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; ____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

XX Limited evaluative testing

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES

____photos; No collection (____items); samples ____

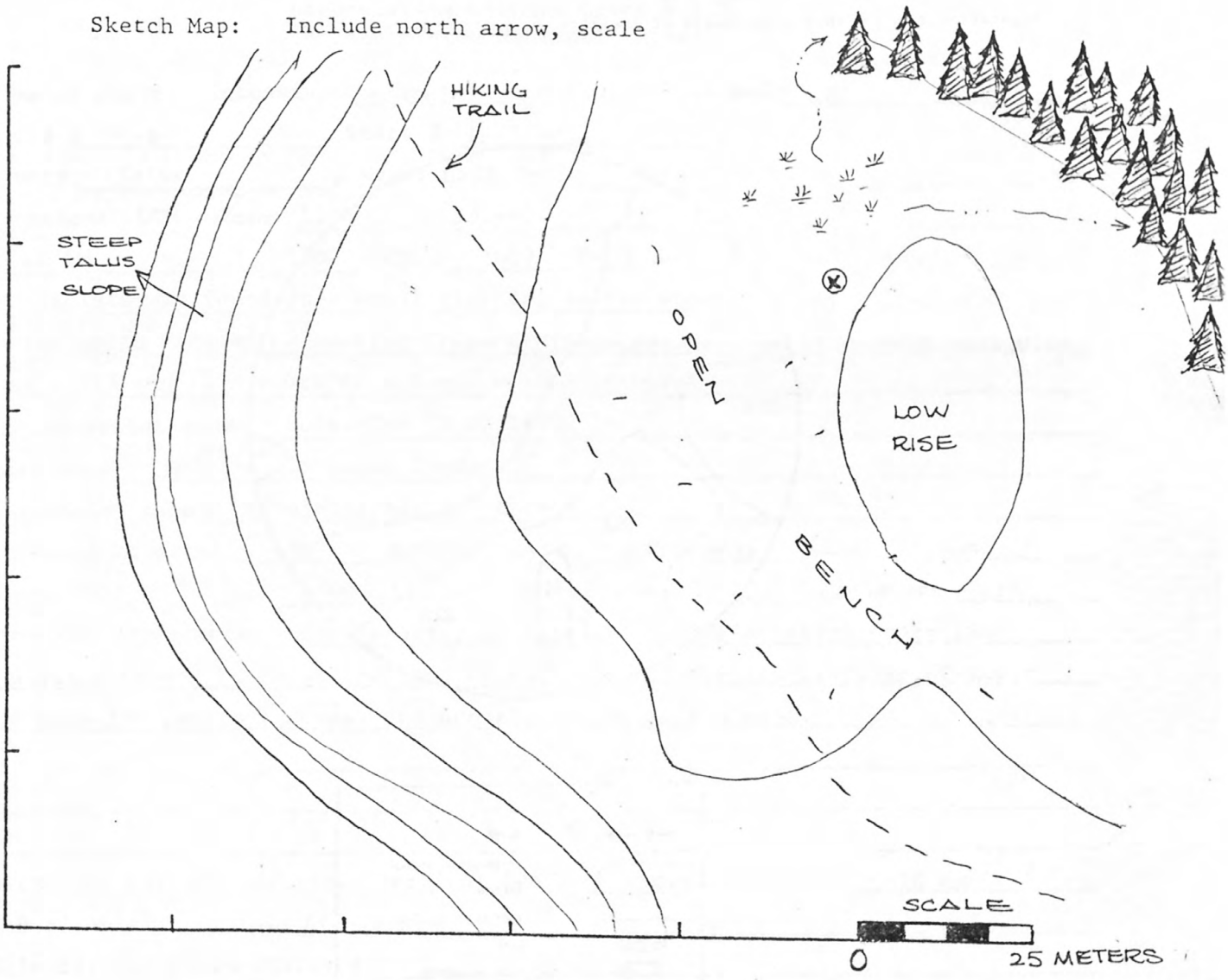
Appended pages: ____discussion, ____tool inventory, XX maps

Recorder Stephen Lau

Date 9/29/80

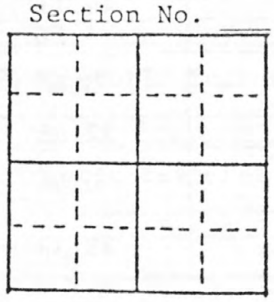
AS 80-WY-1634
IF-4 (TL-5)

Sketch Map: Include north arrow, scale



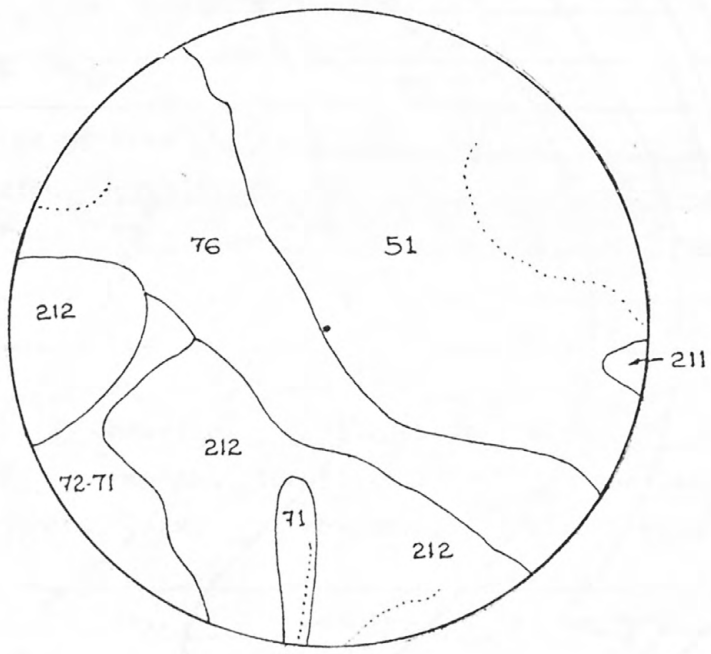
S. Lan

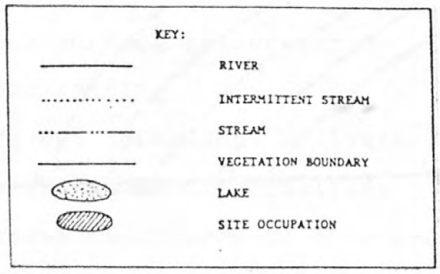
Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-4 (FIELD #TL-5)

Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
51	WHITEBARK PINE, GROUSE WHORTLEBERRY	44.11
71	LOVAGE, ROSE SHRUB, LARKSPUR	1.80
71-72	COW CABBAGE, LUNGWORT, LOVAGE, ROSE SHRUB, LARKSPUR	5.66
76	GOLDEN AVENS	22.66
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	0.44
212	SUBALPINE FIR, MOUNTAIN GOOSEBERRY, WHITEBARK PINE	25.33

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-6 State # IF-5

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 532480 mE 4809670 mN

SW/NE/SW (1300 FSL, 1600 FWL) Sec. 11 -T 40N -R 115W

The isolate was found in a small clearing in the woods east of a low, boggy area on the north face of Cache-Flat Creek drainage divide. It is c. 90 m east of a pack trail and 75 m south of a deep, wooded drainage cut.

Environmental zone Hudsonian (9500-11500')

Soil zone Alpine glaciated lands

Vegetation zone Subalpine/Alpine (see p.)

Distance to water 50 m; Water type marsh/pond Name none

Elevation 2926 m 9600 ft; Gradient of slope 10 . %; Aspect 218°

Physical appearance The locality is situated on a flat ridge projection radiating from a bench at the base of the Cache-Flat Creek drainage divide. The area is open to the west and densely wooded to the east.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm

Horizontal: 0 m (isolate)

Cultural materials observed

01: large cortex flake (52 x 26 x 16 mm) of black obsidian

Prehistoric features none

Historic features A pack trail passes c. 90 m west of the locality.

AS 80-WY-1634 Site # TL-6 (IF-5)

Site description An isolated obsidian cortex flake was found in a small clearing in a spruce grove at the east edge of a broad, grassy bench. The flake was found in the backdirt of an animal burrow. There are wide vistas to the north and east. The artifact is on a bench system on the east side of the Gros Ventre Range (between Jackson and Cache Peaks) on the Flat-Cache Creek divide. The isolate may indicate buried materials.

Suggested use/function of site unknown

Suggested age or period prehistoric

Integrity of site Due to the stabilized nature of the bench, any buried cultural materials should be in context.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ? component identification, ____ subsistence data,

? paleo-environmental data, ? chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES

XX photos; XX collection (1 item); samples _____

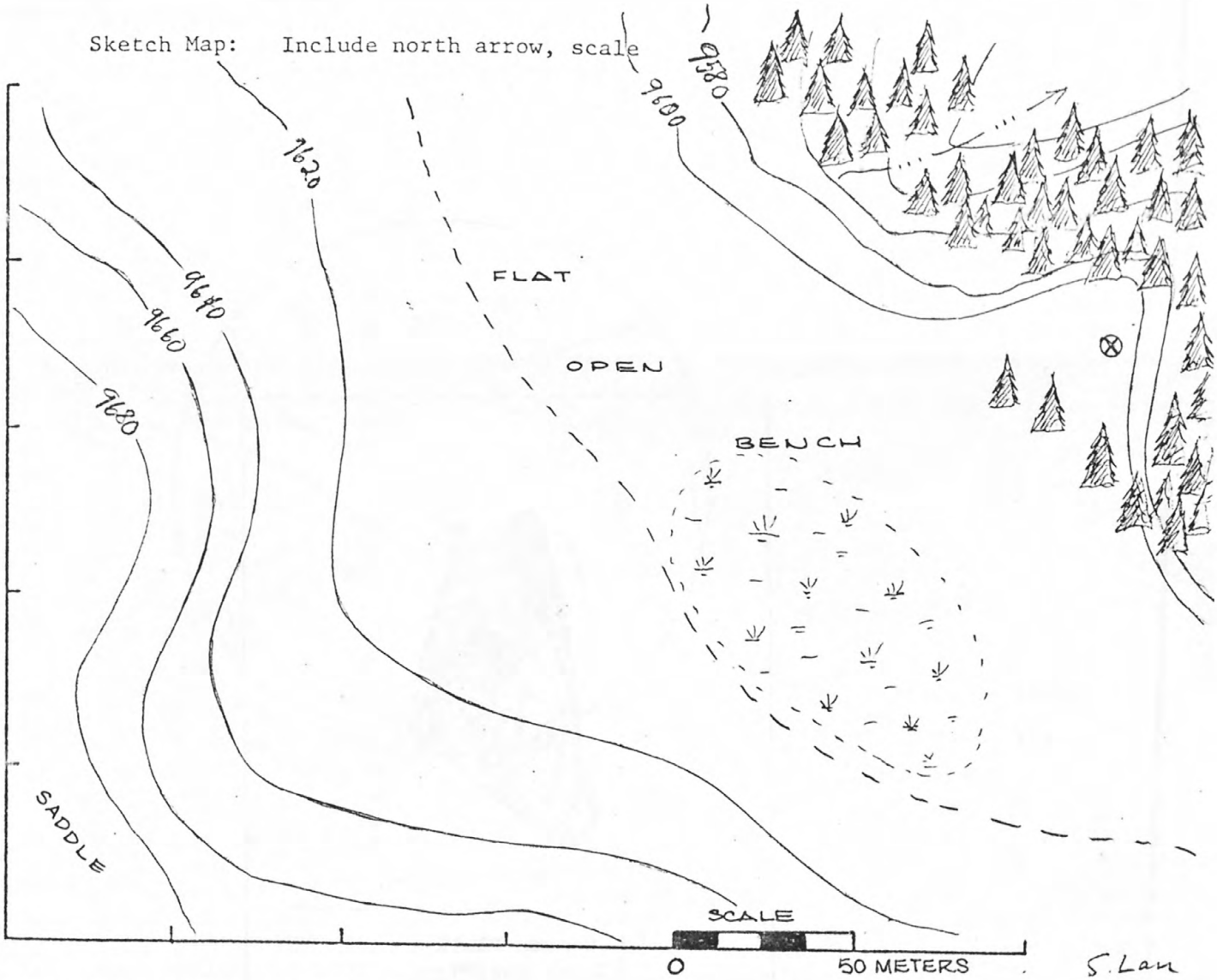
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Stephen Lau

Date 9/29/80

AS 80-WY-1634
IF-5 (TL-6)

Sketch Map: Include north arrow, scale

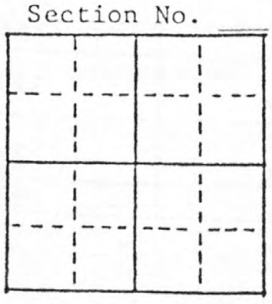


⊗ = OBSIDIAN CORTEX FLAKE

- - - = HIKING TRAIL

N

Location
Section No. ____

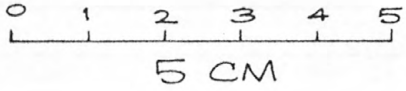


CACHE-LITTLE GRANITE CREEK E
BRIDGER-TETON NATIONAL FORE
IF-5

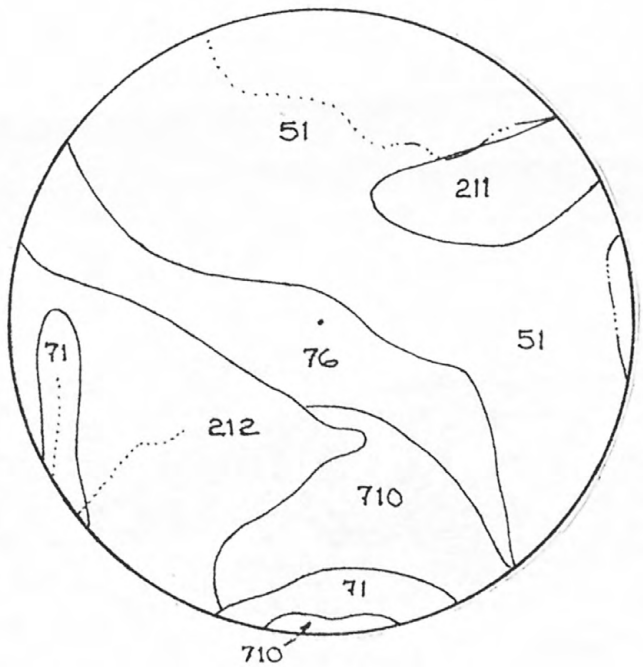
52x26x16

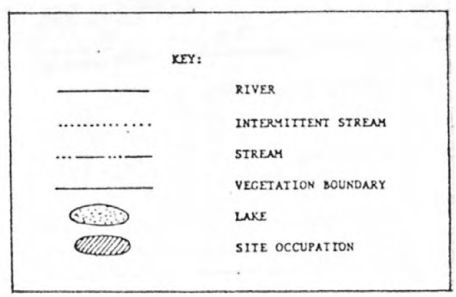
Cortex Flake
Black Obsidian

E Rosenberg



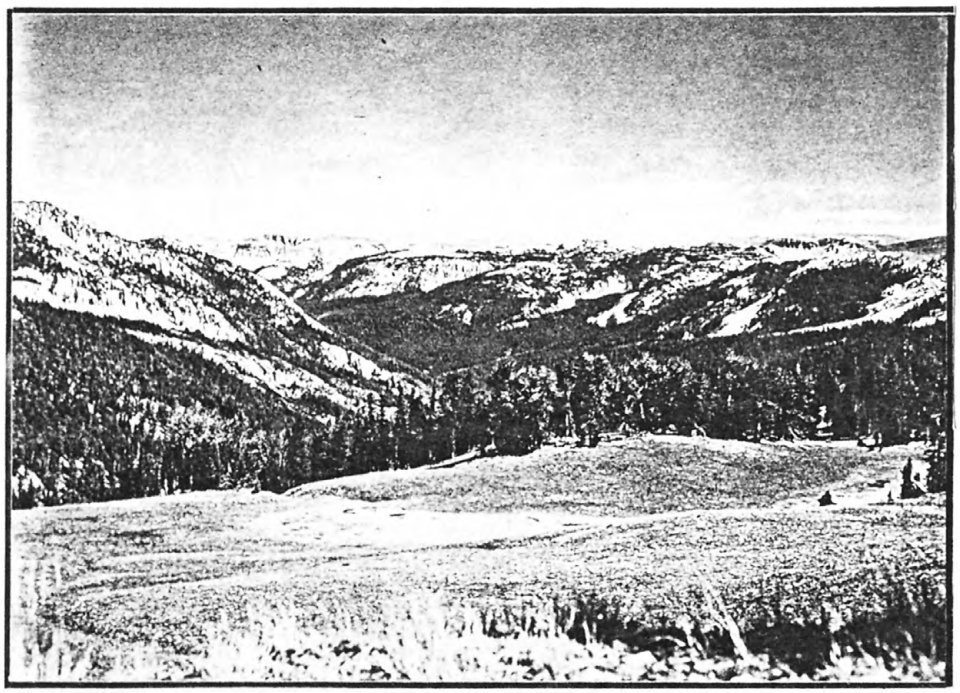
CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-5 (FIELD #TL-6)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
51	WHITEBARK PINE, GROUSE WHORTLEBERRY	46.11
71	LOVAGE, ROSE SHRUB, LARKSPUR	4.55
76	GOLDEN AVENS	14.66
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	6.11
212	SUBALPINE FIR, MOUNTAIN GOOSEBERRY, WHITEBARK PINE	19.11
710	ROCK TALUS	9.44

Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest
AS 80-WY-1634
IF-5



VIEW OF IF-5 LOOKING NORTH.

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # TL-7 State # 48TE963

County Teton, Wyo.; USGS 7½': Turquoise Lake, Wyo.

Location: UTM - Zone 12 ; 533730 mE 4808280 mN

W/NE/SE (1950 FSL, 1150 FEL) Sec. 14 -T 40N -R 115W

The site is located at the head of the southernmost tributary of Flat Creek, in an open meadow on a low, narrow ridge immediately SE of a small pond, c. 0.8 km NE of Cache Peak.

Environmental zone Hudsonian (9500-11500')

Soil zone Alpine glaciated lands

Vegetation zone Subalpine/Alpine (see p.)

Distance to water 60 m; Water type marsh/pond Name none

Elevation 2926 m 9600 ft; Gradient of slope 11 . %; Aspect 237°

Physical appearance The site is situated in an open alpine meadow at the base of Cache Peak. The meadow is on a low, narrow ridge overlooking a marshy depression and pond at the head of the southernmost Flat Creek tributary. The meadow is horseshoe-shaped, ringed by high, talus-covered peaks to the south. The meadow is open except for isolated groves of spruce.

Extent of cultural debris: Vertical (est. XX measured): 0-30 cm

Horizontal: 180 m NS x 60 m EW

Cultural materials observed (SEE CONTINUATION SHEET)

Prehistoric features none

Historic features Fire pits and a modern hunting camp are located across the pond from the site. An unnamed trail passes the south end of the locality.

AS 80-WY-1634 Site # TL-7 (48TE963)

Site description A light lithic scatter was found on a long, low, narrow ridge overlooking a small marshy pond at the head of a major tributary of Flat Creek. About thirteen flakes and four tools of basalt, obsidian, quartzite, and porcelanite were found in an open meadow on the ridge at the edge of a spruce grove. The soils are loose silt and gravels. Channel cutting has revealed considerable deposition.

Suggested use/function of site hunting camp

Suggested age or period Late Prehistoric (?)

Integrity of site Fair. The site surface has been disturbed by frost action and animal burrowing. The area is protected somewhat from serious erosion through channel cutting.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, XX diagnostic tools), ____stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; _____probably not; _____unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

_____ Limited evaluative testing

XX Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES

XX photos; XX collection (8 items); samples obsidian, all tools

Appended pages: _____discussion, XX tool inventory, XX maps

Recorder Stephen Lau, Jeff Bundy

Date 9/29/80

Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest
AS 80-WY-1634
48TE963

Cultural Materials Observed:

01: large bifacially reduced interior flake (50 x 20 x 15 mm) of black obsidian (collected)

02: utilized cortex flake (28 x 18 x 7 mm) of black obsidian (collected)

03: bifacially reduced interior flake (28 x 18 x 5 mm) of black obsidian (collected)

04: thin bifacial knife (34 x 21 x 3 mm) of black obsidian (collected)

05: side-notched projectile point fragment (30 x 17 x 7 mm) of coarse-grained white and rose-colored quartzite (collected)

06: cortex flake (32 x 27 x 6 mm) of gray/black chert with crystalline cortex (collected)

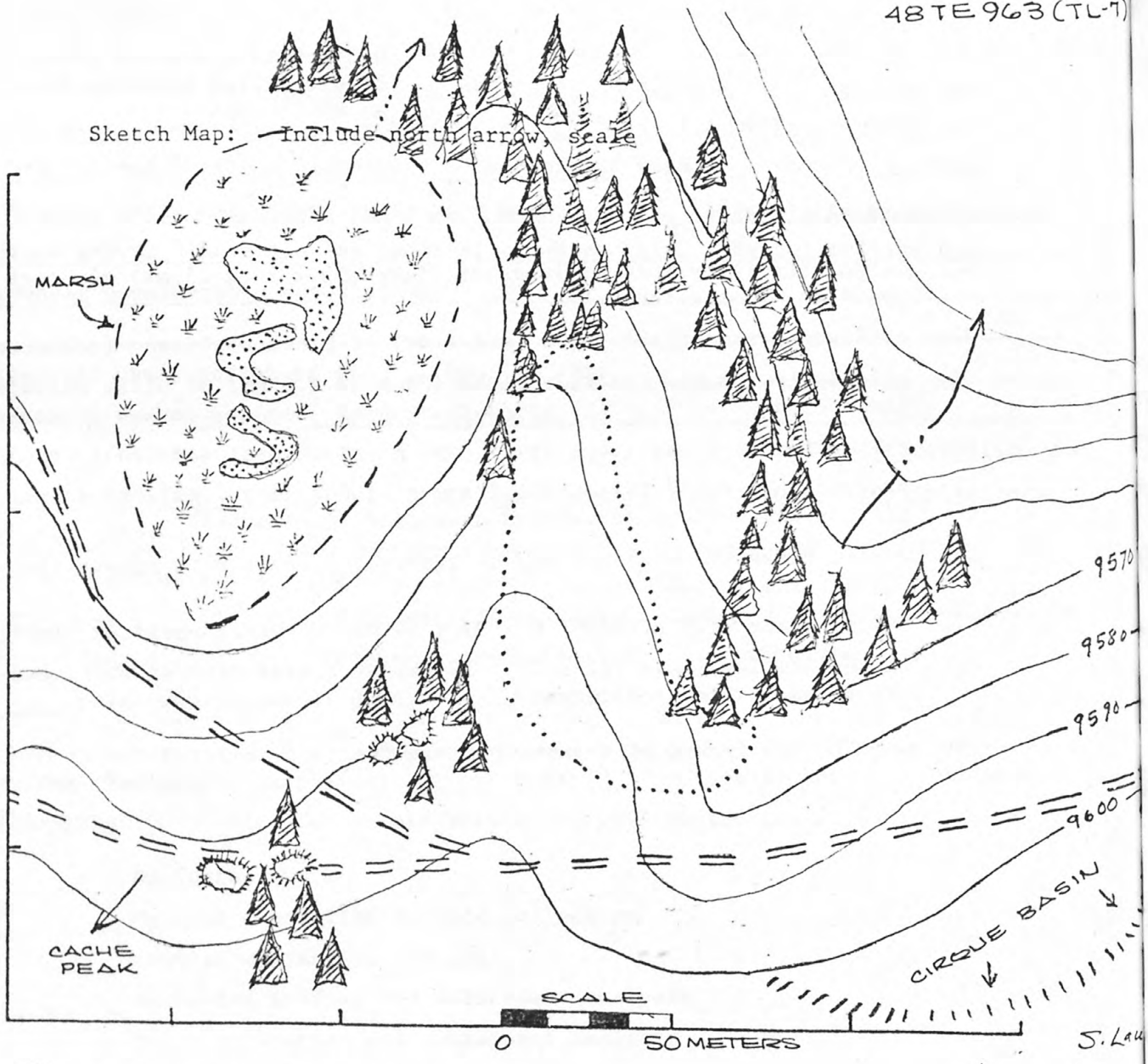
07: crude biface with cortex (50 x 35 x 14 mm) of black obsidian (collected)

08: large interior flake (42 x 26 x 10 mm) of coarse-grained white and orange quartzite (collected)

9+ uncollected flakes of basalt, porcelanite, and obsidian

AS 80-WY-1634
48TE963 (TL-7)

Sketch Map: ~~Include north arrow, scale~~



= APPROX. SITE BOUNDARIES

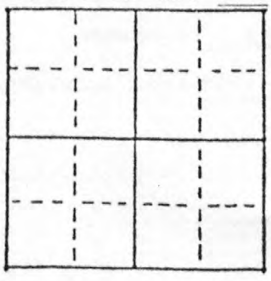
= GRANITE OUTCROPS

= HIKING TRAIL

= POND

N

Location
Section No. ____



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48TE963

01

Bifacially Reduced Flake
Black Obsidian

ER

02

Utilized Cortex Flake
Black Obsidian

ER

03

Bifacially Reduced Flake
Black Obsidian

ER

04

Bifacial Knife
Black Obsidian

ER

ERosenberg

0 1 2 3 4 5

5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48TE963

05

Projectile Point Fragment
White and Rose-colored Quartzite

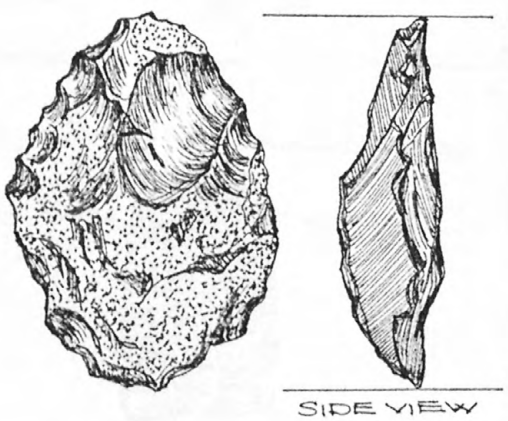
ER

06

Cortex Flake
Gray/black Chert

ER

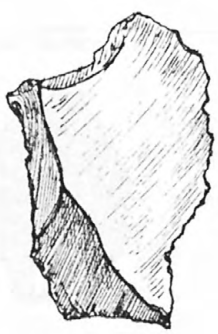
07



Crude Biface
Black Obsidian

ER

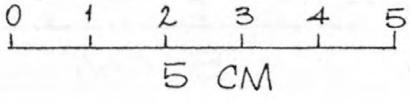
08



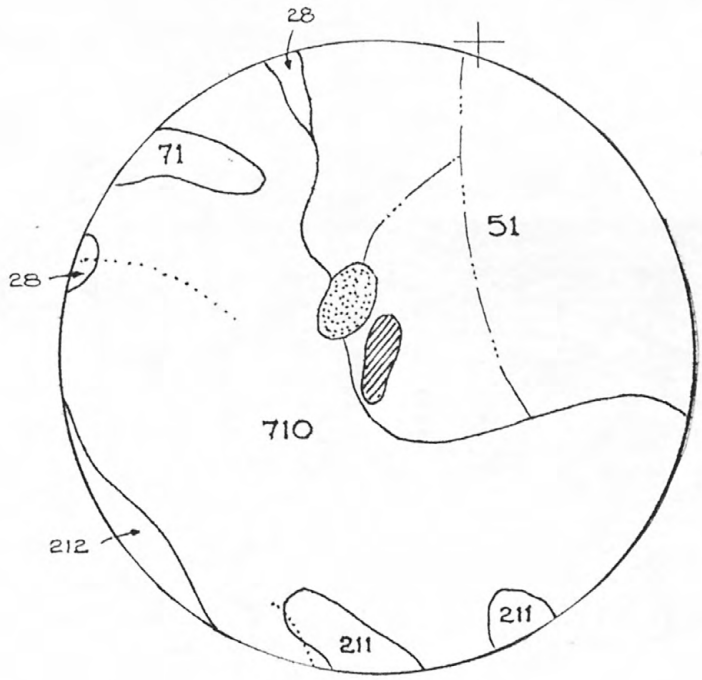
Interior Flake
White and Orange Quartzite

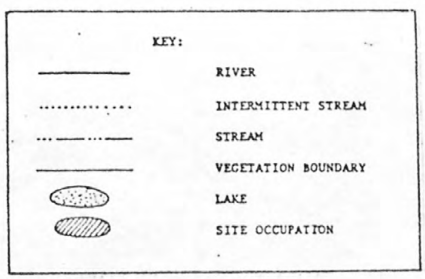
ER

E Rosenberg



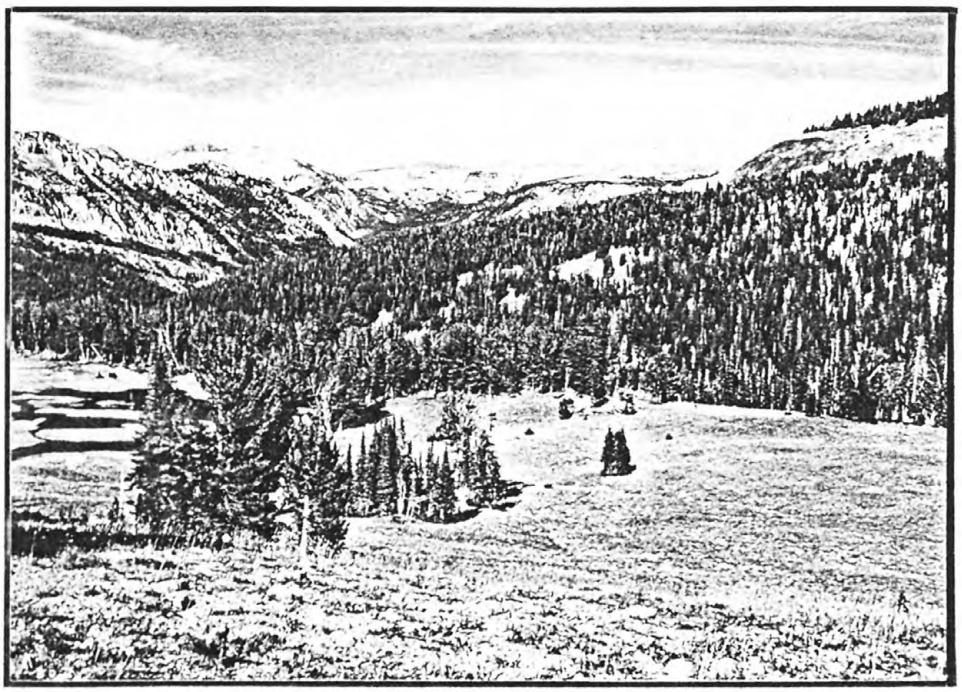
CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE963 (FIELD #TL-7)
Vegetation zones within 1 km radius of locality.



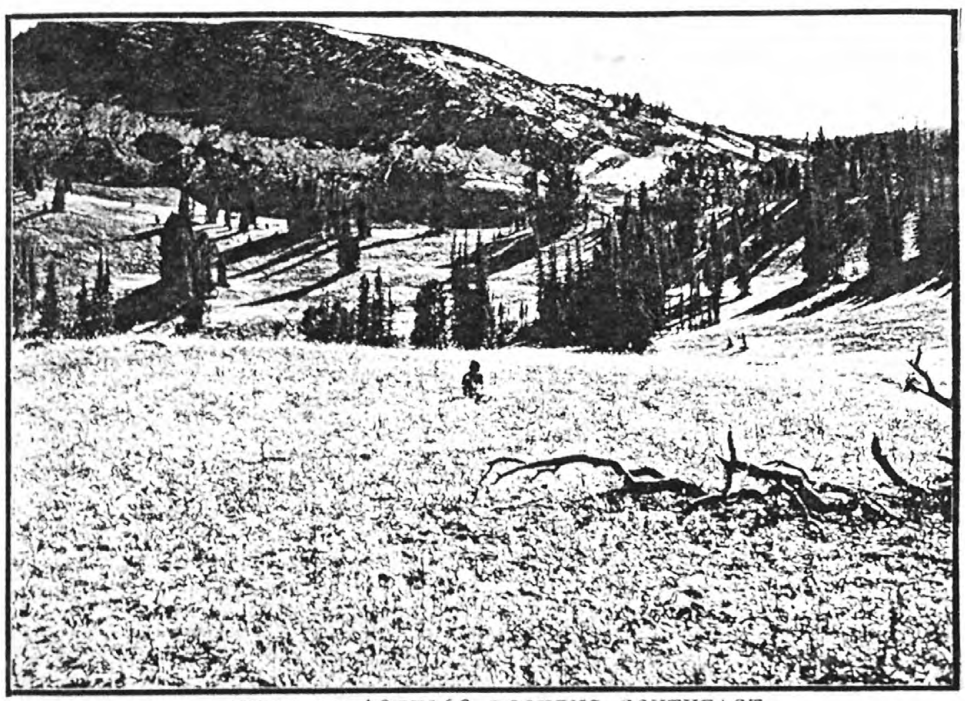


CODE NO.	VEGETATION ZONE	% OF COVER
28	SUBALPINE FIR, GROUSE WHORTLEBERRY	1.11
51	WHITEBARK PINE, GROUSE WHORTLEBERRY	38.88
71	LOVAGE, ROSE SHRUB, LARKSPUR	0.06
211	SUBALPINE FIR, GROUSE WHORTLEBERRY, WHITEBARK PINE	2.33
212	SUBALPINE FIR, MOUNTAIN GOOSEBERRY, WHITEBARK PINE	1.55
710	ROCK TALUS	54.55

Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest
AS 80-WY-1634
48TE963

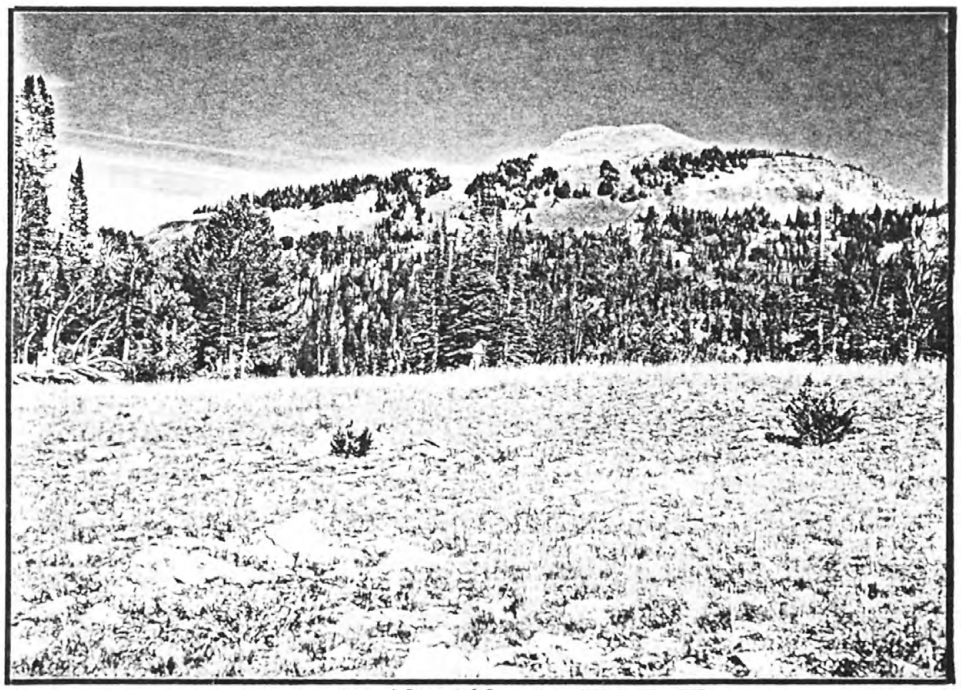


VIEW OF 48TE963 LOOKING NORTH

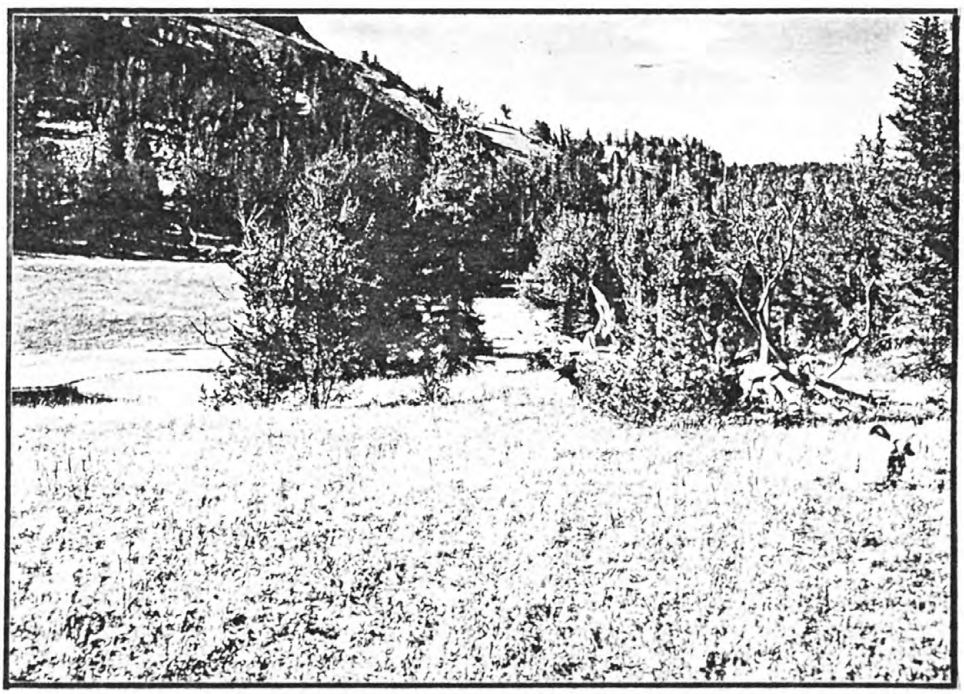


VIEW OF 48TE963 LOOKING SOUTHEAST

Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest
AS 80-WY-1634
48TE963



VIEW OF 48TE963 LOOKING EAST



VIEW OF 48TE963 LOOKING NORTHWEST

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # CD-1 State # 48TE951

County Teton, Wyo.; USGS 7½': Camp Davis, Wyo.

Location: UTM - Zone 12 ; 527330 mE 4797520 mN

NE/SW/NW (1600 FNL , 1100 FWL) Sec. 20 -T 39N -R -15W

The site was found on the south edge of a swamp in the Little Horse Creek Valley, just north of the Little Horse Creek Pack Trail. The site is situated at the confluence of Little Horse Creek and the intermittent (SEE CONTINUATION SHEET)

Environmental zone Upper Sonoran (4500-6500')/Transition (6500-8000')

Soil zone Strongly dissected forested slopes

Vegetation zone Foothills (see p.)

Distance to water 15 m; Water type perennial Name Little Horse Cr.

Elevation 1951 m 6400 ft; Gradient of slope 13 . %; Aspect 230°

Physical appearance The site is in the Little Horse Creek Valley on the border of a boggy marsh area covering the creek floodplain.

Extent of cultural debris: Vertical (est. XX measured): 0-1 m

Horizontal: 10 m NS x 10 m EW

Cultural materials observed

01: small interior flake (11 x 8 x 3 mm) of obsidian (collected)

02: large interior flake (26 x 20 x 2 mm) of obsidian (collected)

03: large interior flake (21 x 24 x 7 mm) of obsidian (collected)

04: large interior flake (10 x 22 x 2 mm) of obsidian (collected)

Prehistoric features none observed - possibly buried

Historic features Modern firepits are located in aspen groves on the valley floor. The Camp Creek and Little Horse Creek pack trails join at the site.

AS 80-WY-1634 Site # CD-1 (48TE951)

Site description A very sparse scatter of obsidian flakes was found in the backdirt of animal burrows along the north side of a pack trail in Little Horse Creek Valley. The site is at the confluence of a runoff channel and the main creek channel adjacent to a marsh covering much of the valley floor. The area is densely vegetated and covered with a thick layer of humus.

Suggested use/function of site temporary campsite

Suggested age or period prehistoric

Integrity of site Fair. Probable buried deposits in humus.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ____stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES Visits with area residents revealed the area around the site has been collected for many years.

_____photos; XX collection (4 items); samples _____

Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Jeff Bundy

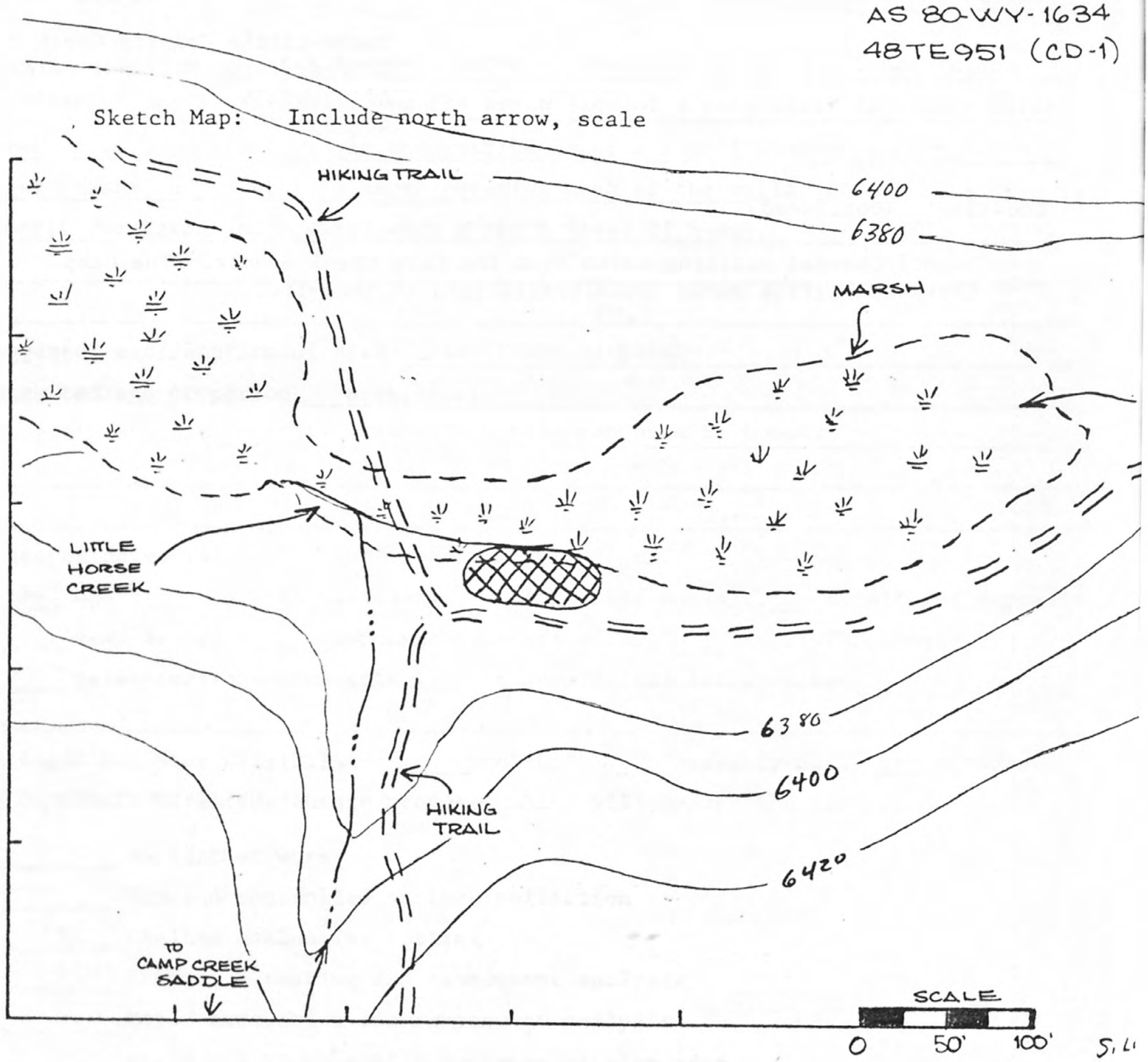
Date 9/26/80

Location: (continued)

runoff channel draining north from the Camp Creek Saddle. The Camp Creek and Little Horse Creek trails join at the site.

AS 80-WY-1634
48TE951 (CD-1)

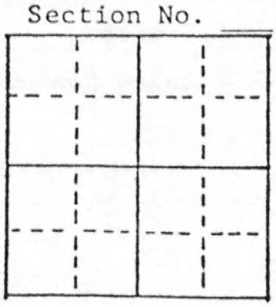
Sketch Map: Include north arrow, scale



= OBSIDIAN FLAKE SCATTER

N

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48TE951

01

Interior Flake
Black Obsidian

ER

02

Interior Flake
Black Obsidian

ER

Interior Flake
Black Obsidian

ER

04

Interior Flake
Black Obsidian

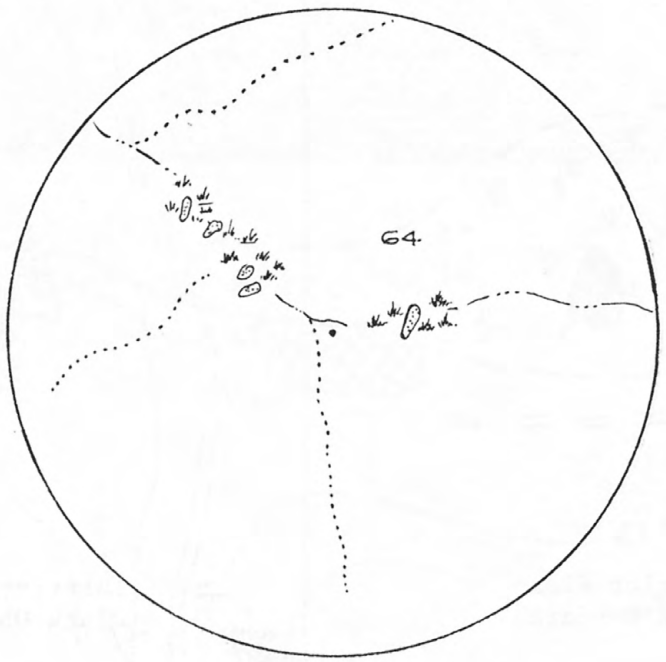
ER

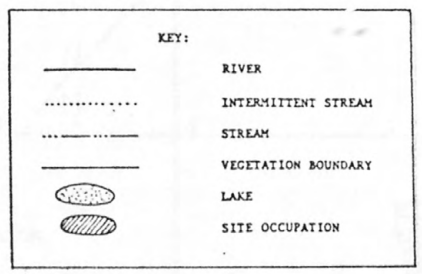
Elosenberg

0 1 2 3 4 5

5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE951 (FIELD #CD-1)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
64*	FLOX/CAMAS, SAGE, WILD ONION, WILD GRASSES	100

* This type is based on ethnographic accounts and present day observations of vegetation types existing along the drainage bottoms (see p.).

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # CD-2 State # 48TE952

County Teton, Wyo.; USGS 7½': Camp Davis, Wyo.

Location: UTM - Zone 12; 527250 mE 4796265 mN

NW/NE/NW (400 FNL, 1400 FWL) Sec. 29 -T 39N -R 115W

A lithic scatter was found in a saddle 90 m east of the Camp Creek Pack Trail along a suspected passage (migration route?) from the Snake River via Horse Creek and Camp Creek to the Hoback River.

Environmental zone Upper Sonoran (4500-6500')

Soil zone Strongly dissected forested slopes (hills of glacial outwash origin)

Vegetation zone Foothills (see p.)

Distance to water 1067 m; Water type perennial Name Camp Creek

Elevation 1975 m 6480 ft; Gradient of slope 12.3 . %; Aspect 279°

Physical appearance The site lies in a saddle heavily vegetated by grasses. There is a glacial outwash of considerable depth, but it is impossible to tell if there are subsurface materials without testing.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm (?)

Horizontal: 32 m NS x 25 m EW

Cultural materials observed

20+ flakes of black obsidian: 40% primary and 60% secondary (not collected) binocular lens (collected)

Prehistoric features No evidence on the surface.

Historic features The Camp Creek Pack Trail passes 90 m west of the locality.

AS 80-WY-1634 Site # CD-2 (48TE952)

Site description A light scatter of obsidian flakes was found on the SE slope of a saddle. This saddle is in the divide between two runoff courses feeding Little Horse and Camp Creeks. The site integrity appears to be fair with only minor erosion disrupting the surface.

Suggested use/function of site temporary camp/tool manufacturing

Suggested age or period prehistoric

Integrity of site Fair. Little erosion has disturbed the surface.

Research potential: ____good, XX fair, ____no.

____ age (____C14, XX obsidian, ____diagnostic tools), XX stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; ____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

XX Limited evaluative testing*

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES *Because of the conditions described in the "location" and "physical appearance" sections above, this site should be evaluated in its totality because it may be on a prehistoric migration route for both man and large mammals.

____photos; XX collection (1 item); samples ____

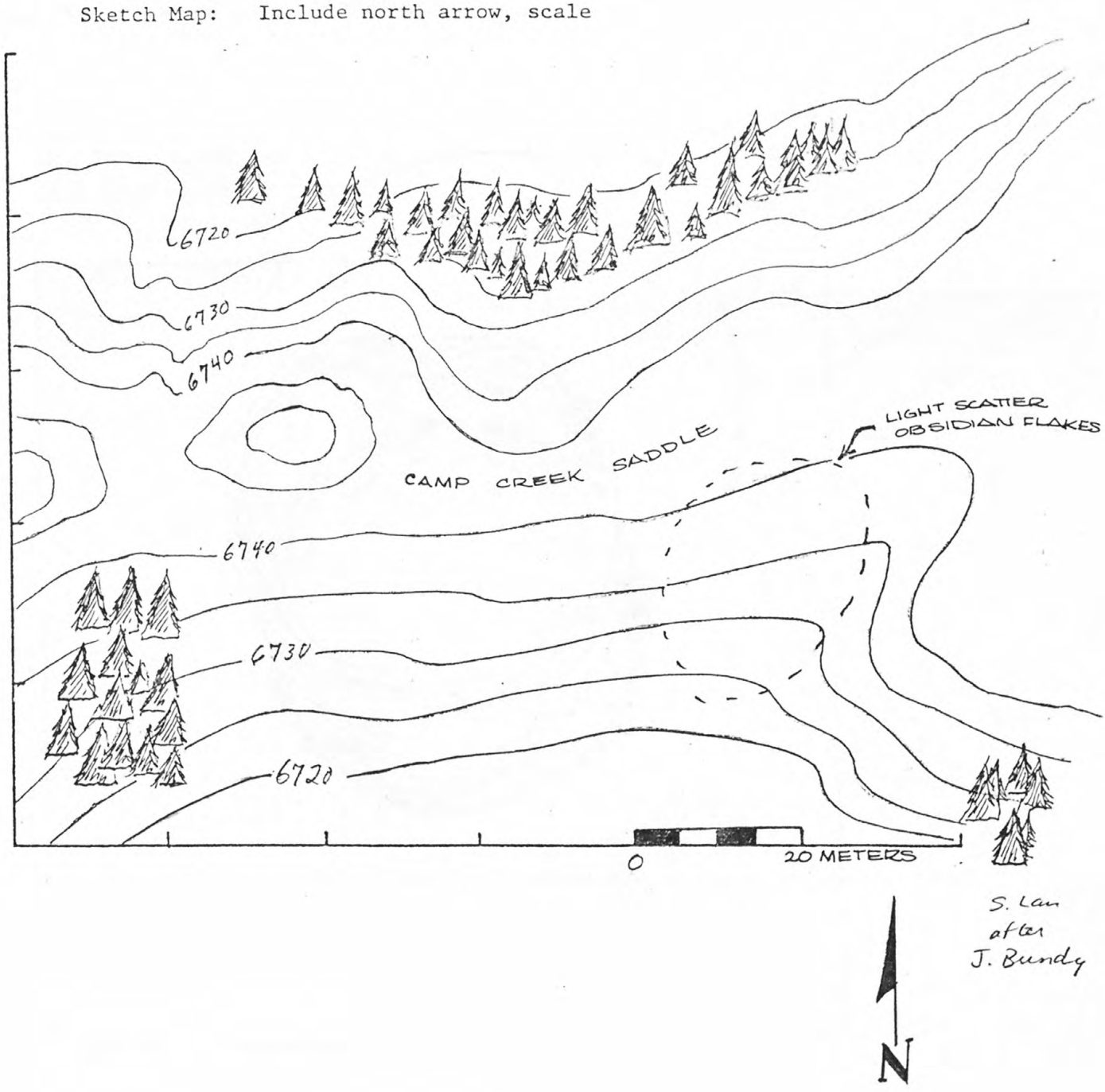
Appended pages: ____discussion, ____tool inventory, XX maps

Recorder Jeff Bundy

Date 9/27/80

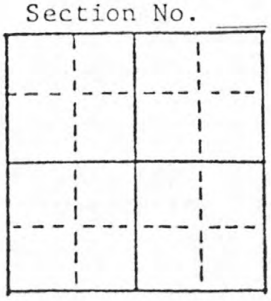
AS 80-WY-1634
48 TE 952 (CD-2)

Sketch Map: Include north arrow, scale



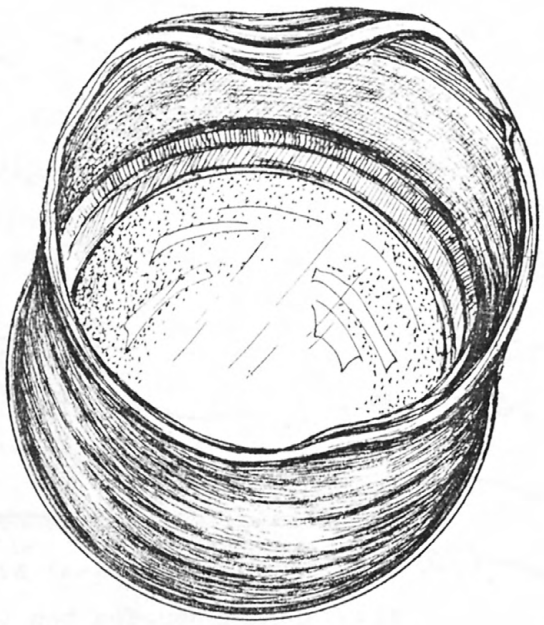
S. Lau after J. Bundy

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S
BRIDGER-TETON NATIONAL FOREST
48TE952

01



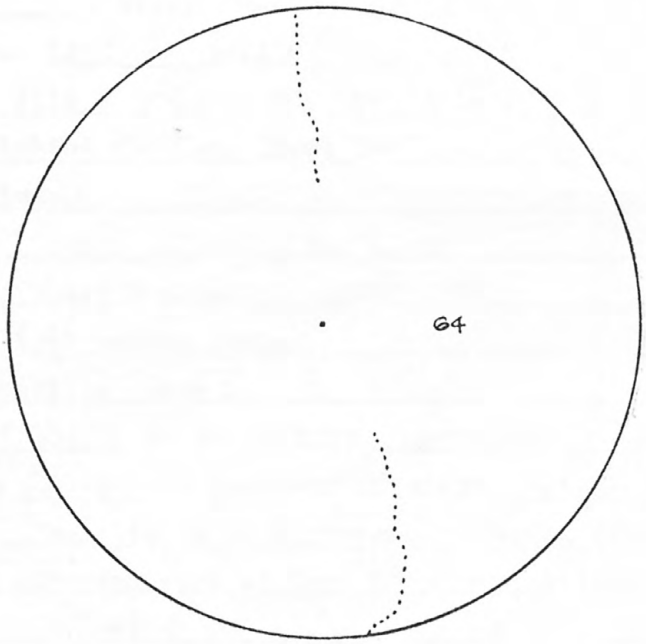
Binocular Lens

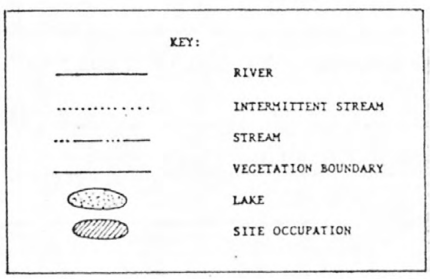
E Rosenberg

0 1 2 3 4 5

5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE952 (FIELD #CD-2)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
64*	FLOX/CAMAS, SAGE, WILD ONION, WILD GRASSES	100

* This type is based on ethnographic accounts and present day observations of vegetation types existing along the drainage bottoms (see p.).

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # CD-3 State # 48TE953

County Teton, Wyo.; USGS 7½': Camp Davis, Wyo.

Location: UTM - Zone 12 ; 527110 mE 4794260 mN

SW/SE/NW (2150 FNL, 1800 FWL) Sec. 32 -T 39N -R 115W

The site is located behind the Camp Creek Inn just off Highway 187 on the north side of the Hoback River.

Environmental zone Upper Sonoran (4500-6500')

Soil zone Rolling forb meadow lands

Vegetation zone Foothills (see p.)

Distance to water 20 m; Water type perennial Name Camp Creek

Elevation 1840 m 6040 ft; Gradient of slope 4.4 . %; Aspect 228°

Physical appearance The site is on a gradual SW-facing slope above the Hoback Valley floor. It is situated east of Camp Creek just before it turns north and drains into the Hoback River.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm

Horizontal: 30 m NS x 30 m EW

Cultural materials observed (SEE CONTINUATION SHEET)

Prehistoric features none

Historic features restaurant, motel, roads

AS 80-WY-1634 Site # CD-3 (48TE953)

Site description A scatter of nine obsidian flakes and a projectile point fragment was observed in the backfill from a house foundation behind the Camp Creek Inn. The site is on a gradual, SW-facing slope above the Hoback Valley floor and east of Camp Creek just prior to where it turns north to empty into the river. The area has been disturbed by construction and is not likely to contain undisturbed buried deposits.

Suggested use/function of site unknown

Suggested age or period prehistoric

Integrity of site Fair. The site has probably been partially destroyed by past and present building, road and other construction.

Research potential: ____good, XX fair, ____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ____stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; XX probably not; ____unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

XX No further work for this study project

____ Map and controlled surface collection

* Limited evaluative testing

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES *This site, not located within the E.I.S. study boundaries, is recorded here for the purpose of adding information to the archeological model used in the survey. If future work is planned for this area, limited evaluative testing is recommended.

____photos; XX collection (10 items); samples obsidian

Appended pages: ____discussion, XX tool inventory, XX maps

Recorder Albert Ortiz

Date 9/20/80

Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest
AS 80-WY-1634
48TE953

Cultural Materials Observed:

01: large retouched interior flake (34 x 22 x 11 mm) of black obsidian (collected)

02: interior flake (25 x 12 x 9 mm) of black obsidian (collected)

03: projectile point midsection (23 x 16 x 4 mm) of black obsidian (collected)

04: large, utilized unifacially retouched interior flake (27 x 23 x 4 mm) of black obsidian (collected)

05: large interior flake (22 x 19 x 8 mm) of black obsidian (collected)

06: large interior flake (23 x 14 x 7 mm) of black obsidian (collected)

07: utilized interior flake (23 x 20 x 6 mm) of black obsidian (collected)

08: large interior flake (24 x 23 x 5 mm) of black obsidian (collected)

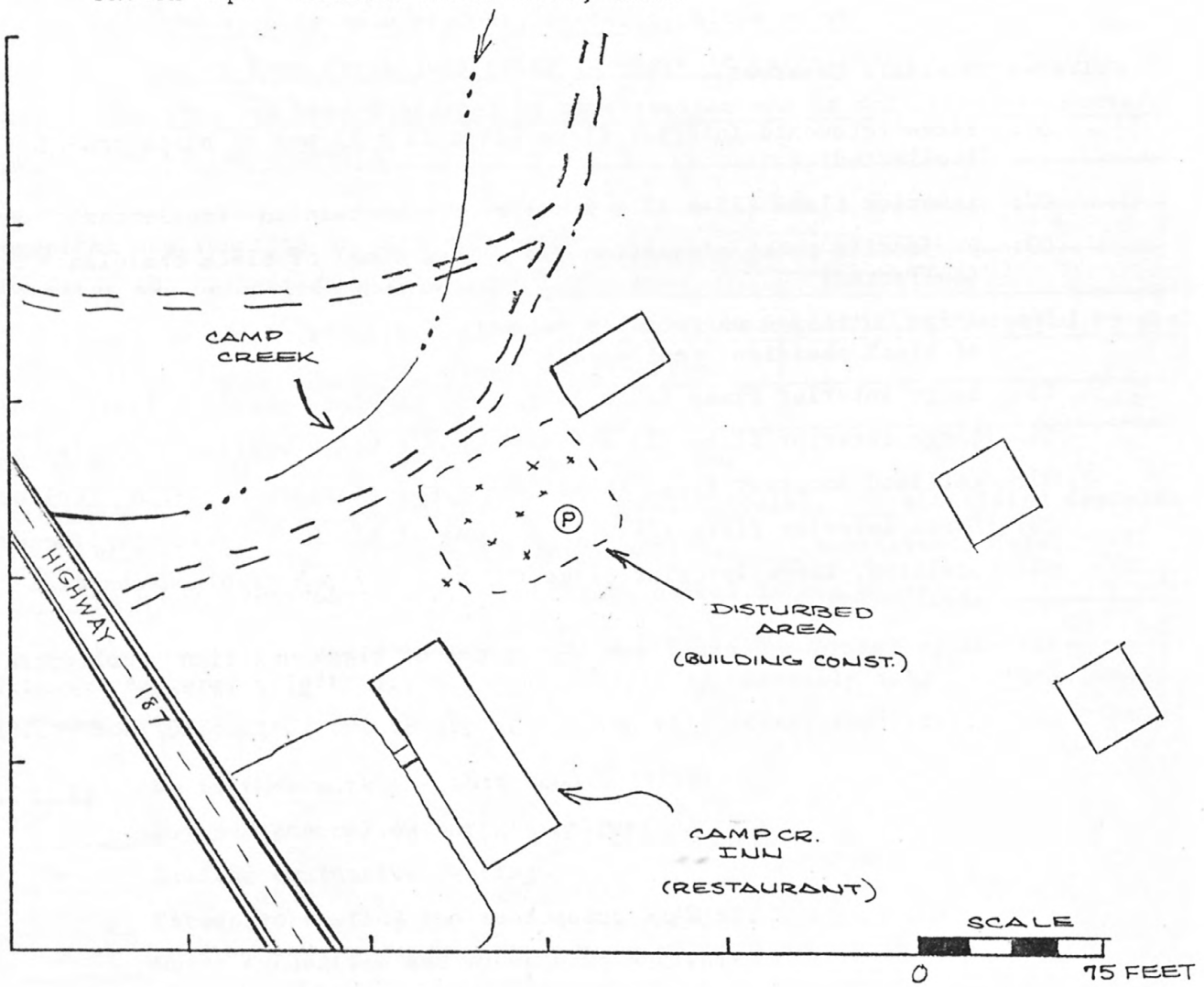
09: utilized, large interior flake (22 x 19 x 7 mm) of black obsidian (collected)

10: large interior flake (28 x 18 x 5 mm) of black obsidian (collected)

AS 80-WY-1634

48TE953 (CD-3)

Sketch Map: Include north arrow, scale

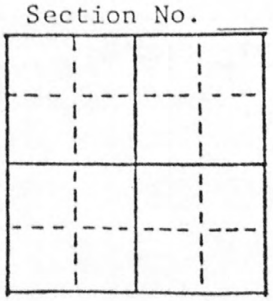


X = FLAKE

Ⓟ = PROJECTILE PT. FRAGMENT

S. Lam

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48TE953

01

Retouched Flake
Black Obsidian

ER

02

Interior Flake
Black Obsidian

ER

03

Projectile Point Fragment
Black Obsidian

ER

04

Utilized Interior Flake
Black Obsidian

ER

05

Interior Flake
Black Obsidian

ER

06

Interior Flake
Black Obsidian

ER

E Rosenberg

0 1 2 3 4 5

5 CM

CACHE - LITTLE GRANITE CREEK E
BRIDGER-TETON NATIONAL FOREST
48TE953

07

Utilized Interior Flake
Black Obsidian

ER

08

Interior Flake
Black Obsidian

ER

09

Utilized Interior Flake
Black Obsidian

ER

10

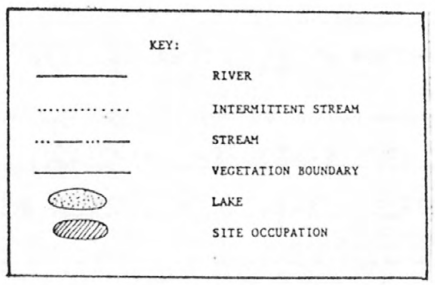
Interior Flake
Black Obsidian

ER

E Rosenberg

0 1 2 3 4 5
5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE953 (FIELD #CD-3)
Vegetation zones within 1 km radius of locality.



CODE NO.	VEGETATION ZONE	% OF COVER
64*	FLOX/CAMAS, SAGE, WILD ONION, WILD GRASSES	100

* This type is based on ethonographic accounts and present day observations of vegetation types existing along the drainage bottoms (see p.).

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # BC-1 State # IF-7

County Teton, Wyo.; USGS 7½': Bull Creek, Wyo.

Location: UTM - Zone 12 ; 539420 mE 4790360 mN

NW/SE/NE (1900 FNL , 850 FEL) Sec. 21 -T 39N -R 114W

A bison skull was found about 23 m east of the west fork of Little Granite Creek. It is c. 2.1 km along the trail which leads from the campground at the confluence of Little Granite and its west fork.

Environmental zone Transition (6500-8000')

Soil zone Strongly dissected open slopes

Vegetation zone Foothills/Montane (see p.)

Distance to water 10 m; Water type perennial Name none

Elevation 2134 m 7000 ft; Gradient of slope 0-5 . %; Aspect 128°

Physical appearance The bison skull was found on the narrow floodplain of the west fork of Little Granite Creek at the base of steep, eroded bluffs. Dense vegetation; including a great deal of decaying vegetation, trees, and moss; covers the valley floor. The surface is wet and boggy, and there are probably several feet of humus deposits.

Extent of cultural debris: Vertical (est. XX measured): unknown

Horizontal: unknown

Cultural materials observed Cultural materials were not observed in association with the bison skull, but the ground visibility was near 0%.

Prehistoric features none on surface

Historic features A trail crosses near the site.

AS 80-WY-1634 Site # BC-1 (48TE955)

Site description A badly decayed bison skull (fragmentary) was observed partially exposed, on the surface in a boggy, densely vegetated flat area. The area is adjacent to the west fork of Little Granite Creek in a narrow, steep-sided valley. Most of the skull was buried. It is not known if cultural materials or events are associated with the bison remains.

Suggested use/function of site unknown

Suggested age or period prehistoric

Integrity of site Probably good. If cultural materials are present, they may be well preserved.

Research potential: _____good, XX fair, _____no.

? age (____C14, ____obsidian, ____diagnostic tools), ? stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

? paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES No cultural materials were observed; however, the ground visibility was near 0%. Soil deposition at the site is extensive due to the sharp slope of the valley side. Dense vegetation on the valley floor has added a very thick humic layer. The skull seems to be embedded in this humic matrix. The horn was collected for possible age and type identification.

_____photos; XX collection (1 item); samples _____

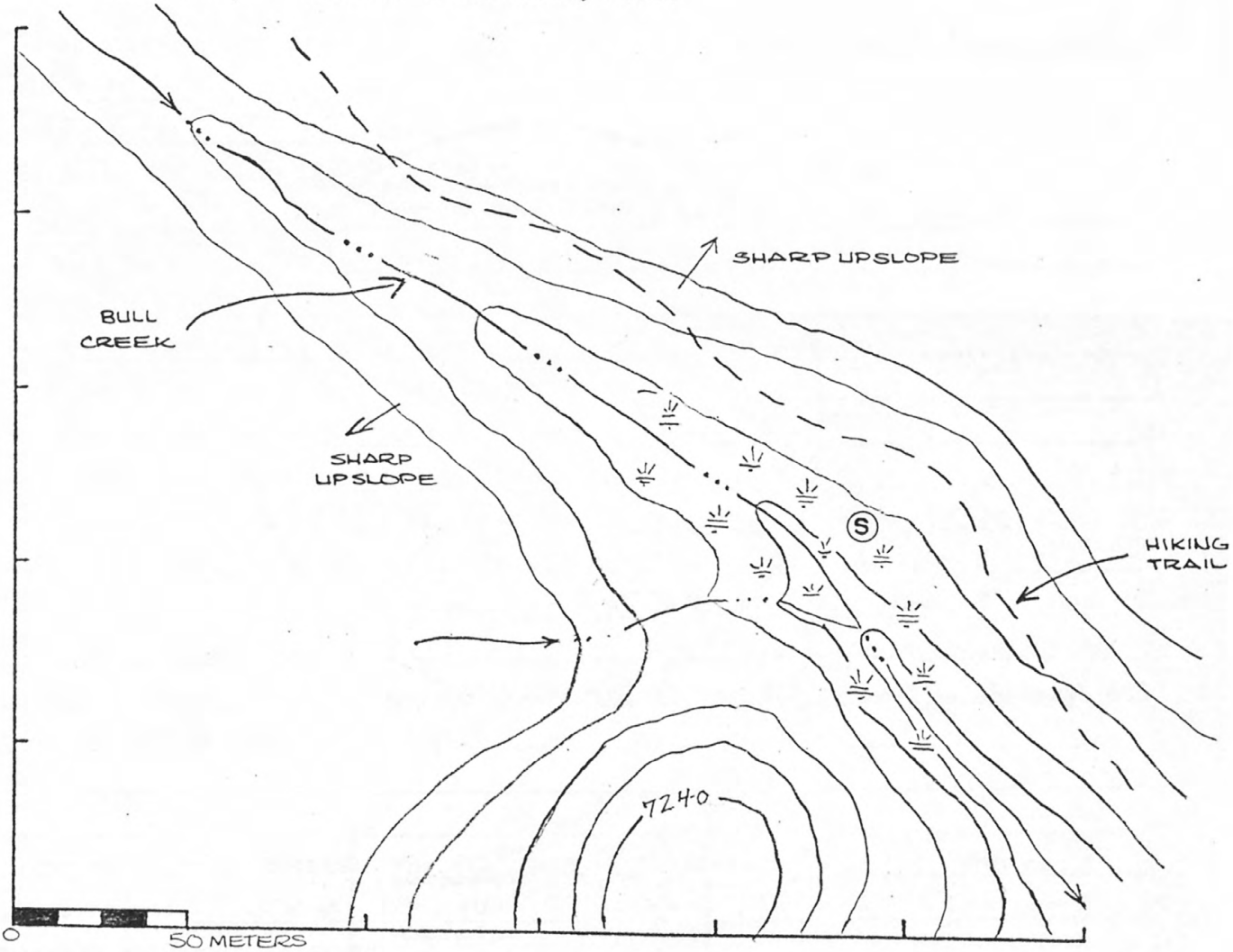
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Stephen Lau

Date 9/11/80

AS 80-WY-1634
IF-7 (BC-1)

Sketch Map: Include north arrow, scale



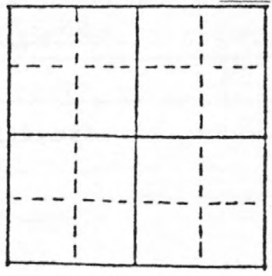
S Lan

(S) = BURIED BISON SKULL

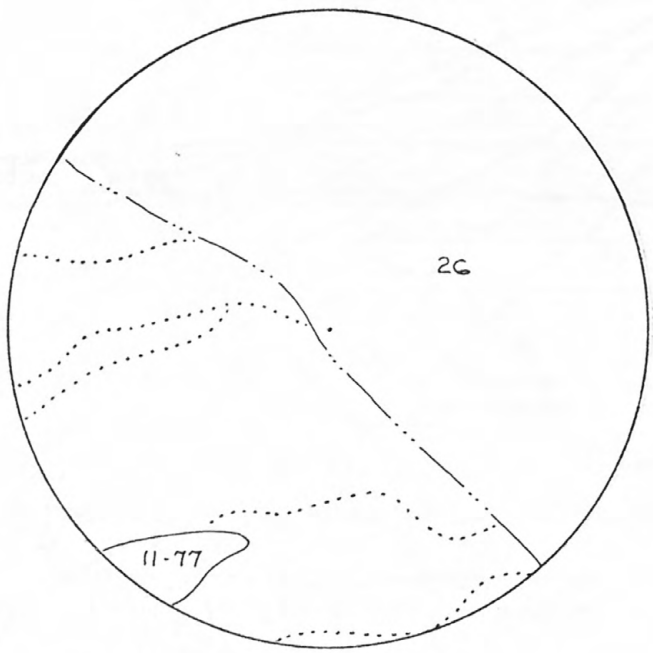
= BOGGY AREA

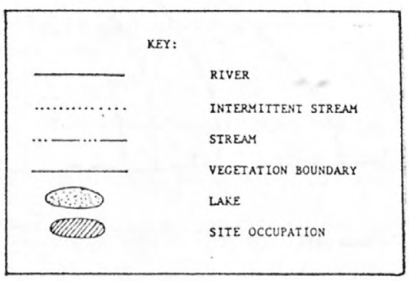
N

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-7 (FIELD #BC-1)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
26	SUBALPINE FIR, MOUNTAIN MAPLE	98.22
11-77	LIMBER PINE, SPIKE FESCUE, BLUEBUNCH WHEATGRASS, IDAHO FESCUE	1.77

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned Getty Reserve well

Field # BC-2 State # 48TE956

County Teton, Wyo.; USGS 7½': Bull Creek, Wyo.

Location: UTM - Zone 12; 536130 mE 4799780 mN

C/SW/SW (650 FSL, 700 FWL) Sec. 8 -T 39N -R 114W

The site is located on the south face of the high drainage divide between a western fork of Little Granite Creek and Horse Creek. The site is 150 m SW of the Getty Reserve well centerstake.

Environmental zone Canadian (8000-9500')

Soil zone Rolling forb meadow lands

Vegetation zone Montane/Subalpine (see p.)

Distance to water 380 m; Water type headwaters Name Horse Creek

Elevation 2585 m 8480 ft; Gradient of slope 27 . %; Aspect 162°

Physical appearance The site is on the eroded south-facing slope of a low, broad hill straddling a high inter-drainage divide. It is below the crest of a saddle between two high, unnamed peaks (10,000' or 3048 m peak to the west and 9000' or 2743 m peak to the east).

Extent of cultural debris: Vertical (est. XX measured): 0-5 cm

Horizontal: 50 m NS x 33 m EW

Cultural materials observed

01: corner-notched projectile point fragment, possibly Pelican Lake (35 x 18 x 9 mm) of black obsidian (collected)

02: biface (?) fragment (28 x 20 x 5 mm) of black obsidian (collected)

03: cortex flake of porcelanite (not collected)

Prehistoric features none

Historic features none

AS 80-WY-1634 Site # BC-2 (48TE956)

Site description Two tools and a cortex flake were found on the steep south face of a saddle on the high inter-drainage divide between the headwaters of Horse Creek and a western tributary of Little Granite Creek. It appears that the artifacts have eroded down from the crest of the saddle.

Suggested use/function of site hunting camp

Suggested age or period Late Archaic (?)

Integrity of site The materials observed were on a steep slope and had probably eroded from the crest of the saddle. Topsoil is scanty on the slope, and quartz gravels are exposed.

Research potential: ____good, XX fair, ____no.

XX age (____C14, XX obsidian, XX diagnostic tools), ____stratified deposits

____ camp design, ____ component identification, ? subsistence data,

? paleo-environmental data, ____ chronological info.; other ____

National Register eligibility: ____probably; ____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

____ No further work

____ Map and controlled surface collection

XX Limited evaluative testing

____ Extensive testing and subsequent analysis

____ Major excavation and subsequent analysis

____ Avoid due to unusual importance of site area

NOTES

____photos; XX collection (3 items); samples ____

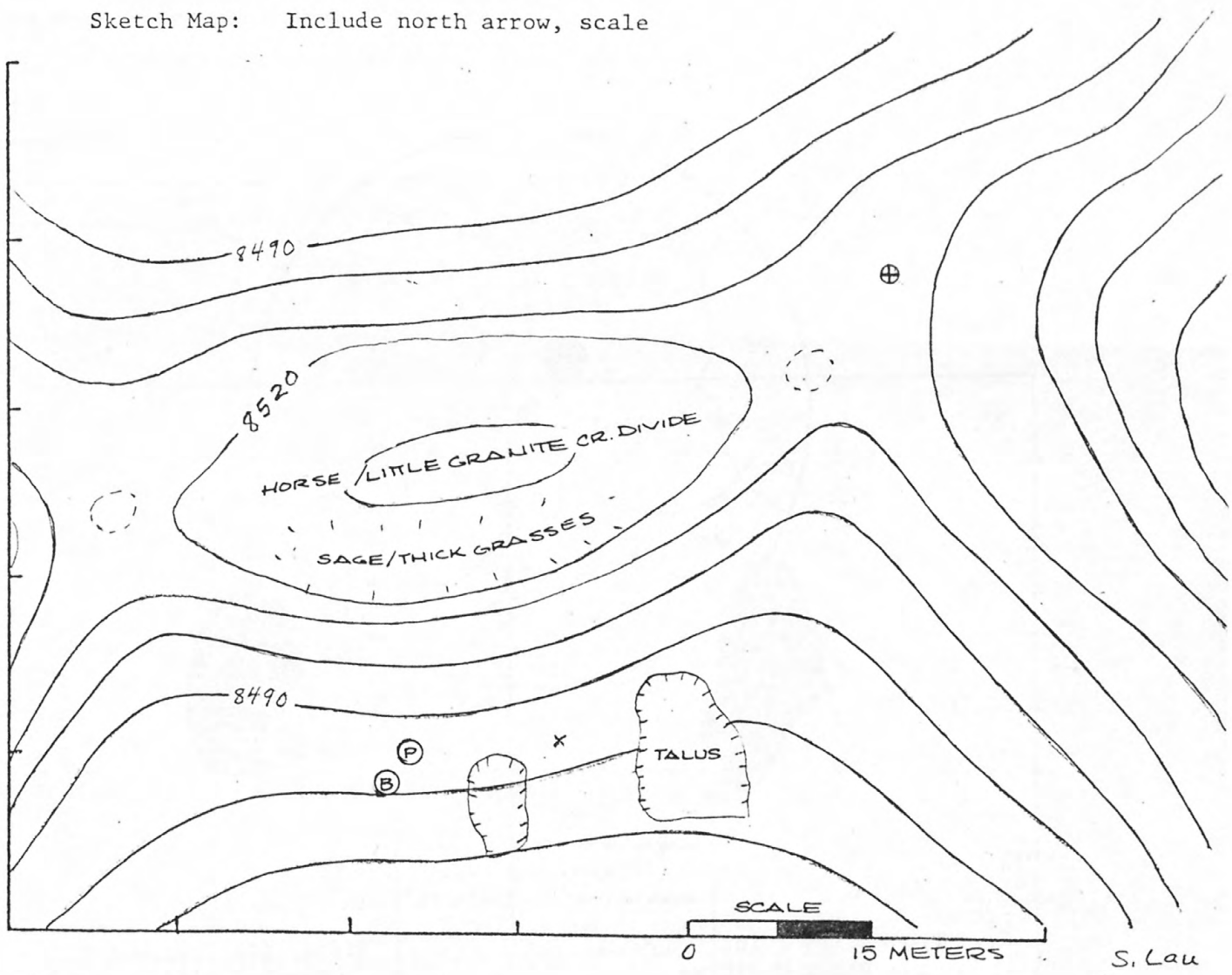
Appended pages: ____discussion, ____tool inventory, XX maps

Recorder Stephen Lau

Date 9/9/80

AS 80-WY-1634
48TE956 (BC-2)

Sketch Map: Include north arrow, scale



◌ = MUDHOLE

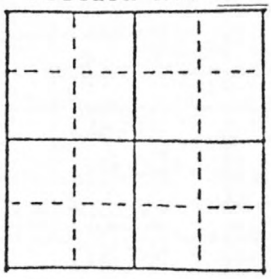
⊕ = CENTERSTAKE FOR GETTY RESERVE WELL

Ⓟ = PROJECTILE POINT

Ⓑ = BIFACE

X = CORTEX FLAKE

Location
Section No. ____



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
48 TE 956

01

Projectile Point Fragment
Black Obsidian

ER

02

Biface (?) Fragment
Black Obsidian

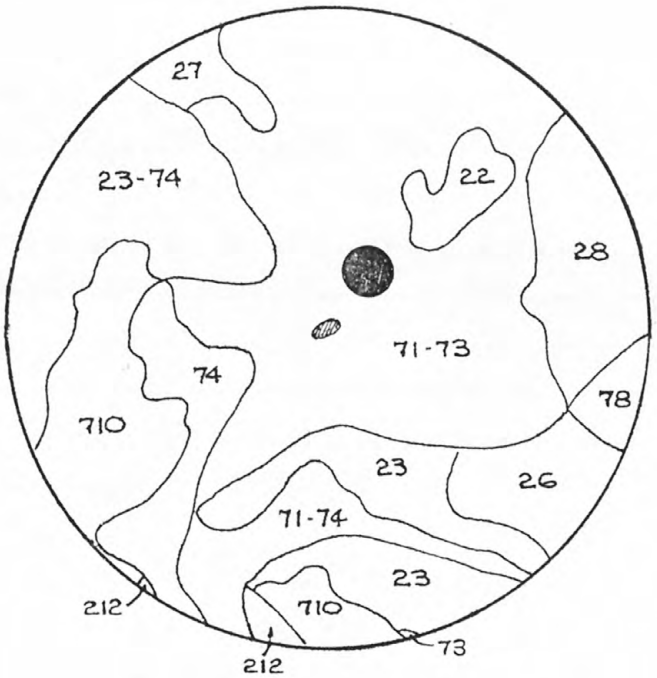
ER

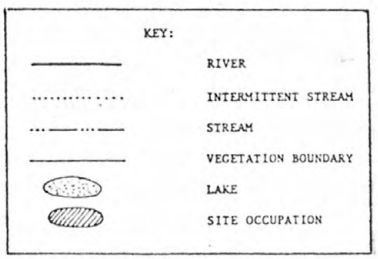
E Rosenberg

0 1 2 3 4 5
5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE956 (FIELD #BC-2)

Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
22	SUBALPINE FIR, MOUNTAIN SWEETROOT	1.88
28	SUBALPINE FIR, GROUSE WHORTLEBERRY	5.22
78	SAGEBRUSH, MOUNTAIN SNOWBERRY	1.00
27	SUBALPINE FIR, BLUE HUCKLEBERRY	1.44
26	SUBALPINE FIR, MOUNTAIN MAPLE	3.88
23	SUBALPINE FIR, MOUNTAIN ARNICA	7.66
71-74	LOVAGE, ROSE SHRUB, LARKSPUR, ARNICA GOAT CHICORY	4.66
74	ARNICA, GOAT CHICORY	4.88
23-74	SUBALPINE FIR, MOUNTAIN ARNICA, ARNICA GOAT CHICORY	10.55
710	ROCK TALUS	8.44
73	GIANT HYSSOP	0.11
212	SUBALPINE FIR, MOUNTAIN GROUSEBERRY, WHITE BARK PINE	0.44
71-73	LOVAGE, ROSE SHRUB, LARKSPUR, GIANT HYSSOP	49.77

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned NCRA well and access

Field # CC-1 State # IF-6

County Teton, Wyo.; USGS 7½': Cache Creek, Wyo.

Location: UTM - Zone 12 ; 528250 mE 4809000 mN

SE/NE/NW (1000 FNL, 1750 FWL) Sec. 16 -T 40N -R 115W

A flake was found c. 45 meters ENE of the confluence of Cache Creek and a perennial, northern tributary. It was 2 meters north of the trail at the edge of a spruce grove on the north bank of Cache Creek.

Environmental zone Transition (6500-8000')

Soil zone Strongly dissected open slopes

Vegetation zone Montane (see p.)

Distance to water 61 m; Water type perennial Name Cache Creek

Elevation 2207 m 7240 ft; Gradient of slope 21 . %; Aspect 58°

Physical appearance The flake was on the gradually sloping north bank of the Cache Creek valley, on a densely vegetated slope above a beaver dam. The vegetation consists of tall grasses, hardwood stands, and marsh and bottom vegetation. The locality is at the confluence of a rapid, small channel feeding Cache Creek and is surrounded by steep slopes.

Extent of cultural debris: Vertical (est. XX measured): 0-30 cm

Horizontal: 0 m (isolate)

Cultural materials observed

01: utilized, large interior flake (39 x 31 x 13 mm) of black obsidian

Prehistoric features none

Historic features Trails cross the site area.

AS 80-WY-1634 Site # CC-1 (IF-6)

Site description An isolated interior flake was found at the confluence of Cache Creek and a perennial tributary. The locality is on the gradually sloping, treeless north bank of Cache Creek, just north of a marshy, wooded swamp created by beaver dams in the wide flat area. The ground surface is irregular and dissected by erosion, but considerable deposition may cover the area.

Suggested use/function of site temporary camp

Suggested age or period prehistoric

Integrity of site Fair. Animal burrows, beaver dams, hiking trails, and significant sheet erosion and frost heaving may have impacted potential buried materials or deposits.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ____ component identification, ____ subsistence data,

? paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES _____

_____photos; XX collection (1 item); samples _____

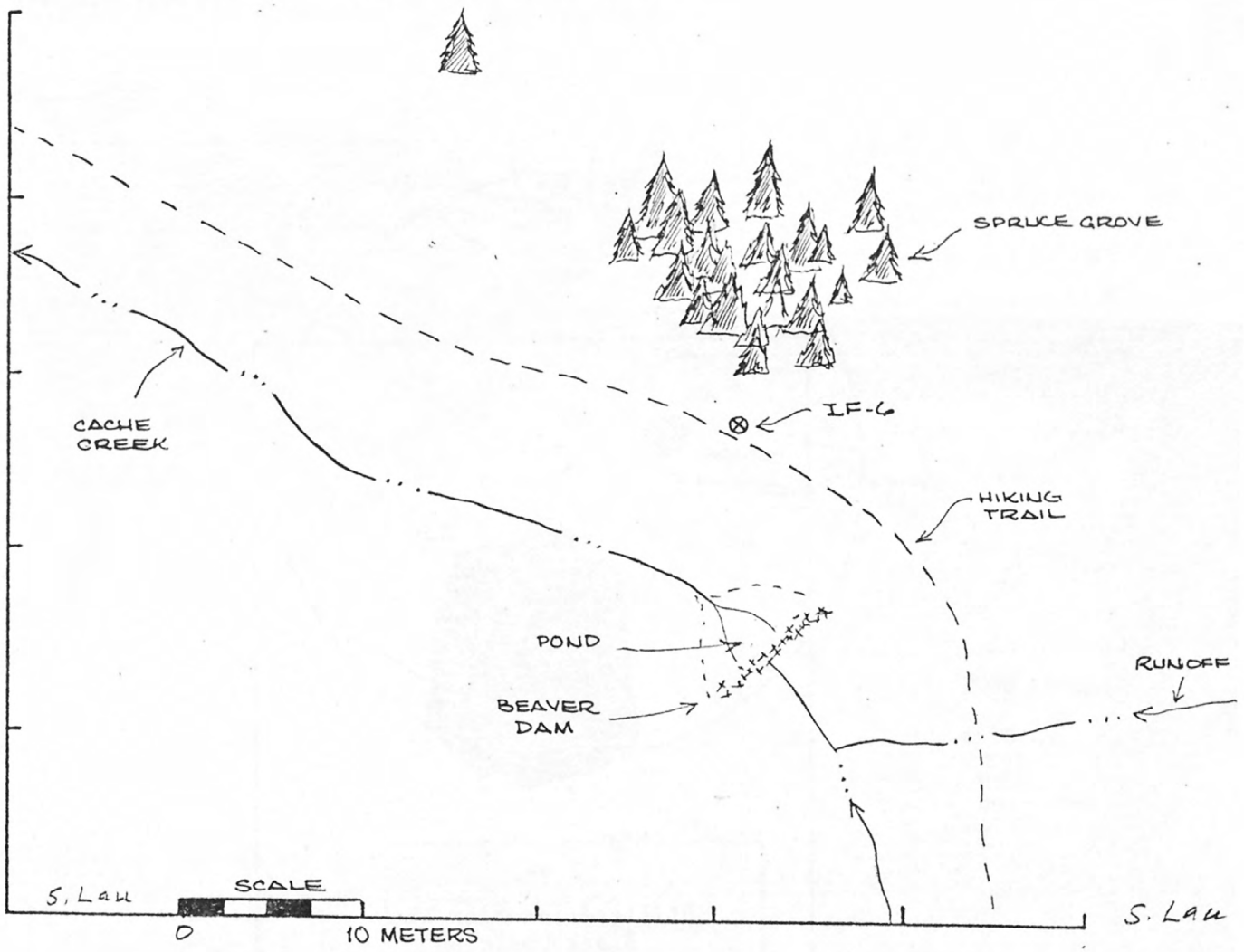
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Stephen Lau

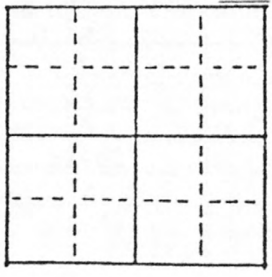
Date 9/5/80

AS 80-WY-1634
IF-6 (CC-1)

Sketch Map: Include north arrow, scale



Location
Section No. ___



CACHE-LITTLE GRANITE CREEK EIS
BRIDGER-TETON NATIONAL FOREST
IF-6

01

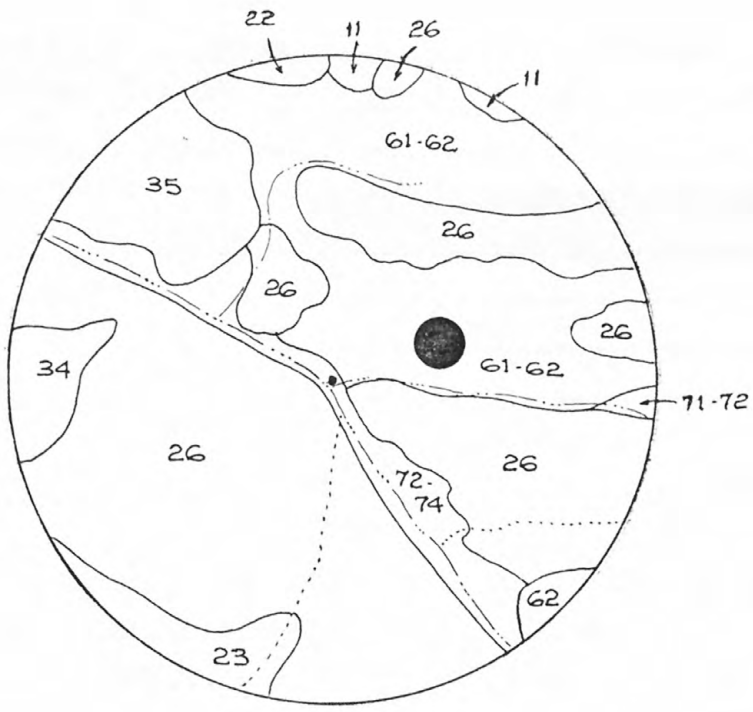
Utilized Interior Flake
Black Obsidian

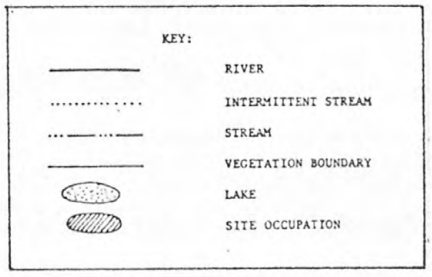
E Rosenberg

0 1 2 3 4 5

5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER IF-6 (FIELD #CC-1)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
11	LIMBER PINE, SPIKE FESCUE	0.3
22	SUBALPINE FIR, MOUNTAIN SWEETROOT	0.4
23	SUBALPINE FIR, MOUNTAIN ARNICA	3.0
26	SUBALPINE FIR, MOUNTAIN MAPLE	57.0
34	DOUGLAS FIR, PINEGRASS	2.7
35	DOUGLAS FIR, WHITE SPRUCE	7.5
61-62	QUAKING ASPEN, LOVAGE, COW CABBAGE	22.4
62	QUAKING ASPEN, COW CABBAGE	0.4
71-72	COW CABBAGE, LUNGWORT, LOVAGE, ROSE SHRUB, LARKSPUR	0.3
72-74	COW CABBAGE, LUNGWORT, ARNICA, GOAT CHICORY	5.7

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned NCRA well and access

Field # CC-2 State # 48TE958

County Teton, Wyo.; USGS 7½': Cache Creek, Wyo.

Location: UTM - Zone 12; 526390 mE 4809600 mN

N/SE/SW (1200 FSL, 700 FWL) Sec. 8 -T 40N -R 115W

The site is located at the confluence of a swiftly flowing tributary and Cache Creek, on the north side of the creek. This is 460 meters east of the confluence of the Game Creek Trail with Cache Creek.

Environmental zone Transition (6500-8000')

Soil zone Rolling forb meadow lands

Vegetation zone Montane (see p.)

Distance to water 0-50 m; Water type perennial Name Cache Creek

Elevation 2158 m 7080 ft; Gradient of slope 16 . %; Aspect 200°

Physical appearance The scatter was found in the deep, narrow Cache Creek stream valley that is densely wooded and vegetated. The valley floor is narrow, taken up almost entirely by the marshy floodplain of the creek. The site occupies a bench and the gently sloping bottom north of the creek and west of a small feeder channel.

Extent of cultural debris: Vertical (est. XX measured): 0-25 cm

Horizontal: 120 m NW-SE x 60 m NE-SW

Cultural materials observed

01: small interior flake (19 x 22 x 4 mm) of black obsidian (collected)

02: utilized cortex flake (21 x 17 x 7 mm) of black obsidian (collected)

two small interior flakes of black obsidian (not collected)

Prehistoric features none

Historic features Modern fire hearths are located throughout the site area. Trails and roads cross the site.

AS 80-WY-1634 Site # CC-2 (48TE958)

Site description A light lithic scatter of four obsidian interior flakes was found on the frost-heaved surface on the north side of Cache Creek and west of a small, swiftly moving stream feeding Cache Creek. The site is in an open area north of the dense woods in the bottom of the deep, narrow stream valley. Most of the material was exposed in animal burrow backdirt.

Suggested use/function of site temporary camp along migration route*

Suggested age or period prehistoric

Integrity of site Fair. Significant erosion (from steep slope to the north), frost heaving, animal burrowing, and road construction.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

? camp design, ____ component identification, ____ subsistence data,

? paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; XX probably not; _____unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

XX No further work

_____ Map and controlled surface collection

_____ Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES This site was reported in a survey by Western Wyoming College for the NCRA well on Cache Creek. The probable boundaries of the site were extended farther to the NE along the small feeder channel by the present survey. Two test squares excavated by WWC were relocated. The State Archeologist's Office had no record of this site so a new state number was assigned.

*(Love: personal communication)

_____photos; XX collection (2 items); samples obsidian

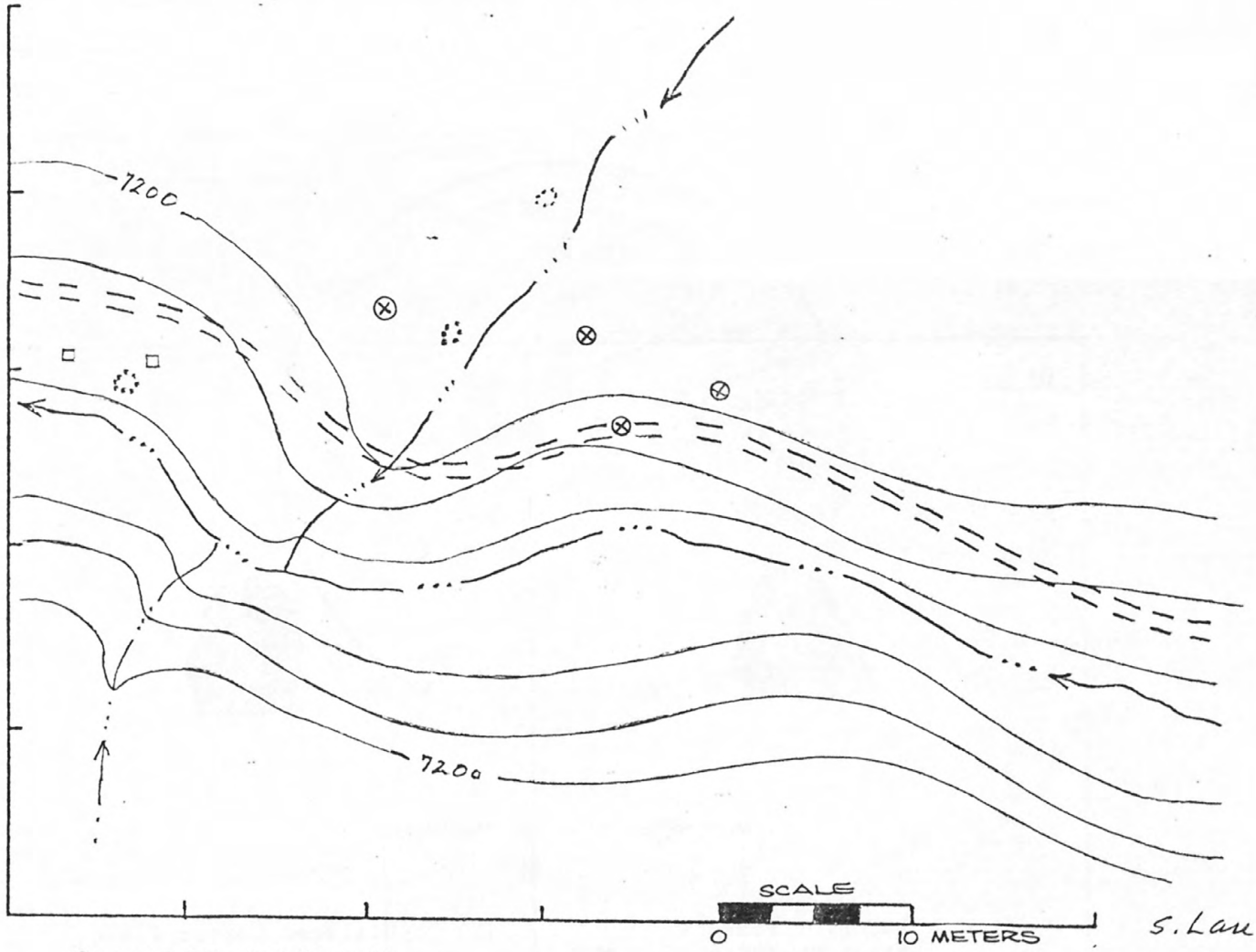
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Stephen Lau

Date 9/3/80

AS 80-WY-1634
48TE958 (CC-2)

Sketch Map: Include north arrow, scale

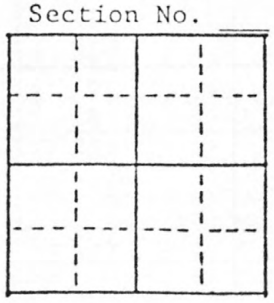


⊗ = OBSIDIAN FLAKE

⁘ = MODERN FIREHEARTH

□ = WESTERN WYOMING COLLEGE TEST PIT (SUMMER 1979)

Location
Section No. ___



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FORES
48TE958

01

Interior Flake
Black Obsidian

ER

02

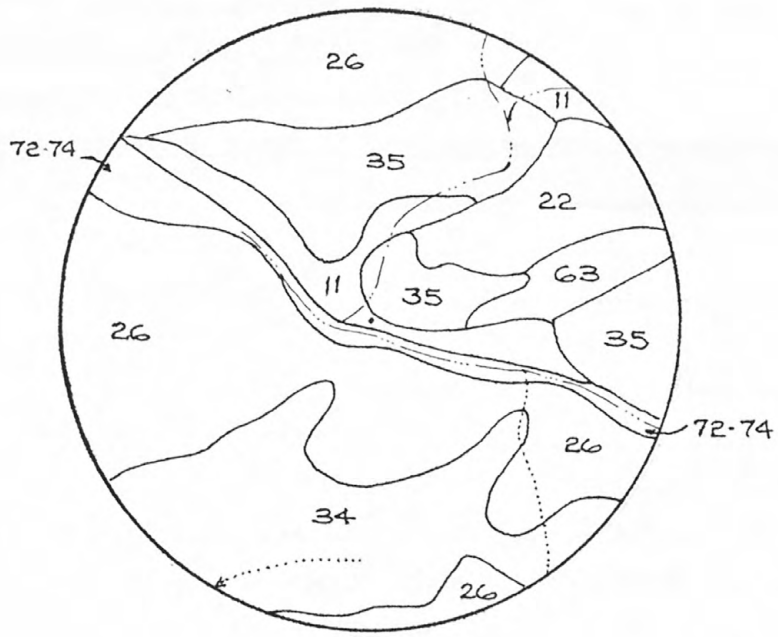
Utilized Cortex Flake
Black Obsidian

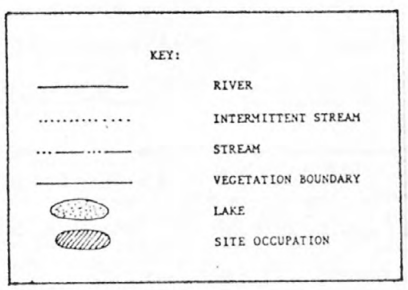
ER

E Rosenberg

0 1 2 3 4 5
5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE958 (FIELD #CC-2)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
11	LIMBER PINE, SPIKE FESCUE	5.88
22	SUBALPINE FIR, MOUNTAIN SWEETROOT	5.66
26	SUBALPINE FIR, MOUNTAIN MAPLE	51.88
34	DOUGLAS FIR, PINEGRASS	16.55
35	DOUGLAS FIR, WHITE SPRUCE	16.11
76-74	COW CABBAGE, LUNGWORT, ATNICA, GOAT CHICORY	3.88

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned NCRA well and access

Field # CC-3 State # 48TE959

County Teton, Wyo.; USGS 7½': Cache Creek, Wyo.

Location: UTM - Zone 12 ; 524090 mE 4807550 mN

SW/SW/SE (300 FSL, 2400 FEL) Sec. 13 -T 40N -R 116W

The site was located at the north terminus of the Game Creek vehicle trail just before it reaches a dammed up marsh in the middle of the wide valley of Game Creek.

Environmental zone Transition (6500-8000')

Soil zone Rolling forb meadow lands

Vegetation zone Montane (see p.)

Distance to water 61 m; Water type perennial Name Game Creek

Elevation 2268 m 7440 ft; Gradient of slope 15 . %; Aspect 62°

Physical appearance The site is located on the treeless, flat valley floor of Game Creek, on the west side of the creek at its confluence with an intermittent channel. The valley floor is a marsh which has been dammed up in many places by beavers. The valley sides are steep and rocky and rise 185-245 m above the creek.

Extent of cultural debris: Vertical (est. XX measured): 0-20 cm

Horizontal: 30 m NS x 30 m EW

Cultural materials observed

01: utilized interior flake (59 x 41 x 12 mm) of coarse yellow quartzite (collected)

02: interior flake (25 x 18 x 2 mm) of black obsidian (collected)

03: small interior flake (17 x 10 x 3 mm) of black obsidian (collected)

04: small interior flake (12 x 13 x 4 mm) of black obsidian (collected)

Prehistoric features none

Historic features Hiking trail, road, modern fire hearths

AS 80-WY-1634 Site # CC-3 (48TE959)

Site description Three small obsidian interior flakes and one large quartzite interior flake were found on the floor of the Game Creek valley at the north terminus of the Game Creek vehicle trail. The site is located just south of a marshy area at the confluence of Game Creek and a small runoff channel. The area has been significantly disturbed by vehicle activity and water erosion.

Suggested use/function of site hunting camp

Suggested age or period prehistoric

Integrity of site Poor. A good deal of vehicle activity, water erosion, and beaver dams may have disturbed potential buried deposits.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ____diagnostic tools), ? stratified deposits

____ camp design, ____ component identification, ____ subsistence data,

____ paleo-environmental data, ____ chronological info.; other _____

National Register eligibility: _____probably; XX probably not; _____unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

XX No further work

_____ Map and controlled surface collection

_____ Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES

_____photos; XX collection (4 items); samples _____

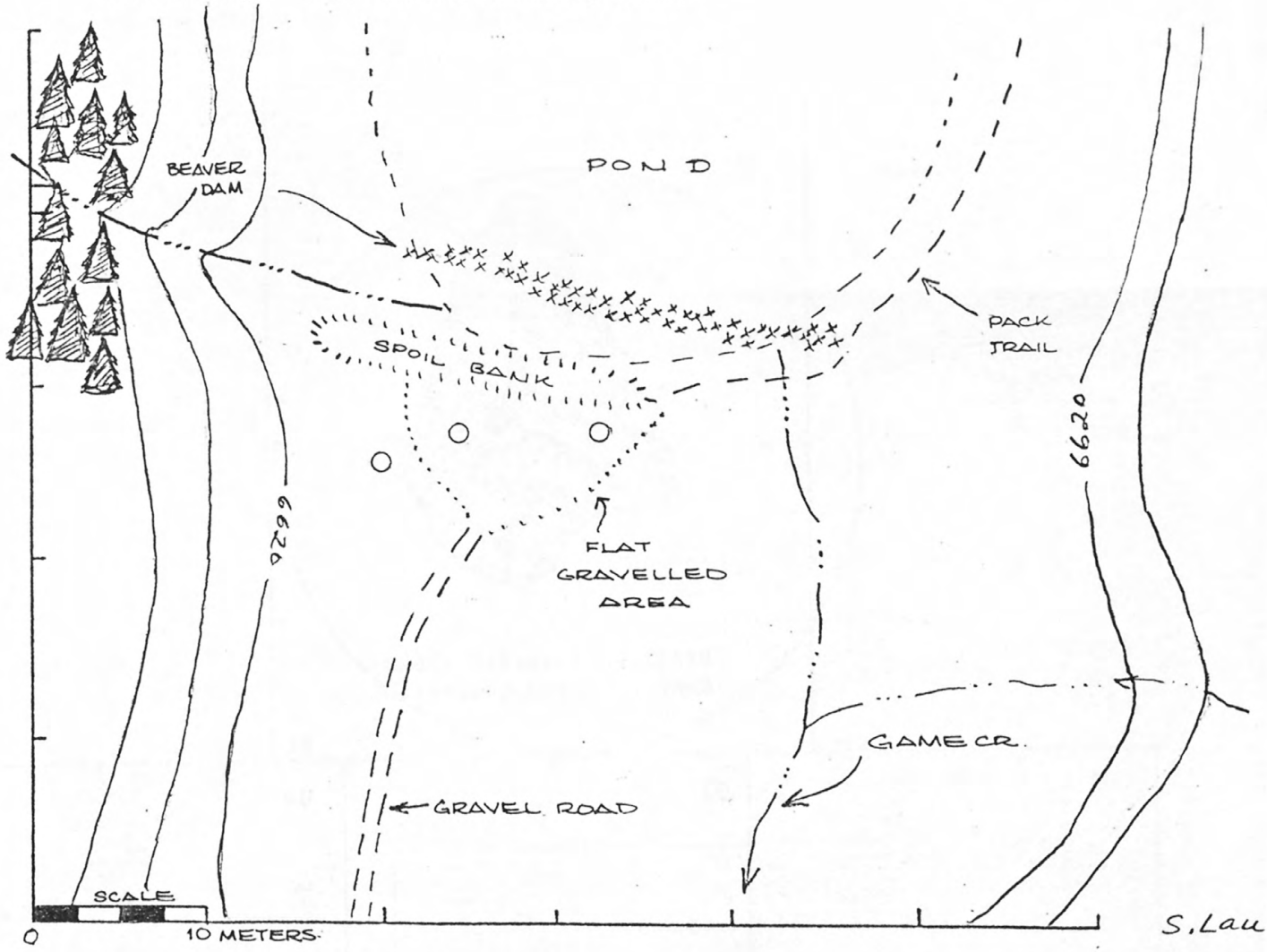
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Stephen Lau

Date 9/20/80

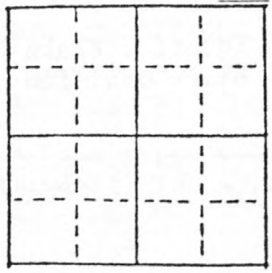
AS 80·WY·1634
48TE959 (CC-3)

Sketch Map: Include north arrow, scale



⊗ = FLAKE

Location
Section No.



CACHE-LITTLEGRANITE CREEK E.I.S
BRIDGER-TETON NATIONAL FORES
48TE959

01

Utilized Interior Flake
Coarse Yellow Quartzite

ER

02

Interior Flake
Black Obsidian

ER

03

Interior Flake
Black Obsidian

ER

04

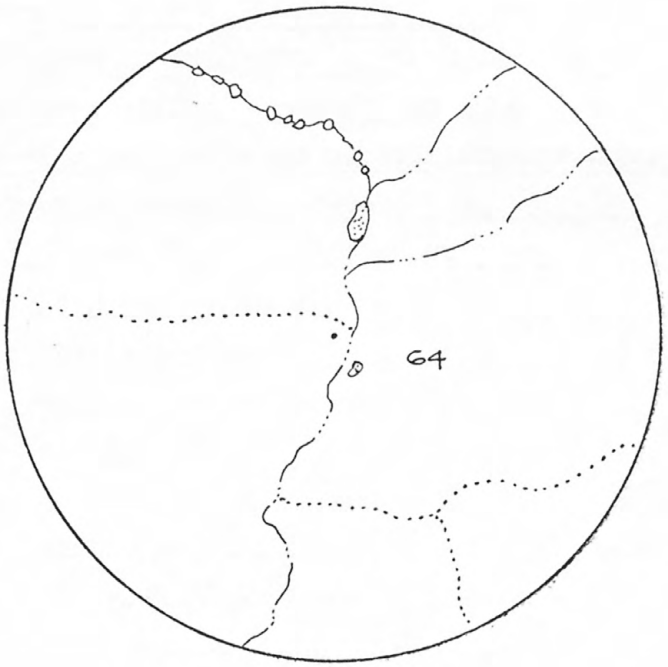
Interior Flake
Black Obsidian

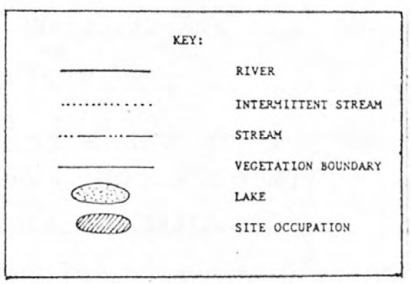
ER

ERosenberg

0 1 2 3 4 5
5 CM

CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE959 (FIELD #CC-3)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
64*	FLOX/CAMAS, SAGE, WILD ONION, WILD GRASSES	100

* This type is based on ethnographic accounts and present day observations of vegetation types existing along the drainage bottoms (see p.).

ARCHEOLOGICAL SERVICES, Box 1188, Laramie Wyo. 82070 (AS 80-WY-1634)

Archeological Survey
Cache-Little Granite Creek E.I.S.
Bridger-Teton National Forest

Type of survey: Intensive (sample) Project planned No

Field # CD-4 State # 48TE954

County Teton, Wyo.; USGS 7½': Camp Davis, Wyo.

Location: UTM - Zone 12 ; 529200 mE 4792200 mN

SE/SE/NE (2250 FNL, 150 FEL) Sec. 4 -T 38N -R 115W

The site is located east of Camp Davis c. 180 m due south of the Hoback River and c. 150 m south of a vehicle trail paralleling the river. It is on an irregular terrace at the NW foot of Beaver Mountain.

Environmental zone Upper Sonoran (4500-6500')

Soil zone Rolling forb meadow lands

Vegetation zone Foothills (see p.)

Distance to water 183 m; Water type river Name Hoback River

Elevation 1877 m 6160 ft; Gradient of slope 5 . %; Aspect 150°

Physical appearance On an eroded terrace on the south side of the Hoback River, at the NW foot of Beaver Mountain. The site is an open, grassy field adjacent to the densely wooded slopes of the mountain.

Extent of cultural debris: Vertical (est. XX measured): 0-30 cm

Horizontal: 130 m NS x 30 m EW

Cultural materials observed

01: metate fragment of fine, brown sandstone

02: chopper of course, white quartzite

03: projectile point midsection of black obsidian

nine flakes of black obsidian (no collections were made since this locality lies outside the survey area)

Prehistoric features none observed

Historic features Two modern campfires found on the same eroded terrace.

AS 80-WY-1634 Site # CD-4 (48TE954)

Site description A sparse lithic scatter was found on the eroded crest of an upper terrace slope overlooking the Hoback River on the south side. A scatter of obsidian flakes, angular debitage, a point fragment, a metate fragment and a chopper were observed in an open, grassy field adjacent to the densely wooded, steep northwest slope of Beaver Mountain.

Suggested use/function of site hunting/gathering (base?) camp

Suggested age or period prehistoric

Integrity of site Fair. Erosion is moderate on the top and face of the terrace slope. Drainage cuts are stabilized through terrace areas.

Research potential: _____good, XX fair, _____no.

XX age (____C14, XX obsidian, ? diagnostic tools), ? stratified deposits

? camp design, ? component identification, ? subsistence data,

? paleo-environmental data, ? chronological info.; other _____

National Register eligibility: _____probably; _____probably not; XX unknown.

RECOMMENDATIONS: (for future projects which will impact the site)

_____ No further work

_____ Map and controlled surface collection

XX Limited evaluative testing

_____ Extensive testing and subsequent analysis

_____ Major excavation and subsequent analysis

_____ Avoid due to unusual importance of site area

NOTES North of the site on a lower terrace a "tipi ring site" was reported by the caretaker of Camp Davis. The unspecified number of rings were allegedly destroyed by bridge construction when Highway 187 was rerouted from the north.

_____photos; No collection (_____items); samples _____

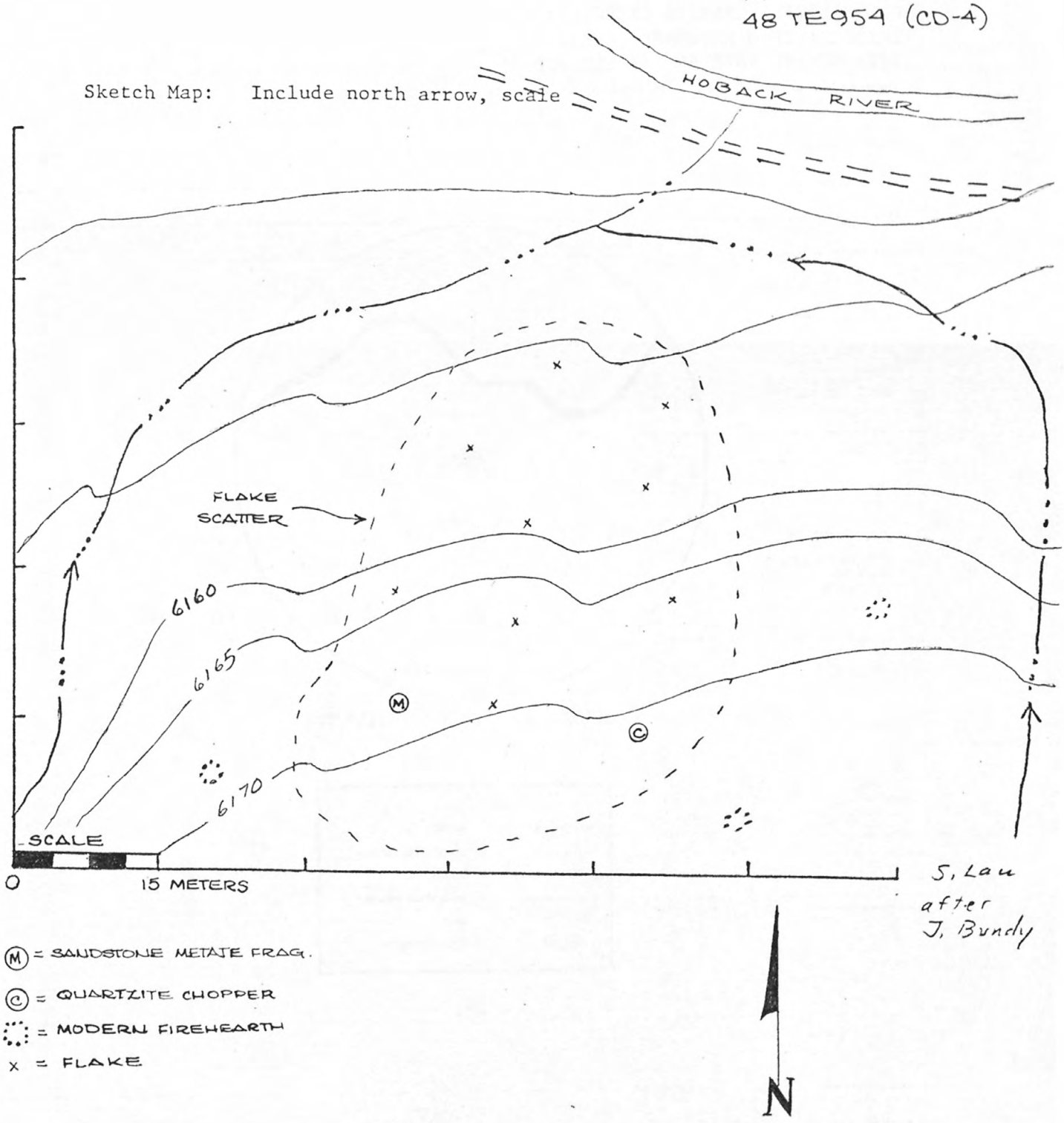
Appended pages: _____discussion, _____tool inventory, XX maps

Recorder Jeff Bundy

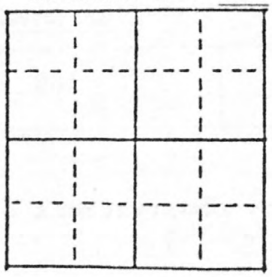
Date 9/27/80

AS 80-WY-1634
48 TE 954 (CD-4)

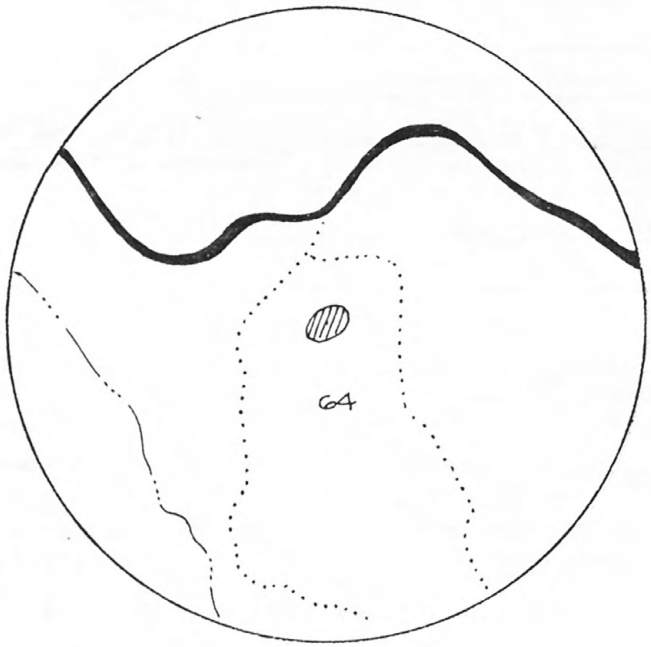
Sketch Map: Include north arrow, scale

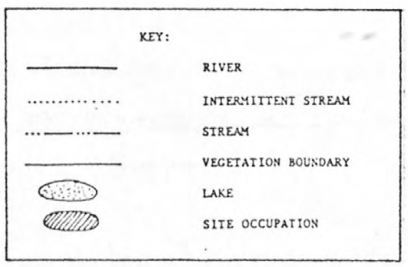


Location
Section No. ____



CACHE-LITTLE GRANITE CREEK E.I.S.
BRIDGER-TETON NATIONAL FOREST
SITE NUMBER 48TE954 (FIELD #CD-4)
Vegetation zones within 1 km radius of locality.





CODE NO.	VEGETATION ZONE	% OF COVER
64*	FLOX/CAMAS, SAGE, WILD ONION, WILD GRASSES	100

* This type is based on ethnographic accounts and present day observations of vegetation types existing along the drainage bottoms (see p.).

APPENDIX B:

COMPUTER ANALYSIS OF CASES

```
BMDP2M - CLUSTER ANALYSIS OF CASES                          PROGRAM REVISED AUGUST 1976
HEALTH SCIENCES COMPUTING FACILITY                          MANUAL DATE  --  1975
UNIVERSITY OF CALIFORNIA, LOS ANGELES

 --- THE DISTANCE MATRIX AFTER CASE CLUSTERING CAN
     BE PRINTED IN A SORTED AND SHADED FORM BY
     STATING 'SHADE' IN THE PRINT PARAGRAPH.  IF 'HIST' IS
     ALSO STATED, A HISTOGRAM OF THE DISTANCES WILL ALSO BE
     PRINTED.  THE MAXIMUM DISTANCE TO BE REPRESENTED BY
     SHADING IS INDICATED BY STATING 'LIMIT = THE MAXIMUM
     DISTANCE'.  VALUES GREATER THAN THIS LIMIT ARE
     REPRESENTED BY BLANKS.  IF NO LIMIT IS SPECIFIED, THE
     PROGRAM DETERMINES INTERVALS OF APPROXIMATELY EQUAL
     FREQUENCY FOR THE SHADING.  WHEN A LIMIT IS CHOSEN,
     INTERVALS OF APPROXIMATELY EQUAL FREQUENCY ARE CHOSEN
     UP TO THE SPECIFIED LIMIT.  TO PRINT THE SHADED
     DISTANCE MATRIX WITHOUT SORTING CASES ACCORDING TO
     THE CLUSTERING, STATE 'NO SORT.'
 --- THE PRINTING OF THE DETAILS OF THE AMALGAMATION PROCESS
     CAN BE SUPPRESSED BY STATING 'NO AMALG' IN THE PRINT
     PARAGRAPH.


 PROGRAM CONTROL INFORMATION

      PROBLEM  TITLE IS 'ARC CLUSTERING'./
      INPUT    VARIABLES ARE 28.
               CASES ARE 16.
               UNIT=3.
               FORMAT IS '(F3.0,F4.1,F4.0,F5.0,F4.0,13F4.1/20X,10F4.1)'./
      VARIABLE LABEL IS ID.
               NAMES ARE ID,SLOPE,ASPECT,ELEV,WATER,N11,N21,N22,N23,N26,N27,
               N28,N34,N35,N51,N61,N62,N64,N71,N72,N73,N74,N76,N77,N78,N211,
               N212,N710./
      PRINT    DATA.
               SHADE.
               HIST.
               DIST.
               VERT./
      END/
```

```
PROBLEM TITLE . . . . . .ARC CLUSTERING

NUMBER OF VARIABLES TO READ IN. . . . . 28
NUMBER OF VARIABLES ADDED BY TRANSFORMATIONS. . 0
TOTAL NUMBER OF VARIABLES . . . . . 28
NUMBER OF CASES TO READ IN. . . . . 16
CASE LABELING VARIABLES . . . . . ID
LIMITS AND MISSING VALUE CHECKED BEFORE TRANSFORMATIONS
BLANKS ARE. . . . . ZEROS
INPUT UNIT NUMBER . . . . . 3
REWIND INPUT UNIT PRIOR TO READING. . DATA. . . YES

INPUT FORMAT
       (F3.0,F4.1,F4.0,F5.0,F4.0,13F4.1/20X,10F4.1)

VARIABLES TO BE USED
         2  SLOPE     3  ASPECT    4  ELEV      5  WATER     6  N11
         7  N21       8  N22       9  N23      10  N26      11  N27
        12  N28      13  N34      14  N35      15  N51      16  N61
        17  N62      18  N64      19  N71      20  N72      21  N73
        22  N74      23  N76      24  N77      25  N78      26  N211
        27  N212     28  N710

NUMBER OF CASES READ. . . . . 16
PRINT DISTANCE MATRIX . . . . . YES
TYPE OF TREE PRINTED. . . . . .VERTICAL
CALCULATING PROCEDURE . . . . . SUM-SQR
STANDARDIZATION OF INPUT DATA . . . . . YES
PRINT INPUT DATA MATRIX AFTER STANDARDIZATION . YES
```

STANDARDIZED INPUT DATA

CASE NO.	LABEL	SLOPE 2	ASPECT 3	ELEV 4	WATER 5	N11 6	N21 7	N22 8	N23 9	N26 10	N27 11
1	OP5:::::	1.925	1.818	.796	1.153	-.301	-.250	1.247	-.491	-.422	1.552
2	OQ5:::::	-.909	-1.047	.482	-.673	-.301	-.250	-.335	1.237	.251	2.876
3	OQ#:::::	-.403	.019	.639	-.702	-.301	-.250	-.335	-.491	-.593	1.166
4	OR5:::::	-.099	-1.833	.604	-.673	-.301	-.250	-.335	2.931	.642	-.490
5	OR/:::::	-.909	-.505	1.387	2.037	-.301	-.250	-.335	-.491	-.593	-.490
6	OR#:::::	-.099	.246	1.360	-.474	-.301	-.250	-.335	-.491	-.593	-.490
7	OR':::::	.002	.573	1.360	-.417	-.301	-.250	-.335	-.491	-.593	-.490
8	OS5:::::	.204	.455	-1.147	-.673	-.301	-.250	-.335	-.491	-.593	-.490
9	OS9:::::	.133	1.311	-1.085	1.809	-.301	-.250	-.335	-.491	-.593	-.490
10	OS/:::::	-.666	.420	-1.429	-.645	-.301	-.250	-.335	-.491	-.593	-.490
11	OS=:::::	-2.124	-1.327	-.677	-.702	.310	-.250	-.335	-.491	2.776	-.490
12	OS#:::::	1.621	-.733	.482	1.409	-.301	-.250	3.445	.152	-.459	.283
13	OS":::::	1.014	.770	-.489	-.673	-.098	3.750	-.335	-.356	1.362	-.490
14	OS':::::	.508	-.069	-.615	-.474	3.703	-.250	-.335	1.440	1.187	-.490
15	OS9:::::	.407	.840	-.332	-.588	-.301	-.250	-.335	-.491	-.593	-.490
16	OT5:::::	-.605	-.942	-1.335	.285	-.301	-.250	-.335	-.491	-.593	-.490

STANDARDIZED INPUT DATA

CASE NO.	LABEL	N28 12	N34 13	N35 14	N51 15	N61 16	N62 17	N64 18	N71 19	N72 20	N73 21
1	OP5:::::	-.300	-.290	-.341	-.472	-.279	-.264	-.653	2.425	3.626	-.308
2	OQ5:::::	-.300	-.290	-.341	-.472	.189	3.725	-.653	-.510	-.356	-.308
3	OQ#:::::	-.300	-.290	-.341	-.472	1.842	-.280	-.653	-.510	-.356	-.308
4	OR5:::::	-.300	-.290	-.341	-.362	-.403	-.280	-.653	.868	.575	.671
5	OR/:::::	-.300	-.290	-.341	2.070	-.403	-.280	-.653	-.037	.022	-.308
6	OR#:::::	-.300	-.290	-.341	2.185	-.403	-.280	-.653	-.026	-.356	-.308
7	OR':::::	.539	-.290	-.341	1.770	-.403	-.280	-.653	-.500	-.356	-.308
8	OS5:::::	-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
9	OS9:::::	-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
10	OS/:::::	-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
11	OS=:::::	-.300	-.290	-.341	-.472	-.403	-.280	-.653	-.510	-.356	-.308
12	OS#:::::	3.667	-.290	-.341	-.472	-.403	-.280	-.653	2.352	-.356	3.637
13	OS":::::	-.300	.359	1.402	-.472	3.089	.184	-.653	-.489	.049	-.308
14	OS':::::	-.300	3.701	3.377	-.472	-.403	-.280	-.653	-.510	-.356	-.308
15	OS9:::::	-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
16	OT5:::::	-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308

STANDARDIZED INPUT DATA

CASE NO.	LABEL	N74 22	N76 23	N77 24	N78 25	N211 26	N212 27	N710 28	N71 19
1	OP5:::::	-.343	-.376	3.536	3.550	-.418	1.092	.294	1.000
2	OQ5:::::	-.343	-.376	-.325	-.323	1.457	-.520	-.380	1.000
3	OQ#:::::	-.343	-.376	-.325	-.323	3.274	-.520	-.321	1.000
4	OR5:::::	-.343	-.376	-.325	-.323	.342	.349	-.336	1.000
5	OR/:::::	-.343	3.103	-.325	-.323	-.402	2.666	-.380	1.000
6	OR#:::::	-.343	1.877	-.325	-.323	-.165	1.885	.309	1.000
7	OR!:::::	-.343	-.376	-.325	-.323	-.323	-.319	3.620	1.000
8	OS5:::::	-.343	-.376	-.325	-.323	-.418	-.520	-.380	1.000
9	OS9:::::	-.343	-.376	-.325	-.323	-.418	-.520	-.380	1.000
10	OS/:::::	-.343	-.376	-.325	-.323	-.418	-.520	-.380	1.000
11	OS=:::::	-.343	-.376	1.011	-.323	-.418	-.520	-.380	1.000
12	OS#:::::	3.614	-.376	-.325	.968	-.418	-.470	.235	1.000
13	OS":::::	.582	-.376	-.325	-.323	-.418	-.520	-.380	1.000
14	OS':::::	.263	-.085	-.325	-.323	-.418	-.520	-.380	1.000
15	OS9:::::	-.343	-.376	-.325	-.323	-.418	-.520	-.380	1.000
16	OT5:::::	-.343	-.376	-.325	-.323	-.418	-.520	-.380	1.000

DETAILS OF THE AMALGAMATION (CLUSTERING) PROCESS

FOR EACH AMALGAMATION, THE FOLLOWING ARE PRINTED

-- THE DISTANCE BETWEEN THE TWO CLUSTERS JOINED

-- THE CASE NUMBERS FOR THE 'BOUNDARIES' OF THE NEWLY FORMED CLUSTER AS GIVEN IN THE CLUSTER TREE WHICH FOLLOWS THESE DETAILS

-- THE NUMBER OF CASES IN THE CLUSTER (SUM OF THE CASE WEIGHTS FOR THE CLUSTER IF CASE WEIGHT VARIABLE IS SPECIFIED)

-- THE (WEIGHTED) AVERAGES OF THE VARIABLES FOR THE CLUSTER (DIFFERENCES BETWEEN CLUSTERS CAN BE DESCRIBED IN TERMS OF THOSE VARIABLES WHOSE MEANS DIFFER MOST BETWEEN THE CLUSTERS)

AMALGAMATION ORDER	DISTANCE	CASES	SUM OF CS. WTS.	2 SLOPE	3 ASPECT	4 ELEV	5 WATER	6 N11	7 N21	8 N22	9 N23	10 N26	11 N27
				12 N28	13 N34	14 N35	15 N51	16 N61	17 N62	18 N64	19 N71	20 N72	21 N73
				22 N74	23 N76	24 N77	25 N78	26 N211	27 N212	28 N710			
1	.916	10	8	2.000	-.231	.438	-1.288	-.659	-.301	-.250	-.335	-.491	-.593	-.490
					-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
					-.343	-.376	-.325	-.323	-.418	-.520	-.380			
2	1.219	15	8	3.000	-.018	.572	-.970	-.635	-.301	-.250	-.335	-.491	-.593	-.490
					-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
					-.343	-.376	-.325	-.323	-.418	-.520	-.380			
3	1.902	16	8	4.000	-.165	.193	-1.061	-.405	-.301	-.250	-.335	-.491	-.593	-.490
					-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
					-.343	-.376	-.325	-.323	-.418	-.520	-.380			
4	2.498	9	8	5.000	-.105	.417	-1.066	.038	-.301	-.250	-.335	-.491	-.593	-.490
					-.300	-.290	-.341	-.472	-.403	-.280	1.436	-.510	-.356	-.308
					-.343	-.376	-.325	-.323	-.418	-.520	-.380			
5	3.213	6	5	2.000	-.504	-.130	1.374	.782	-.301	-.250	-.335	-.491	-.593	-.490
					-.300	-.290	-.341	2.128	-.403	-.280	-.653	-.032	-.167	-.308
					-.343	2.490	-.325	-.323	-.283	2.275	-.036			
6	5.068	11	8	6.000	-.442	.126	-1.001	-.086	-.199	-.250	-.335	-.491	-.032	-.490
					-.300	-.290	-.341	-.472	-.403	-.280	1.088	-.510	-.356	-.308
					-.343	-.376	-.102	-.323	-.418	-.520	-.380			
7	5.216	8	4	7.000	-.393	-.154	-.772	-.170	-.214	-.250	-.335	-.002	.065	-.490
					-.300	-.290	-.341	-.456	-.403	-.280	.839	-.313	-.223	-.168
					-.343	-.376	-.134	-.323	-.310	-.396	-.374			
8	5.095	4	3	8.000	-.394	-.132	-.595	-.236	-.225	-.250	-.335	-.064	-.018	-.283
					-.300	-.290	-.341	-.458	-.123	-.280	.653	-.338	-.240	-.185
					-.343	-.376	-.158	-.323	.138	-.412	-.367			
9	5.360	7	3	9.000	-.350	-.053	-.378	-.256	-.233	-.250	-.335	-.111	-.082	-.306
					-.207	-.290	-.341	-.211	-.154	-.280	.508	-.356	-.253	-.199
					-.343	-.376	-.176	-.323	.087	-.401	-.076			
10	5.214	5	3	11.000	-.378	-.067	-.060	-.067	-.246	-.250	-.335	-.180	-.175	-.339
					-.224	-.290	-.341	.215	-.199	-.280	.297	-.297	-.237	-.219

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AMALGAMATION ORDER	DISTANCE	CASES	SUM OF CS. WTS.	2 SLOPE	3 ASPECT	4 ELEV	5 WATER	6 N11	7 N21	8 N22	9 N23	10 N26	11 N27
				12 N28	13 N34	14 N35	15 N51	16 N61	17 N62	18 N64	19 N71	20 N72	21 N73
				22 N74	23 N76	24 N77	25 N78	26 N211	27 N212	28 N710			
				-.343	.145	-.203	-.323	.020	.085	.056			
11	5.915	3	2	12.000	-.422	-.149	-.015	-.118	-.250	-.290	-.335	-.062	-.139	-.071
					-.230	-.290	-.341	.157	-.167	.053	.218	-.315	-.247	-.226
					-.343	.101	-.213	-.323	.139	.035	.019			
12	6.262	13	2	13.000	-.312	-.078	-.051	-.161	-.239	.058	-.335	-.085	-.024	-.103
					-.236	-.240	-.207	.109	.084	.063	.151	-.328	-.224	-.232
					-.272	.064	-.222	-.323	.097	-.008	-.011			
13	7.171	14	2	14.000	-.253	-.078	-.091	-.183	.043	.036	-.335	.024	.063	-.131
					-.240	.041	.049	.067	.049	.039	.093	-.341	-.234	-.238
					-.234	.054	-.229	-.323	.060	-.044	-.038			
14	8.474	2	1	15.000	-.108	.049	-.032	-.094	.020	.017	-.230	-.010	.031	-.019
					-.244	.019	.023	.031	.027	.019	.044	-.157	.024	-.242
					-.241	.025	.022	-.065	.028	.031	-.015			
15	8.655	12	1	16.000	.000	.000	.000	.000	.000	-.000	.000	.000	.000	.000
					.000	.000	.000	.000	.000	.000	-.000	.000	.000	.000
					.000	.000	.000	.000	.000	.000	.000			

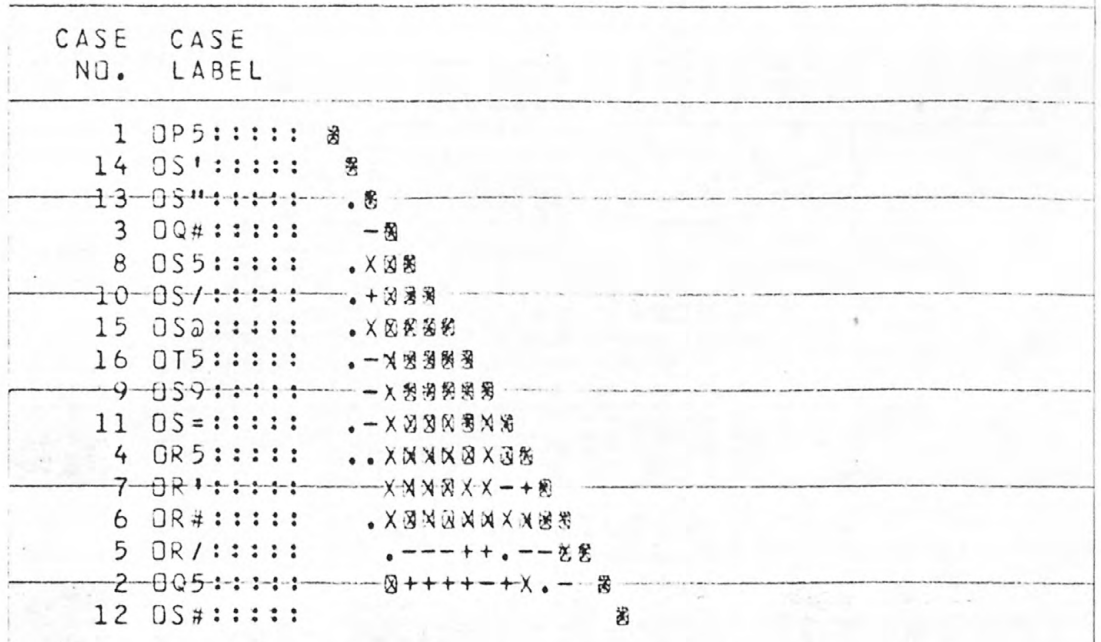
```
        C N
          0    1 1     1 1 1   1           1
        A .  1 4 3 3 8 0 5 6 9 1 4 7 6 5 2 2

        S L  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
          A  P S S Q S S S T S S R R R R Q S
        E B  5 ' " # 5 / 0 5 9 = 5 ' # / 5 #
          E  : : : : : : : : : : : : : : : :
          L  : : : : : : : : : : : : : : : :
             : : : : : : : : : : : : : : : :
             : : : : : : : : : : : : : : : :
             : : : : : : : : : : : : : : : :
   AMALG.
  DISTANCE
             * * * * * * * * * * * * * * * *
       .916  I I I I -+- I I I I I I I I I I
      1.219  I I I I  -+-- I I I I I I I I I
      1.902  I I I I   -+--- I I I I I I I I
      2.498  I I I I    -+---- I I I I I I I
      3.213  I I I I     I     I I I -+- I I
      5.068  I I I I     -+----- I I  I  I I
      5.216  I I I I      -+------ I  I  I I
      5.095  I I I -------+-       I  I  I I
      5.360  I I I        -+--------  I  I I
      5.214  I I I         --+---------  I I
      5.915  I I I           -+----------- I
      6.262  I I ------------+-            I
      7.171  I -------------+-             I
      8.474  --------------+-              I
      8.655                -+---------------
```

HISTOGRAM OF DISTANCES BETWEEN CASES.
THE VALUES PRINTED TO THE LEFT OF EACH BAR ARE THE UPPER
ENDPOINT OF THE INTERVAL AND THE FREQUENCY FOR THE INTERVAL.

```
      .225     0
      .451     0
      .676     0
      .901     0
     1.126     2 **
     1.352     0
     1.577     0
     1.802     2 **
     2.027     1 *
     2.253     0
     2.478     1 *
     2.703     2 **
     2.929     2 **
     3.154     0
     3.379     1 *
     3.604     0
     3.830     0
     4.055     0
     4.280     0
     4.506     0
     4.731     2 **
     4.956     1 *
     5.181     2 **
     5.407     4 ****
     5.632     9 *********
     5.857     4 ****
     6.082     5 *****
     6.308     4 ****
     6.533     4 ****
     6.758    11 ***********
     6.984     6 ******
     7.209     4 ****
     7.434     1 *
     7.659     8 ********
     7.885     5 *****
     8.110     2 **
     8.335     1 *
     8.561     1 *
     8.786     4 ****
     9.011     5 *****
     9.236     4 ****
     9.462     5 *****
     9.687     5 *****
     9.912     2 **
    10.137     3 ***
    10.363     3 ***
    10.588     2 **
    10.813     0
    11.039     0
    11.264     2 **
```

DISTANCES BETWEEN CASES REPRESENTED IN SHADED FORM.
HEAVY SHADING INDICATES SMALL DISTANCES.



THE DISTANCES HAVE BEEN REPRESENTED ABOVE IN SHADED FORM ACCORDING TO THE FOLLOWING SCHEME

		LESS THAN		4.843
	FROM	4.843	TO	5.557
	FROM	5.557	TO	6.045
X	FROM	6.045	TO	6.571
+	FROM	6.571	TO	6.796
−	FROM	6.796	TO	7.509
.	FROM	7.509	TO	7.922
		GREATER THAN		7.922

INITIAL DISTANCES BETWEEN CASES

CASE NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0.00	10.22	9.50	9.19	9.58	8.99	9.37	8.97	8.71	9.24	9.90	10.02	10.15	11.26	8.72	9.37
2	10.22	0.00	5.49	6.15	8.51	7.47	7.79	6.74	7.39	6.72	6.76	10.52	8.25	9.09	6.73	6.61
3	9.50	5.49	0.00	6.13	7.68	6.23	6.56	5.43	6.08	5.50	6.44	10.02	6.81	8.78	5.30	5.62
4	9.19	6.15	6.13	0.00	7.05	5.95	6.72	5.57	6.45	5.68	5.43	8.88	7.60	7.67	5.56	5.33
5	9.58	8.51	7.68	7.05	0.00	3.21	6.80	7.03	6.63	7.03	7.52	10.31	9.04	9.63	6.84	6.65
6	8.99	7.47	6.23	5.95	3.21	0.00	4.71	5.43	5.95	5.59	6.56	9.78	7.77	8.65	5.15	5.71
7	9.37	7.79	6.56	6.72	6.80	4.71	0.00	5.71	6.13	5.87	6.90	9.54	7.94	8.92	5.41	6.05
8	8.97	6.74	5.43	5.57	7.03	5.43	5.71	0.00	2.63	.92	5.17	9.34	6.51	7.63	.93	1.89
9	8.71	7.39	6.08	6.45	6.63	5.95	6.13	2.63	0.00	2.75	6.03	9.27	6.98	8.06	2.57	2.83
10	9.24	6.72	5.50	5.68	7.03	5.59	5.87	.92	2.75	0.00	4.86	9.56	6.71	7.73	1.59	1.65
11	9.90	6.76	6.44	5.43	7.52	6.56	6.90	5.17	6.03	4.86	0.00	10.26	7.15	7.64	5.39	4.66
12	10.02	10.52	10.02	8.88	10.31	9.78	9.54	9.34	9.27	9.56	10.26	0.00	10.44	11.15	9.25	9.30
13	10.15	8.25	6.81	7.60	9.04	7.77	7.94	6.51	6.98	6.71	7.15	10.44	0.00	7.91	6.45	6.95
14	11.26	9.09	8.78	7.67	9.63	8.65	8.92	7.63	8.06	7.73	7.64	11.15	7.91	0.00	7.64	7.78
15	8.72	6.73	5.30	5.56	6.84	5.15	5.41	.93	2.57	1.59	5.39	9.25	6.45	7.64	0.00	2.44
16	9.37	6.61	5.62	5.33	6.65	5.71	6.05	1.89	2.83	1.65	4.66	9.30	6.95	7.78	2.44	0.00

```
BMDP2M - CLUSTER ANALYSIS OF CASES                    PROGRAM REVISED AUGUST 1976
HEALTH SCIENCES COMPUTING FACILITY                    MANUAL DATE -- 1975
UNIVERSITY OF CALIFORNIA, LOS ANGELES

   --- THE DISTANCE MATRIX AFTER CASE CLUSTERING CAN
       BE PRINTED IN A SORTED AND SHADED FORM BY
       STATING 'SHADE' IN THE PRINT PARAGRAPH.  IF 'HIST' IS
       ALSO STATED, A HISTOGRAM OF THE DISTANCES WILL ALSO BE
       PRINTED.  THE MAXIMUM DISTANCE TO BE REPRESENTED BY
       SHADING IS INDICATED BY STATING 'LIMIT = THE MAXIMUM
       DISTANCE'.  VALUES GREATER THAN THIS LIMIT ARE
       REPRESENTED BY BLANKS.  IF NO LIMIT IS SPECIFIED, THE
       PROGRAM DETERMINES INTERVALS OF APPROXIMATELY EQUAL
       FREQUENCY FOR THE SHADING.  WHEN A LIMIT IS CHOSEN,
       INTERVALS OF APPROXIMATELY EQUAL FREQUENCY ARE CHOSEN
       UP TO THE SPECIFIED LIMIT.  TO PRINT THE SHADED
       DISTANCE MATRIX WITHOUT SORTING CASES ACCORDING TO
       THE CLUSTERING, STATE 'NO SORT.'
   --- THE PRINTING OF THE DETAILS OF THE AMALGAMATION PROCESS
       CAN BE SUPPRESSED BY STATING 'NO AMALG' IN THE PRINT
       PARAGRAPH.


PROGRAM CONTROL INFORMATION

        FINISH/


  PROGRAM TERMINATED NORMALLY.
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