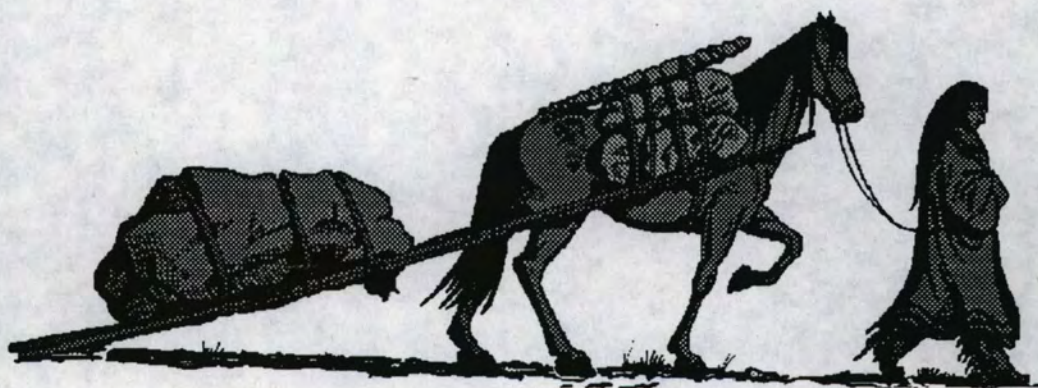


Obsidian

And Prehistoric Transhumance
On and Adjacent to the
Payette National Forest,
Idaho

by
Lawrence A. Kingsbury



Heritage Program
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OBSIDIAN, is the ancient name for volcanic "natural" glass. Most obsidian is black in color. However, obsidian varies in color from black, red, green, gray and brown. There are variances in these solid colors in that some obsidian colors are mixed. Black and red obsidian has been found at the Glass Buttes source in Oregon and at Bear Gulch source in Idaho. Some obsidian is opaque and some is translucent with bands of color. Most obsidians are rhyolitic in composition. All obsidian has glassy luster and a conchoidal fracture that produces concentric wave length breaks, that can be controlled during percussion and pressure knapping (Anonymous 1974:350).

Because obsidian can be shaped, prehistoric people found this natural glass useful in the manufacture of sharp edged tools. Obsidian wherever it was found was used by prehistoric people. In Europe and the Near East, obsidian was widely traded from the ancient exploited sources in Hungary, Sardinia, Lipari off Sicily, central and eastern Turkey and on the island of Melos in the Aegean Sea (Bray & Trump 1975). In 1996, the author examined an obsidian artifact on a neolithic site on the southern coast of Crete. Obsidian does not naturally occur on Crete. In Mesoamerica, obsidian has been found in Mexico and Guatemala (Stross et. al. 1977:115-116). In 1994 the author examined obsidian microblades at the classic period Mayan ruins of Tulum, State of Quintana Roo, Mexico. The obsidian at Tulum probably came from the Valley of Mexico, hundreds of miles to the northwest. In the western United States, obsidian has been found in northwestern Utah and western Nevada (Condie & Blaxland 1970:275), southwestern Montana and eastern Idaho (Willingham 1995:4), western Idaho (Wells 1987:313), and northwestern Wyoming (Hughes & Nelson 1987:313), southern, eastern Oregon, and northern California, in mentioning just a few general areas. Obsidian was a prized and desired material for prehistoric Indians in North America.

The American Indian Hopewell complex, also referred to as the "Hopewell Burial Cult," of the Midwest United States dates from about 2300 years before the present (BP) and lasted until about 1,750 year BP. The Hopewellian complex was believed to have developed in Illinois and evolved into its classic stage in Ohio (Prufer 1964:35), (Jennings 1968:229). Hopewell people were expert flint knappers and made flawless ceremonial knives from obsidian. Some of the large ceremonial knives of black obsidian are 13 inches in length and were unearthed at a Hopewell burial site in southeastern Ohio. The obsidian for these ceremonial knives may have originated from the Yellowstone Plateau (Prufer 1964:233), a distance of about 2,000 miles to the west from southeastern Ohio. The Native Americans in Idaho lived much closer to the Obsidian sources of the Intermountain West.

Obsidian does not naturally occur in the geology on the Payette National Forest (PNF). When obsidian is found on the PNF, it was carried into the area by prehistoric Native Americans from sources somewhere else. There are approximately 436 identified prehistoric archaeological sites on the PNF. Many of these sites contain obsidian artifacts.

A sample of 141 obsidian artifacts from 27 archaeological sites and 6 isolated finds on the PNF, along with 11 obsidian artifacts from 11 sites in the area of the Middle Fork of the Salmon River, were analyzed by a non-destructive energy dispersive x-ray fluorescence analysis (XRF). XRF has been demonstrated to be an effective method for correlating obsidian artifacts with their geologic sources, (Davis 1972), (Sappington 1979), (Ames & Green 1980), and (Hughes & Nelson 1987), (Wright & Chaya 1985).

Robert Lee Sappington Ph.D. and Richard E. Hughes Ph.D. are the two scientists who have analyzed selected obsidian artifacts on and adjacent to the PNF. See Table 1. Robert Lee Sappington is a professor of anthropology at the University of Idaho, Moscow. Richard E. Hughes is director of Geochemical Research Laboratory, Portola Valley, California. Each scientist performed independent laboratory investigations using XRF spectrometers equipped with an x-ray tube, accompanied with a variety of necessary equipment to complete the analysis.

Each piece of obsidian contains trace elements unique to the geological source. Trace elements include zinc (Zn), gallium (Ga), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), niobium (Nb), barium (Ba), titanium (Ti), manganese (Mn), and iron (Fe). These trace elements are expressed in quantitative units i.e. parts per million [ppm] by weight. Matches between unknowns and known obsidian chemical groups were made on the basis of correspondences in diagnostic trace element concentration values. Artifact-to-obsidian source (geochemical type) correspondence were considered reliable if diagnostic mean measurements for artifacts fell within two standard deviations of mean values for sources standards. The results of this science is a data table. The artifact-to-source, geochemical type, attribution for each artifact appears on the data table. The trace element configurations will match geologic obsidian sources (Hughes 1996).

Because obsidian does not occur naturally on the PNF, obsidian can be useful for determining prehistoric transhumance. The obsidian that has been carried to the PNF is derived from sources in eastern Oregon, southern and eastern Idaho and probably northwestern Wyoming. Most of the obsidian artifacts analyzed were derived from the Timber Butte obsidian source in southwestern Idaho. In a letter addressed to Ms. Lee Bennett, Forest Archaeologist on the PNF from 1980 to 1988, dated April 6, 1981, from Robert Lee Sappington, he states...

"Nearly all items (91%) came from Timber Butte, which is about what we expected, but the secondary source area was in the Wallowas (7%) and the remaining three items (2%) came from the Yellowstone area." (Sappington 1981).

What the above percentages suggest is that, the nearer the obsidian source is to the PNF, the higher the frequency will be for that type of obsidian occurring. On the other hand, the lower percentage suggests a greater distance from the PNF. See Maps 1 and 2. Arnold (1984:136) stated that 95 percent of 241 obsidian artifacts from Long Valley, Idaho were derived from the Timber Butte, Idaho obsidian source. The Timber Butte source is about 40 linear miles south of Long Valley, Idaho.

At prehistoric archaeological site 10VY492 (PY-584), located on the South Fork of the Salmon River, four obsidian artifacts were analyzed by XRF. Three of the specimen originated from Timber Butte, Idaho. The distance from the Timber Butte obsidian source to 10VY492 is about 75 linear miles. The Native Americans probably carried that obsidian a far greater distance meandering through the mountainous terrain. A meandering distance is estimated to be 80 to 90 miles. The fourth obsidian artifact analyzed by XRF came from the Dooley Mountain obsidian source in eastern Oregon.

Dooley Mountain is located south of Baker City, Oregon at about 13 linear miles. From Dooley Mountain to site 10VY492 is a distance of 106 linear miles. Making an adjustment for meandering through the mountainous terrain the distance that piece of obsidian was carried is estimated to be as much as 130 to 150 miles. That is, providing the Native American picked up the obsidian at Dooley Mountain and headed east to the South Fork of the Salmon River. In reality, the obsidian was probably handled and used for a far greater distance over a longer period of time.

The obsidian artifacts analyzed by Richard E. Hughes in the area of the Middle Fork of the Salmon River, which is on the eastern boundary of the PNF, revealed that obsidian was being derived from the Timber Butte source to the southwest and from the Bear Gulch source to the east. Site 10LH28 had an obsidian artifact analyzed from the Timber Butte source a distance of 105 linear miles away to the southeast. Site 10VY69 had an obsidian artifact analyzed from the Bear Gulch source a distance of 145 linear miles east. Again, one must realize that Native Americans were not likely traveling in straight line distances and they probably meandered along traditional trails and mountain passes carrying their obsidian tools over long distances.

Another archaeological observation made by the author while doing archaeological excavations at 10VY492 (PY-584) on the South Fork of the Salmon River is that, the greater distance from the obsidian source to the archaeological site, the smaller the tools and chipping debitage become. Obsidian is being curated and used to exhaustion at 10VY492. As obsidian is used up, other lithic material types found within the area become utilized. At site 10VY492 basalt and cryptocrystalline silicates are found in a higher frequency as compared to obsidian.

How long ago were prehistoric Native Americans using obsidian on the PNF? The oldest artifacts of obsidian found in the area of the PNF have been associated with the Paleoindian Period, that dates to 10,000 to 12,000 years BP. Petersen, (1987) reported finding an obsidian Clovis point on the edge of Cascade Reservoir within Long Valley, south of the PNF. Also, a Haskett point base of obsidian was found next to Warren Creek and an Eden point associated with the Cody Complex was found on the edge of Lake Fork Creek (Stoddard 1996:5). It appears that for the past 12,000 years, prehistoric people have been using obsidian and transporting it to the PNF.

In summary, XRF analysis of obsidian artifacts at prehistoric archaeological sites on the PNF, appear to demonstrate five prehistoric ethnographic behaviors that existed prior to Euroamerican contact.

First, despite the absence of locally available obsidian on the PNF, some prehistoric Native Americans had a preference for obsidian and obtained it from sources located in eastern Oregon, southwestern and eastern Idaho, and northwestern Wyoming. The procurement of obsidian from several different sources, indicates that these people were traveling great distances and probably traveled on foot, prior to the introduction of the horse. Within the area of the PNF, the greatest linear distance from the obsidian source to the archaeological site is about 150 linear miles.

Second, they were in communication with other neighboring Native American groups. All obsidian source locations adjacent to the PNF are situated within the former traditional ranges of the Nez Perce, Northern Paiute, Bannock and Northern Shoshone.

Third, the Rocky Mountains of central Idaho appear not to have been a physical barrier to Native American people. Within the Frank Church-River of No Return Wilderness, archaeological sites have been found in the valley floors as well as in the higher elevations of the subalpine lakes and mountain ridges.

Fourth, Paleoindians, 12,000 years ago, up until the time of Euroamerican contact and the introduction of iron tools were using obsidian on the PNF.

Finally, while the means by which obsidian was obtained and exchanged cannot be demonstrated, it is assumed that a combination of both direct procurement from the source and exchange were probably undertaken. A related conclusion is that obsidian was carried long distances and used for a period of time until it was exhausted. When the acquired obsidian was exhausted, other lithic materials with properties of conchoidal fracturing were obtained.

Native Americans of central Idaho were mobile as they foraged over large areas searching for seasonally abundant food resources. They made periodic trips to congregate with other people where plant, animal and mineral resources were plentiful. When people get together, an item like obsidian could be exchanged. From a scientific perspective, XRF and obsidian are useful measures in determining prehistoric transhumance throughout the world, wherever obsidian and humans can be found.

TABLE 1

PREHISTORIC ARCHAEOLOGICAL SITES ON THE PAYETTE NATIONAL FOREST (PNF)
WHERE OBSIDIAN ARTIFACTS HAVE BEEN SOURCED THROUGH X-RAY FLUORESCENCE
AT THE UNIVERSITY OF IDAHO, MOSCOW, BY ROBERT LEE SAPPINGTON PH.D.

PNF SITE #	SMITHSONIAN TRINOMIAL	GENERAL AREA BY COUNTY	NUMBER OF SPECIMEN XRF ANALYZED	ORIGINATING OBSIDIAN SOURCE
PY-333	10VY233	Valley County	18	Timber Butte, ID
PY-240	10VY246	Valley County	9	Timber Butte, ID
PY-381	10VY250	Valley County	1	Timber Butte, ID
PY-241	10VY112	Valley County	15	Timber Butte, ID
PY-242	10VY224	Valley County	8 1	Timber Butte, ID Kepler-Yellowstone
PY-127	10VY44	Valley County	1	Timber Butte, ID
PY-21	10VY50	Valley County	1	Timber Butte, ID
PY-135	10VY54	Valley County	2	Timber Butte, ID
PY-25	10WN167	Washington County	1	Timber Butte, ID
PY-124	10VY41	Valley County	3	Timber Butte, ID
PY-109	10AM69	Adams County	4	Timber Butte, ID
PY-114	10VY31	Valley County	1	Timber Butte, ID
PY-244	10VY226	Valley County	2	Timber Butte, ID
PY-330	10AM107	Adams County	5	Timber Butte, ID
PY-331	10AM108	Adams County	17 6 1	Timber Butte, ID Ebell Source, OR Kepler-Yellowstone
PY-332	10VY222	Valley County	1 10	Teton Pass, WY Timber Butte, ID
PY-334	10VY238	Valley County	1 2	Ebell Source, OR Timber Butte, ID
PY-357	10AM93	Adams County	2	Timber Butte, ID

TABLE 1 (continued)

OBSIDIAN ARTIFACTS SOURCED AT GEOCHEMICAL RESEARCH LABORATORY, BY
RICHARD E. HUGHES PH.D.

PY-10	10AM23	Adams County	1	Timber Butte, ID
PY-60	10IH1580	Idaho County	8	Timber Butte, ID
PY-584	10VY492	Valley County	1 3	Dooley Mountain, OR Timber Butte, ID
PY-399	10AM141	Adams County	1 3	Dooley Mountain, OR Timber Butte, ID
PY-604	10IH1583	Idaho County	2	Timber Butte, ID
PY-752	10AM211	Adams County	1 3	Sugarloaf Butte Timber Butte, ID
PY-983	10AM264	Adams County	4	Timber Butte, ID
PY-989	10WN444	Washington County	1	Timber Butte, ID
PY-330	10AM107	Adams County	1	Timber Butte, ID

The six isolated finds analyzed all were sourced to Timber Butte, ID.

Prehistoric Archaeological Sites on the Middle Fork District of the
Salmon-Challis National Forest

	10VY70	Valley County	1	Bear Gulch, ID
	10VY60	Valley County	1	Bear Gulch, ID
	10LH491	Lemhi County	1	Unknown Source
	10LH27	Lemhi County	1	Bear Gulch, ID
	10LH28	Lemhi County	1	Timber Butte, ID
	10VY125	Valley County	1	Timber Butte, ID
	10VY376	Valley County	1	Timber Butte, ID
	10CR576/876	Custer County	1	Timber Butte, ID
	10VY83	Valley County	1	Unknown Source
	10VY454	Valley County	1	Timber Butte, ID
	10CR929	Custer County	1	Unknown Source

REFERENCES CITED

Anonymous

- 1974 Dictionary of Geological Terms, Anchor Press/Doubleday, Garden City, New York.

Ames, Kenneth M., and James P. Green

- 1980 Results of an XRF Trace Element Analysis of Obsidian Tools from the Hatwai and Lenore Archaeological Sites, Lower Clearwater River, Central Idaho, Ms, Idaho State Historical Society, Boise.

Arnold, Quentin Mark

- 1984 Prehistory of Long Valley, Idaho. USDA Forest Service, Intermountain Region, Cultural Resource Report No. 10, Ogden.

Bray, Warwick and David Trump

- 1975 The Penguin Dictionary of Archaeology, Penguin Books Inc., Baltimore.

Condie, Kent C., and Alan B. Blaxland

- 1970 Sources of Obsidian in Hogup and Danger Caves, In "Hogup Cave," by C. Melvin Aikens, Appendix IX. University of Utah Anthropological Papers No. 93, Salt Lake City.

Davis, Leslie B.

- 1972 Prehistoric Stone Quarring and the Redistribution of Yellowstone Rhyolite Plateau Obsidian, Montana Geological Society 21st Annual Field Conference, pp. 181-186.

Hughes, Richard E. and Fred W. Nelson

- 1987 New Findings on Obsidian Source Utilization in Iowa, Plains Anthropologist 33:313-316.

Hughes, Richard E.

- Letter Reports on File, PY97-1192, at USDA Forest Service, Intermountain Region, Payette National Forest, Supervisor's Office, McCall, Idaho.
April 28, 1994
May 18, 1994
April 10, 1995
September 23, 1996

Jennings, Jesse D.

- 1974 Prehistory of North America, McGraw-Hill Book Company, New York.

REFERENCES (continued)

Petersen, Nicholas H.

- 1987 A Clovis Point from Long Valley, Idaho Archaeologist,
Vol. 8, No. 2, BSU, Boise.

Prufer, Olaf H.

- 1964 The Hopewell Cult, In "Archaeology Myth and Reality,"
Scientific American, January 1982, W.H. Freeman and Company,
San Francisco.

Sappington, Robert Lee

- 1980 X-ray Fluorescence Analysis of Obsidian Flakes from 10-VY-165.
In "Archaeological Test Excavation at 10-VY-165, South Fork Salmon
River Satellite Facility, Valley County, Idaho," by Keo Boreson,
Appendix A, p.35. University of Idaho Anthropological Research
Manuscript Series No. 57, Moscow.
- 1981 Letter Report on File, PY81-200, at USDA Forest Service,
Intermountain Region, Payette National Forest, Supervisor's
Office, McCall, Idaho.
April 6, 1981
- 1982 Obsidian Procurement Along the Middle Fork of the Salmon River in
Central Idaho, in "A Cultural Resource Reconnaissance in the Middle
Fork Salmon Basin," USDA Forest Service, Intermountain Region,
Cultural Resource Report No. 7, Ogden.

Stoddard, Steven E.

- 1996 A Projectile Point Typology for the Payette National Forest, Idaho,
USDA Payette National Forest, Heritage Program, Forest Supervisor's
Office, McCall, Idaho.

Stross F.H., H.V. Michel, F.Asaro, and R. Gruhn

- 1977 Sources for Some Obsidian Flakes from a Paleoindian Site in
Guatemala, American Antiquity 42:114-118.

Wells, Merle

- 1980 Ethnohistory and Timber Butte Obsidian, Idaho Archaeologist
4(2):1-3.

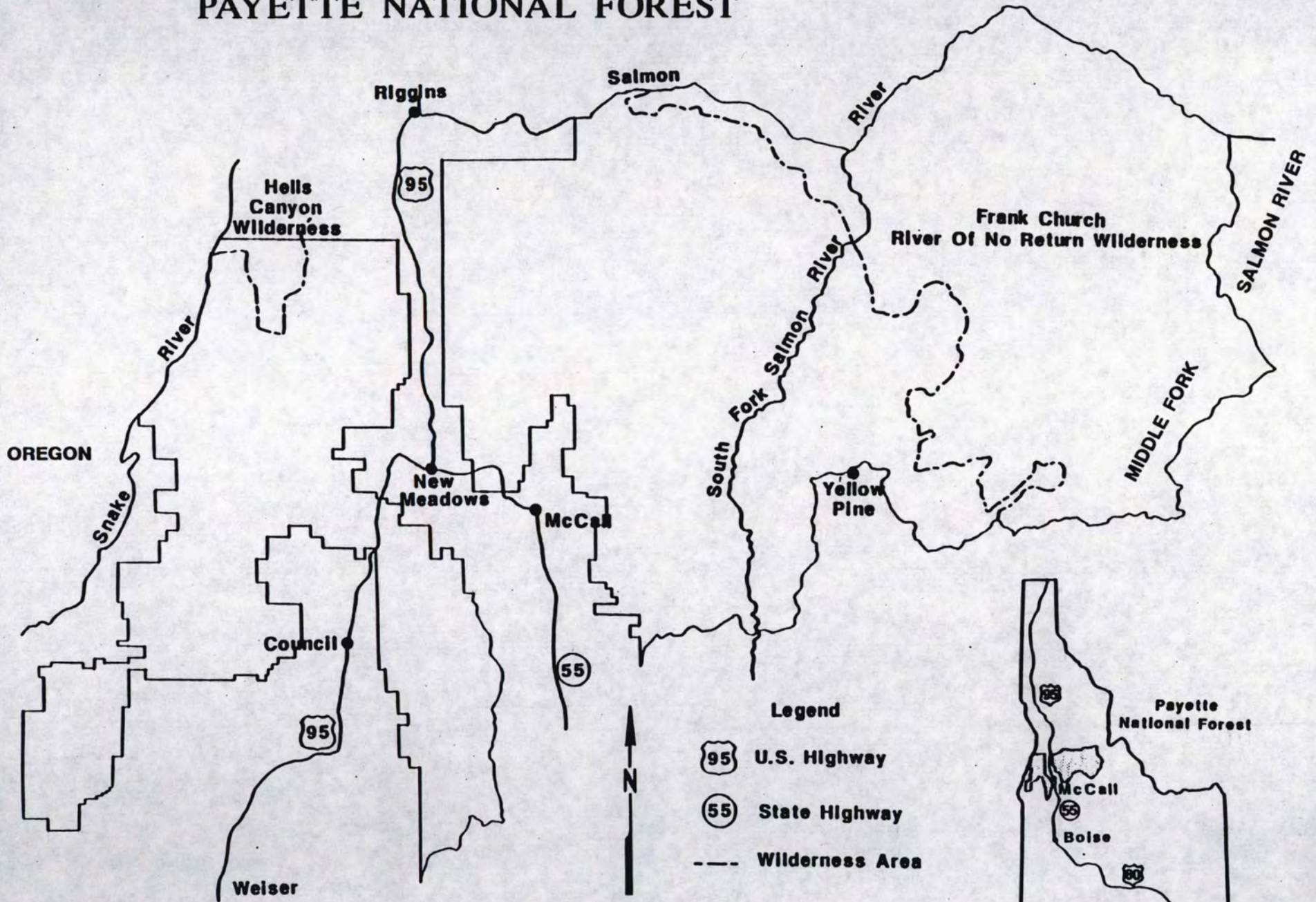
Wright, Gary A. and Henry J. Chaya

- 1985 Obsidian Source Analysis in Northwestern Wyoming: Problems and
Prospects. Plains Anthropologist 30:237-242.

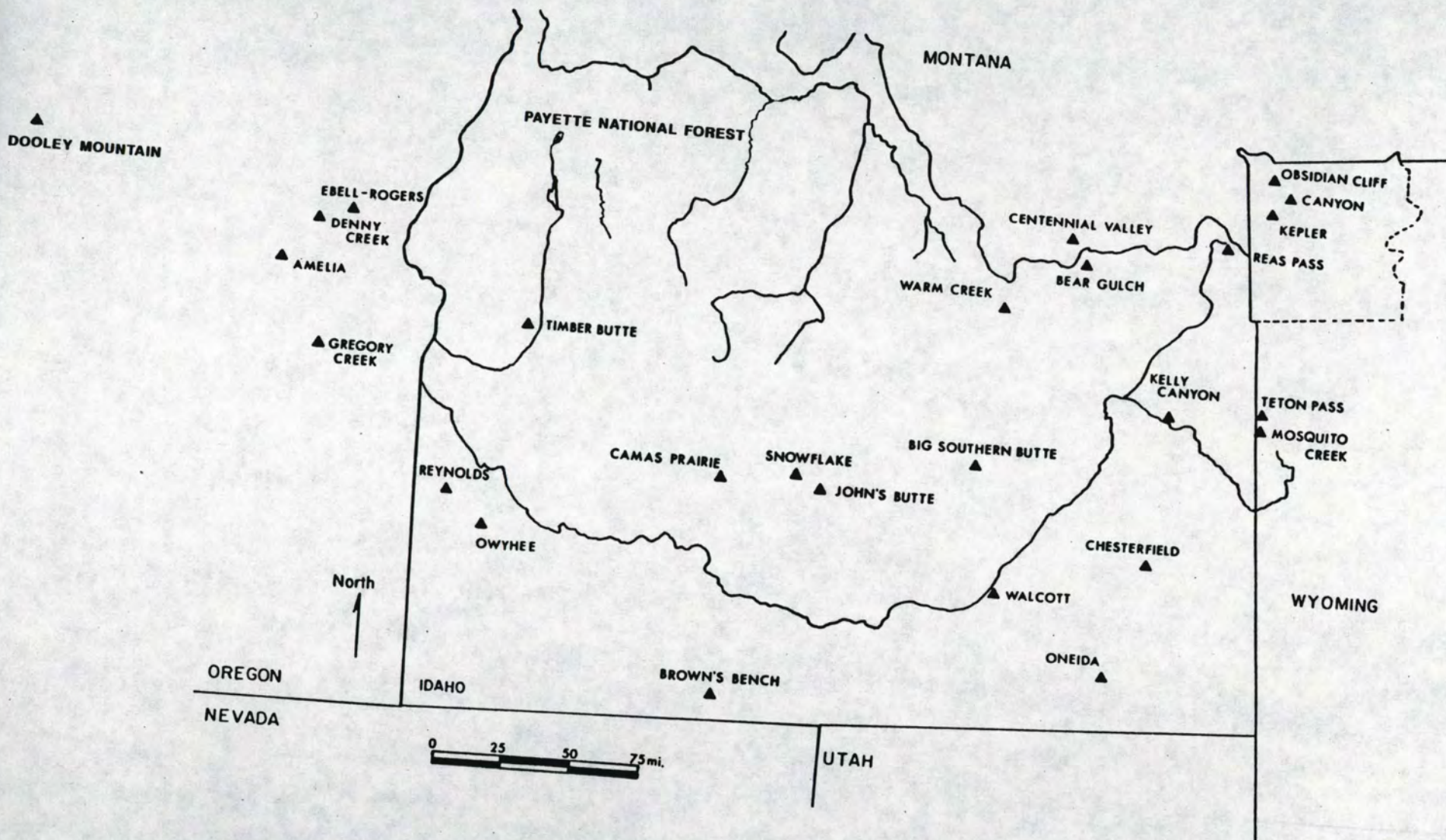
Willingham, Charles G.

- 1995 Big Table Mountain: An Obsidian Source in the Centennial Mountains
of Eastern Idaho, Idaho Archaeologist, 18(1):3-7.

PAYETTE NATIONAL FOREST



MAP 1 PAYETTE NATIONAL FOREST



MAP 2 OBSIDIAN SOURCES IN IDAHO AND ADJACENT TO IDAHO.