

# Record of Early People on Yellowstone Lake

## *Cody Complex Occupation at Osprey Beach*

by Mack W. Shortt



Artist's rendition of life at the Osprey Beach site 9,400 years ago.

### Summary

Archeological research in Yellowstone National Park is in its infancy. While archeologists generally know who was in the park and when for any particular thousand year block, little is known about the daily lives of the people. The National Park Service and the Museum of the Rockies (MOR) have been investigating an interesting campsite that has potential to help fill in pieces of that gap.

The work described in this paper, conducted on Yellowstone Lake in 2000 and 2002, has revealed new insights regarding the earliest people who lived on the shore

of the lake. The location was given the name Osprey Beach for the birds who live there (and whose fishing was not interrupted by our research). Our excavation and analysis have increased knowledge and understanding of those who occupied the area roughly 10,000 years ago. It has been learned that peoples thought to occupy only the plains and foothills, and believed to be primarily bison hunters, were also present in this mountainous lake area on a seasonal basis, and had adopted the broader strategy of hunter-gatherers. This work, while illuminating on its own, raises new questions about this early peri-

od, and should spark further investigations.

### Introduction

In the study of archeology, the Precontact Period (i.e., the time prior to Native American contact with Non-Native Euro-American people) is divided into several broad time periods. Each time period is further broken down into cultural units (e.g., those with similar artifact assemblages) arranged in temporal sequences. One such cultural unit is the “complex,” composed of a unique assemblage of artifacts. Questions relating to the origin and ultimate fate of each complex, or other cul-

tural units, remain to be answered. It is important to note that the term complex does not directly equate with one particular ethnological tribe or cultural group we know from the historic period; in fact, it could be shared by several groups of distinct people. This article describes recent archaeological discoveries in Yellowstone National Park that relate to the cultural unit known as the Cody Complex.

### The Cody Complex

The Cody Complex was first defined in 1951 at the Horner site; a bison kill located roughly 100 km (62 mi) east of Yellowstone Lake near Cody, Wyoming. The bison were identified as an extinct species known as *Bison Antiquus* that was half again as large as modern bison. Horner subsequently became the type site (where this particular group of artifacts were first identified as occurring together) for the Cody Complex. The three tools associated with the Cody Complex include Scottsbluff and Eden projectile points (Figure 1, left and middle) and specialized tools referred to as Cody knives (Figure 1, right). A diagnostic feature of Eden points (Figure 1, middle) that does not show well in this illustration is that they are diamond-shaped in cross-section. Complete Eden points are long and slender, which may account for their frequent breakage.

These three diagnostic tools may occur alone in sites or with either of the other two diagnostic artifact types. Radiocarbon dates from the Horner site ranged from approximately 9,300 to 8,700 radiocarbon years before the present (B.P.). In recent years, the Cody Complex has become a relatively well documented cultural entity identified on the Northwestern Plains and in adjacent Central and Northern Rocky Mountain basins. The typical Cody site dates from approximately 8,000 to 10,000 B.P.

Cody people traditionally have been viewed as representing “classic” early Native American plains bison hunters, dif-

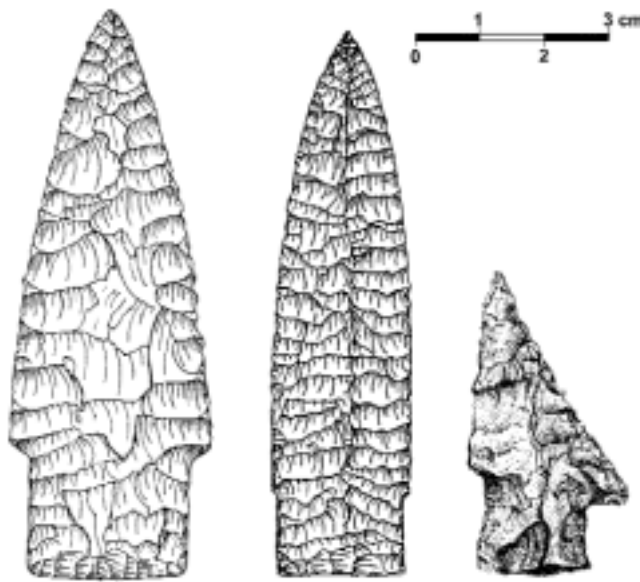


Figure 1. Idealized artifact types. Left to right, Scottsbluff, Eden, and Cody knife.

ferent from the contemporaneous peoples who inhabited foothills and mountain regions. Our work is helping change that impression, which was, for the most part, based upon a singular focus on the excavation of Cody bison kill sites and their associated processing and campsite areas. Indeed, sites such as Finley in the Green River Basin, Carter/Kerr–McGee in the Powder River Basin, and the Frasca and Jurgens sites in northeastern Colorado, are interpreted as large-scale bison procurement operations. Campsites with Cody components include Hell Gap in eastern

Site at Jackson Lake, and at Fishing Bridge and near Solution Creek in Yellowstone National Park. Unfortunately, the Cody Complex artifacts at these sites were mixed with those of more recent periods, making it impossible to determine what other artifacts may have been used at the Cody Complex camp. However, the distribution of these sites suggests that seasonal adaptive strategies are broadly-based, and that Cody people were engaged in a variety of subsistence activities, not just bison killing. The following discussion addresses Cody Complex strategies as reflected by the recent archaeological investigations on the shore of Yellowstone Lake.

### Archeology at the Osprey Beach Locality

The Osprey Beach Locality is characterized by a high north-facing bluff that rises slightly more than six meters (20 feet) above the current lake level (Figure 2). The site was first recorded during the 1958 and 1959 field seasons by the University of Montana’s J. J. Hoffman, during the first professional archeological inventory of Yellowstone National Park. It was revisited in summer 2000 when, at the request of Yellowstone archeologist Ann

Archeological sites and artifact types are typically named after the person who discovered the site, landowners of the site, or nearby towns. The Horner site is named after Pearl Horner, the original landowner. Scottsbluff and Eden points, Cody knives, and the Cody Complex derive their names from Scottsbluff, New Mexico, and Eden and Cody, Wyoming.

Wyoming, Medicine Lodge Creek in northern Wyoming, Claypool in eastern Colorado, the MacHaffie and Mammoth Meadow sites in southwestern Montana.

Cody Complex points and knives also have been found in montane and lakeside contexts, however, such as the Lawrence

Johnson, WSU volunteers surveyed a long section of beach and collected artifacts—two Cody knives and a Scottsbluff projectile point base—that suggested that early Precontact Period archeological deposits could be present.

The Museum of the Rockies archeolo-

gy field crew has completed two field programs at Osprey Beach: a four-day evaluative excavation and survey in August 2000, and a 15-day data recovery excavation program in August 2002. The goal was to recover as much of the archeological deposits as possible, because ongoing natural erosion and illegal artifact collection continue to impact the site. The WSU group also conducted a limited test excavation program in the area during summer 2001. While the small number of artifacts recovered by the WSU test has not yet been documented in a formal report, the two Cody knives, a Scottsbluff point base, and a shaft abrader collected by that crew are included in this discussion.

Combined, the 2000 and 2002 MOR field testing programs at Osprey Beach resulted in the excavation of 66 complete and partial units that were one meter square (Figure 3). Even so, site boundaries have not been identified. The excavations revealed a simple stratigraphic sequence that consisted of three sedimentary units: two colluvial sand deposits and a series of pebbly beach sand lenses that resemble the sands exposed on the modern beach. Dr. Ken Pierce, of the United States Geological Survey, has suggested that after the formation of a paleo-shoreline dating to ca. 10,500 years ago, the level of Yellowstone Lake lowered and retreated to the north. The pebbly beach deposits represented former paleo-beach lines cut by wave action, and were formed when the level of Yellowstone Lake was approximately five meters (16 feet) higher than today. The arti-

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Figure 2. The Osprey Beach site is on an eroding terrace about six meters above the current water level of Yellowstone Lake.

facts were in bedded gravel beach deposits. Thus, at the time of occupation, Cody Complex peoples were camped on a vegetation-free beach, above the active wave zone (see rendering on page 2).

#### Who, What, Where, and When?

When were Precontact Native American people at Osprey Beach, and what activities took place there? A conventional radiocarbon age of 9,360 ( $\pm$  60) B.P. was obtained on a charcoal sample collected by Ken Pierce in 2000. The large number of waste flakes (byproducts of manufacturing and repair activities), and a variety of stone tools suggested that a number of domestic tasks were undertaken. (An analogy for waste flakes would be

wood shavings from whittling, as there are many more shavings than finished carving.) Several small activity areas consisting of concentrated scatters of flakes were recovered, marking the locations where someone worked on tools.

The great majority of artifacts were small pieces of obsidian produced during the manufacturing and maintenance of tools. High numbers of obsidian artifacts are unusual in Cody Complex sites, but

Osprey Beach is the first Cody Complex site excavated in an area where people had easy access to unlimited amounts of obsidian. In addition to obsidian, stone material types at the site included opalized wood, various colors and grades of chert (an opaque stone with a high silica content that is prized for tool-making), including semi-translucent dark green and pinkish-grey varieties, and a single piece of Knife River flint (from quarries in west central North Dakota). The flakes from tool manufacture and repair are currently being analyzed and quantified.

The tools were of greatest diagnostic value, however, and much has been learned from them. Further, although no preserved animal bone was recovered,

analysis of the tools has provided new and unique insights into subsistence activities of these peoples.

#### Analytical Tools

Archeologists make a concerted effort to determine the sources of stone used for tools, as this information provides insight into the travel patterns of the users. The dark green chert used for two of the Cody knives (Figure 4, top middle and right) are from the Absaroka Mountains,

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Figure 3. Osprey Beach site during the 2002 excavations.

which form the park's eastern border. There are many sources of obsidian, and it is often possible to distinguish between them.

*Obsidian sourcing:* At 70–77%, silicon dominates the chemical composition of obsidian. In addition, each obsidian source contains a number of trace elements, whose relative abundance (in parts per million) varies from source to source.

tion of each source.

A typical seasonal migration might look like this: Assuming that people were camped on Yellowstone Lake during the summer, they might have gone south in the fall and acquired obsidians from Conant Creek and Teton Pass on their way to their winter camps in eastern Idaho. In the early spring, they might have moved north and replenished their supplies of

obsidian was a locally available resource for tools (see map below).

*Blood residue analysis:* Upon completion of the 2000 and 2002 field programs, the Cody knives, projectile points, end scrapers, and retouched flakes were submitted for blood residue analysis, a test that seeks to identify species of origin for blood proteins extant on some artifacts.

This technique was pioneered by the Royal Canadian Mounted Police for modern forensics work, and has been applied to archeological specimens over the past 10 years with considerable success. Archeological specimens are washed with special liquids, and the residue is analyzed

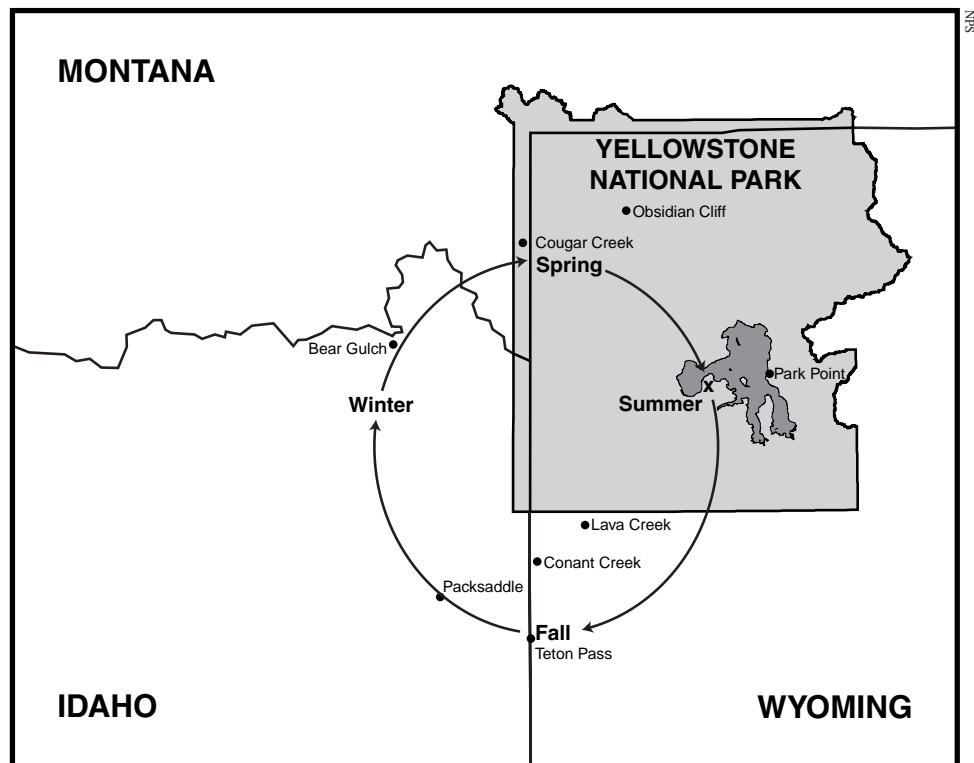
As people are believed to have collected [obsidian] from nearby sources in their travels, we can see where they went by knowing the location of each source.

Using the trace elements zinc, gallium, rubidium, strontium, yttrium, zirconium, niobium, barium, titanium, and manganese, each source has a unique “fingerprint.” The individual composition of these 10 trace elements (in parts per million) creates an original pattern that permits the identification and separation of different obsidian sources and artifacts made from those obsidians.

Thirty-eight specimens from Osprey Beach were analyzed through x-ray fluorescence. These obsidians were assigned sources as follows: 22 (58%) were from Obsidian Cliff Plateau, 8 (21%) were from Bear Gulch (in northeastern Idaho), and 4 (11%) from Teton Pass (west of Jackson Hole). Conant Creek Tuff (near the Idaho border between Yellowstone and Grand Teton National Parks), Huckleberry Ridge Tuff (in the southeastern quarter of the park), Cougar Creek (northwest of Madison Junction), Park Point (on the east shore of Yellowstone Lake), and Packsaddle (in southeastern Idaho) were represented by single specimens. We assume there was little trade in local lithic materials, as everyone would have had equal access to them. As people are believed to have collected from nearby sources in their travels, we can see where they went by knowing the loca-

obsidian from the Bear Gulch source, before coming into the park up the Madison River Valley and past the Cougar Creek obsidian source. A slight jog to the north would get them in the vicinity of Obsidian Cliff obsidian, where a supply of raw material could be obtained before returning to the Yellowstone Lake for the summer. While on the lake, Park Point

in a method similar to human blood typing. A tool's blade and base are washed separately, often producing distinctly different results. This may be because the knife or point is attached to the handle or spear with one type of material such as sinew or blood and then the blade may have had contact with a different animal. Labels in the artifact photos point to the



Sources for obsidian specimens found at Osprey Beach and hypothesized seasonal round.

type of blood residue found on the blade and hafting (notches/base) elements. Hafting is the means by which the artifact is attached to a shaft or handle. About 25% of the specimens submitted for blood residue analysis produce positive results. At present, the technique can distinguish between families but not between members of the same family. We know the identified sheep blood is Rocky Mountain bighorn sheep because 9,400 years ago there were no domestic sheep in North America.

The stem of one of the green chert Cody knives (Figure 4) provided a positive reaction to rabbit antiserum. This may have been related to the site's inhabitants' skinning rabbits or to the use of rabbit ligaments for hafting. Both are strong possibilities. Second, the blade of a broken obsidian Cody knife yielded a positive reaction to canid antiserum, but we cannot differentiate between the four canid forms (wolf, coyote, fox, and dog) found in the park. It should be noted that a Scottsbluff projectile point collected during an excavation at Fishing Bridge in 1992 also tested positive to rabbit antiserum.

Two Osprey Beach knives provided positive mixed species results (Figure 4). One artifact elicited positive test results to rabbit and deer on its stem and blade. The other provided positive test results for rabbit on the stem and Rocky Mountain bighorn sheep on the blade. Combined, the blood residue analyses of the Cody knives indicate that rabbit tissues were likely used as hafting materials and that deer, Rocky Mountain bighorn sheep, and canids were probably butchered prior to artifact abandonment. Several years ago, a chert Cody Knife, collected from the beach in the late 1950s, tested positive for bison.

The projectile points submit-

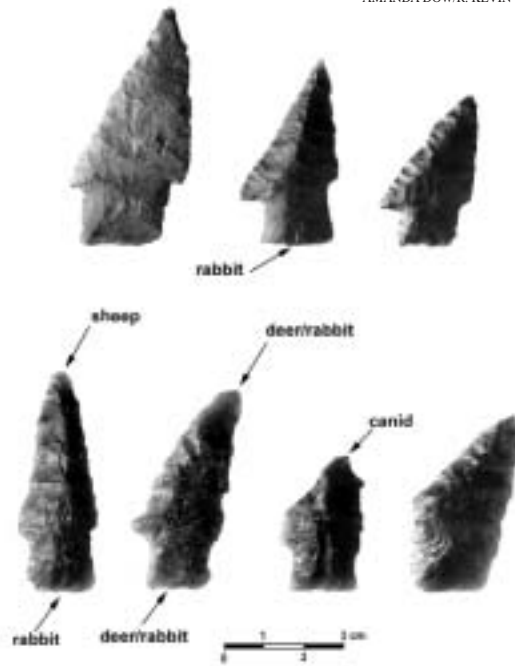
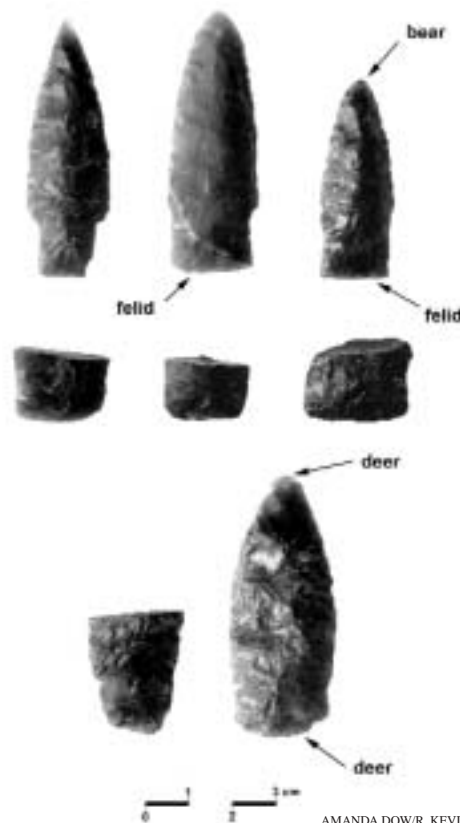


Figure 4 (above). Cody knives from the Osprey Beach site. The bottom row are all obsidian. Top left is brown chert, top middle and right are dark green chert. Blood residue analysis results are shown by the arrows.

Figure 5 (below). Scottsbluff points and bases (upper and middle rows), and parallel-oblique lanceolate projectiles (bottom row). Blood residue analysis results are shown by the arrows.



ted for residue analyses provided equally diverse results (Figure 5). The stems of two complete Scottsbluff projectile points each elicited positive test results to cat (felid) antiserum, and one also provided a positive result for bear. Another projectile point provided a positive reaction to deer antiserum on its stem and blade portions. Finally, the large obsidian expedient flake tool (Figure 5) provided a positive reaction to canid antiserum. A key finding is that bison, the hallmark target species of the Cody Complex, was conspicuously absent in the artifacts tested from Osprey Beach; however, it may simply not have been present in the samples tested. Had bison been identified, this would confirm the earliest evidence of bison in the park.

### Stone Tools Recovered

Stone tool types recovered from the Osprey Beach Locality included seven Cody knives, eight projectile points and fragments, five shaft abraders, five awl abraders, a ground cobble, two end scrapers, one large retouched flake, and an adze. These tools suggest that in addition to domestic activities, a wide range of manufacture and repair tasks took place, implying that the occupation lasted days or even weeks. It is likely that one or more hides were prepared at the site.

*Cody knives:* The Cody knives found both on the beach below the test units and during excavation represent three stone material types: vitreous dark green chert (probably from the Absaroka volcanic rocks on the park's eastern border), brown chert, and obsidian (Figure 4). All four obsidian knives were made of obsidian sourced to the Obsidian Cliff Plateau between Mammoth Hot Springs and

Norris Junction.

Generally, the finely-made brown chert and dark green chert Cody knives (Figure 4, top row) are in better condition than their obsidian counterparts. One obsidian specimen had snapped during use, and another appears to have been re-sharpened so often that the artifact has nearly lost its asymmetric form (Figure 4, lower left). The two remaining complete obsidian Cody knives were, in relative terms, less finely made and heavily worn. It seems that the Precontact Period inhabitants of the Osprey Beach locality were less concerned with curating obsidian knives than with maintaining the integrity of the green and brown chert specimens. This phenomenon may be related to the unlimited quantities of readily-available Obsidian Cliff Plateau volcanic glass versus more “exotic” stone types, and to the relatively more brittle nature of obsidian.

**Projectile points:** For the most part, the projectile points recovered at Osprey Beach were consistent with styles found at other Cody Complex sites. These were probably attached to spears or darts (the bow and arrow do not appear until about 200 A.D. in this part of the world). Forms include three complete Scottsbluff projectiles, two manufactured of Obsidian Cliff obsidian and one of translucent brown chert (Figure 5, top row), and three Scottsbluff point bases, one each of Park Point, Obsidian Cliff, and Bear Gulch obsidian (Figure 5, middle row).

Two projectile points recovered during excavation were morphologically different from the Scottsbluff and Eden types, which are the hallmarks of the Cody Complex. One was a fragmentary specimen



Figure 6. Three sandstone shaft abraders and split pumice cobble abrader (lower right).

that had a convex base, straight lateral margins, and an irregular-to-parallel-oblique flaking pattern (Figure 5, bottom left). This is Bear Gulch obsidian. The other complete specimen, sourced to the Obsidian Cliff Plateau, was characterized by a convex base, excurvate lateral margins, a slightly narrowing stem, incipient shoulders, and a parallel-oblique flaking pattern (Figure 5, bottom right). The complete specimen closely resembles forms from the Lookingbill site southeast of Yellowstone National Park. While most par-

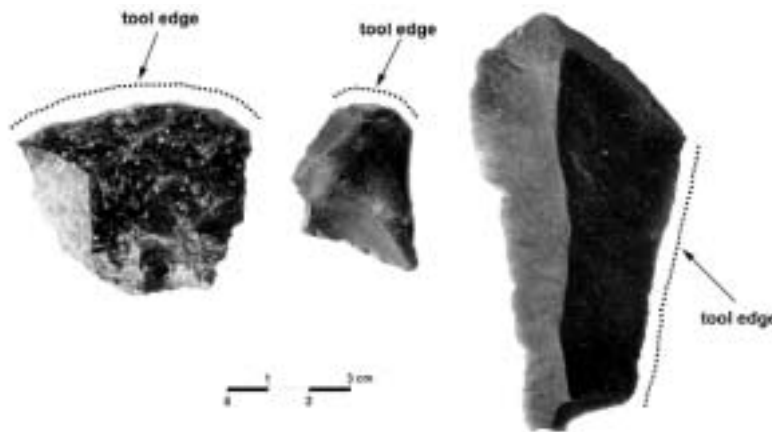


Figure 7. End scrapers and retouched flake (far right) showing working edges.

allel-oblique lanceolate projectiles temporally follow the Cody Complex (ca. 9,000 to 8,500 B.P.), archeological research at Barton Gulch (Alder Complex) in southwestern Montana, and Medicine Lodge Creek in the Bighorn Basin, demonstrate that lanceolate projectiles occur in assemblages that are roughly contemporaneous with, or older than, those of the Cody Complex. The association of these forms with the Cody Complex artifacts at Osprey Beach suggests that members of different cultural groups could have been coming together seasonally in multi-ethnic gatherings. Both groups may have originated from the Plains/Intermountain Basins and/or Rocky Mountains and foothills.

**Abraders:** Abraders are objects whose coarse surfaces are used to smooth a softer object. We identified three types: shaft abraders (used to straighten spear shafts), awl/artifact edge abraders (used to make bone/wood awls or to grind the edges of stone artifacts), and a ground cobble. The 10 shaft and awl/artifact edge abraders are pieces of stone composed of cemented sand. The size of the sand determines whether the artifact functioned as a fine or coarse abrader. The ground cobble tool is a split pumice cobble. The discovery of 11 sandstone abraders during excavation is noteworthy in light of the fact that they are rare at other Cody Complex sites. In fact, the Osprey Beach site has more sandstone abraders than any other Cody Complex site in North America.

The artifacts identified as shaft abraders (five) exhibit generally wider grooves that extend continuously between the lateral margins of the artifact (Figure 6, left column). Four

of the specimens have broader, u-shaped groove widths that approximate 1.5 cm in width. Another has a slight v-shaped groove with a maximum width of 0.75 cm. Other sites with shaft abraders are MacHaffie, Claypool and Jurgens, and Horner.

In addition, six awl/artifact edge abraders were found. These were likely used to make bone/wood awls, or grind or dull the edges of stone artifacts so that the sharp edges would not cut through the hafting materials for the points and Cody knives. These awl/edge abraders tend to be irregular in outline, and consist of amorphous sandstone cobbles with discontinuous 3- to 5-mm grooves incised onto flat cobble surfaces. The grooves gen-

in 1854, the Assiniboine were described as rubbing a heated hide with a pumice stone or porous bone during tanning.

*End scrapers:* The two end scrapers found at the Osprey Beach Locality are large flakes with modification along single edges (Figure 7). The smaller (Figure 7, center) of the two has heavily worn ridges, perhaps indicative of heavy use, and is Obsidian Cliff obsidian, while the larger (Figure 7, left) is from the Cougar Creek source in the Madison Valley.

*Retouched flake:* The one large flake tool (created as the byproduct of the manufacture or refinement of another tool) has slightly irregular flaking (shaping/sharpening) along its shortest edge (Figure 7, right). The obsidian from which this tool

## Conclusions

The Osprey Beach site is the first Cody Complex site to be excavated that demonstrates a clear stratigraphy. Its content and context suggests the site is of at least regional and perhaps national importance. The MOR archeological program has demonstrated that by 9,360 ( $\pm 60$  B.P.), probably during warm weather months, bands of Cody Complex peoples travelled into the heart of Yellowstone country to hunt, gather, and make a wide variety of tools, and that they were joined at Yellowstone Lake by other peoples. While no bone is preserved in the site, blood residue analysis of the tools indicated that a variety of mammalian species were exploited.

## PROTECTING YELLOWSTONE'S ARCHEOLOGICAL SITES

In the field of archeology, we always face the conflicting demands of education and preservation. New analyses and advances in our understanding of early people follow each important discovery of artifacts. The provenience of the discovery is often crucial to the new insights. Sharing this information widely, however, inevitably conflicts with our responsibility to preserve these resources as it advertises the park's archeological sites and sometimes, directly or indirectly, results in illegal collecting. Last year, artifact thieves were incarcerated and fined into the thousands of dollars for stealing artifacts within the park. As we continue our exploration of the park's cultural resources, we are always mindful of striking the proper balance. We work closely with law enforcement and are pleased with their cooperative efforts to preserve and protect the nation's archeological resources in the park. Visitors sometimes find sites and artifacts as they enjoy the park. They are encouraged to bring these finds to our attention, and we make every effort to provide those who do with information about what they found and what it means.

—Dr. Ann Johnson, park archeologist

erally do not extend to the lateral margins of the artifacts. The distinction between these artifact types is blurry, as both broad and long grooves can be found on the same object with the shorter, narrower grooves.

Finally, a 7.8-cm-long split pumice cobble had been utilized as an abrading implement (Figure 6, lower right). One side is relatively flat, with rough, unmodified surfaces, while the opposite exhibits an undulating surface with smoothed, polished facets. Portions of its edges also appear to have been worn smooth. References to the use of such artifacts occur in the ethnographic literature. For example,

was made is from Obsidian Cliff.

*Adze:* An adze-like implement was also recovered. It is a rectangular stone slab that has heavy stepping and battering on one end, and a flat, unmodified surface at the opposite end. Its lateral margins also consist of flat, unmodified surfaces. Thinning of the artifact is suggested by two large flake scars on one side. The tool may have been used to split wood, bone, or other soft materials. In addition, it could have served as a heavy, hand-held chopping tool.

While canids, sheep, rabbits, and deer were identified, no bison were present. It is not known that bison were present in the park at this early date. To date, we have no evidence of fish being used. We have found no evidence for season of use, but given the severity of the winters during this post-glacial period, it is assumed that this was a summer camp.

While in the area around the lake, people utilized obsidian from both Obsidian Cliff Plateau and Park Point to manufacture projectile points and specialized bifaces. Obsidian from sources such as Bear Gulch and Cougar Creek was proba-

bly brought in for tools during the late spring and early summer, and obsidian from other sources were in use as well. In addition, non-local cherts were used by Osprey Beach peoples. Only two pieces of obsidian were found during the excavations at the Horner site; one was from Obsidian Cliff Plateau, and the other from an unknown source. Most of the stone at the Horner site indicated close ties to the Bighorn Mountains to the east, and suggests minor contacts with the Yellowstone Park area by the people at the Horner site.

Pieces of locally-derived sandstone were used as abrading tools to fashion wood or bone tools. Indeed, the 11 sandstone abrading tools represent the largest assemblage of such tools ever found at a Cody Complex site. The type of grooves present suggests that spear shafts and bone awls were being worked. The end scrapers and hide abraders suggest that hides were being tanned, possibly for shelters. The sharpening of awls implies that clothing was being prepared, as these tools are believed to be associated with manufacture of clothing.

As a result of the Osprey Beach investigations, we have a more complete picture of human life in the park some 9,000 years ago. The picture on page 2 is an artist's rendition of what the Osprey Beach camp might have looked like. There are also archeological sites on six of the seven islands in Yellowstone Lake, and one of these sites is assigned to the Cody Complex. To date, there is no evidence for how people would have gotten to the islands during the summer.

Finally, in the past it was suggested that approximately 10,000 years ago, an ecological boundary separated intermountain basin/plains-oriented cultural groups (people adapted to plains bison hunting lifeways) from other contemporaneous cultural groups that occupied adjacent foothill and mountain regions. The latter cultural groups were thought to be adapted to hunting and gathering in environs where a wider range of faunal and floral species could be exploited. Other studies, however, suggest that by Cody Complex times, the different adaptations to those ecological zones were breaking down. The Osprey Beach evidence supports the hypothesis that Cody Complex peoples

were seasonally adapted not only to the plains and intermountain basins as bison hunters, but also to upland/mountain environs, where a variety of mammalian species were available. The diverse blood residue data indicate that the mountains/plains cultural dichotomy, if it ever existed, was in fact breaking down by the time of the Osprey Beach occupation 9,360 ( $\pm$  60 B.P.). It appears, therefore, that early Precontact Period Native Americans at Osprey Beach were versatile hunter-gatherers who sustained themselves in many ways under the various natural resource circumstances they encountered. 🌀

### Acknowledgements

I would like to acknowledge the substantial support of the Yellowstone Park Foundation for the 2002 Osprey Beach Locality archeology project. Their generosity has made a highly significant contribution to the understanding of early Native American settlement in Yellowstone National Park. The Teton County Preservation Board is recognized for funding the 2002 blood residue analyses that provided critical insights. John Albanese and Dr. Kenneth Pierce visited the site and provided important contributions through their geological interpretations. Drs. Ann M. Johnson, Brian O.K. Reeves, and Leslie B. Davis are acknowledged for their considerable efforts in facilitation, coordination, and supervision. Finally, the participation of John Reynolds, a volunteer on the field project, in the review of this paper is gratefully noted.

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