Howard

SITE 24CA287, A FRESHWATER MUSSEL SHELL MIDDEN NEAR GREAT FALLS

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INTRODUCTION

In the spring of 1988, the Montana Department of Fish, Wildlife and Parks began negotiating with the Montana Power Company to purchase five properties located on the Missouri River between Ulm and Great Falls, Montana. The Department of Fish, Wildlife, and Parks hoped to acquire the properties from Montana Power for development of fishing access sites, recreation areas, and wildlife habitat.

Recognizing their responsibilities to the Montana State Historic Preservation Office, as mandated by various state and federal antiquities laws and regulations, Fish, Wildlife and Parks requested a cultural resource assessment of all five properties to be carried out before development plans were drawn up (Aaberg 1988).

One property contained a unique cultural feature for Montana, a substantial freshwater mussel shell midden (24CA287). This article describes the preliminary information that is available for this site.

ENVIRONMENTAL SETTING AND NATURAL HISTORY

Location

The stretch of Missouri River with site 24CA287 is about 25 miles downstream from where the river breaks through the Adel Mountains of the Rocky Mountains East Front and enters the Great Plains (Fig. 1). It lies eight miles upstream from Great Falls, in Cascade County.

Geology

The Missouri River valley between Cascade and Great Falls is very mature. Numerous old oxbows and meander scars testify to the lateral migrations of the river through time. The valley is in the same place it was before Illinoian and Wisconsinian glaciations. Below Great Falls, the Missouri River has changed course and carved valleys several times during the Pleistocene and Holocene Epochs (Alden 1932).

Above Cascade, the Missouri River occupies a very ancient valley, which probably had its beginnings 3 or 4 million years ago when rapid uplift of existing mountain ranges occurred. This uplifting expansive areas of isolated alpine areas created lakes that eventually overflowed and began carving drainage systems. Some geologists believe that before this rapid uplifting, the Continental Divide lay 100 to 150 miles north and east and much of southwestern Montana was drained by the ancestral Snake River (Lyons 1944). With uplifting, the Missouri River captured much of the area once draining down the west side of the Continental Divide.

The dominant physiographic feature of the project area is the Missouri River valley. For that reason the geological history will focus on this stretch of the river rather than on the geology of the closest mountain ranges, the Adel and Big Belts.

In the project area there is up to 270 feet of valley fill (Alden 1932). Before the valley infilled the Missouri River cut through marine and beach deposits of the Kootenai and Colorado Formations laid down during the Cretaceous Period. These Cretaceous Formations are dominated by sandstone in the project area but include the dark shales of the Colorado formation as well. Reddish, brownish and pinkish sandstones of the Kootenai formation are particularly prominent along the

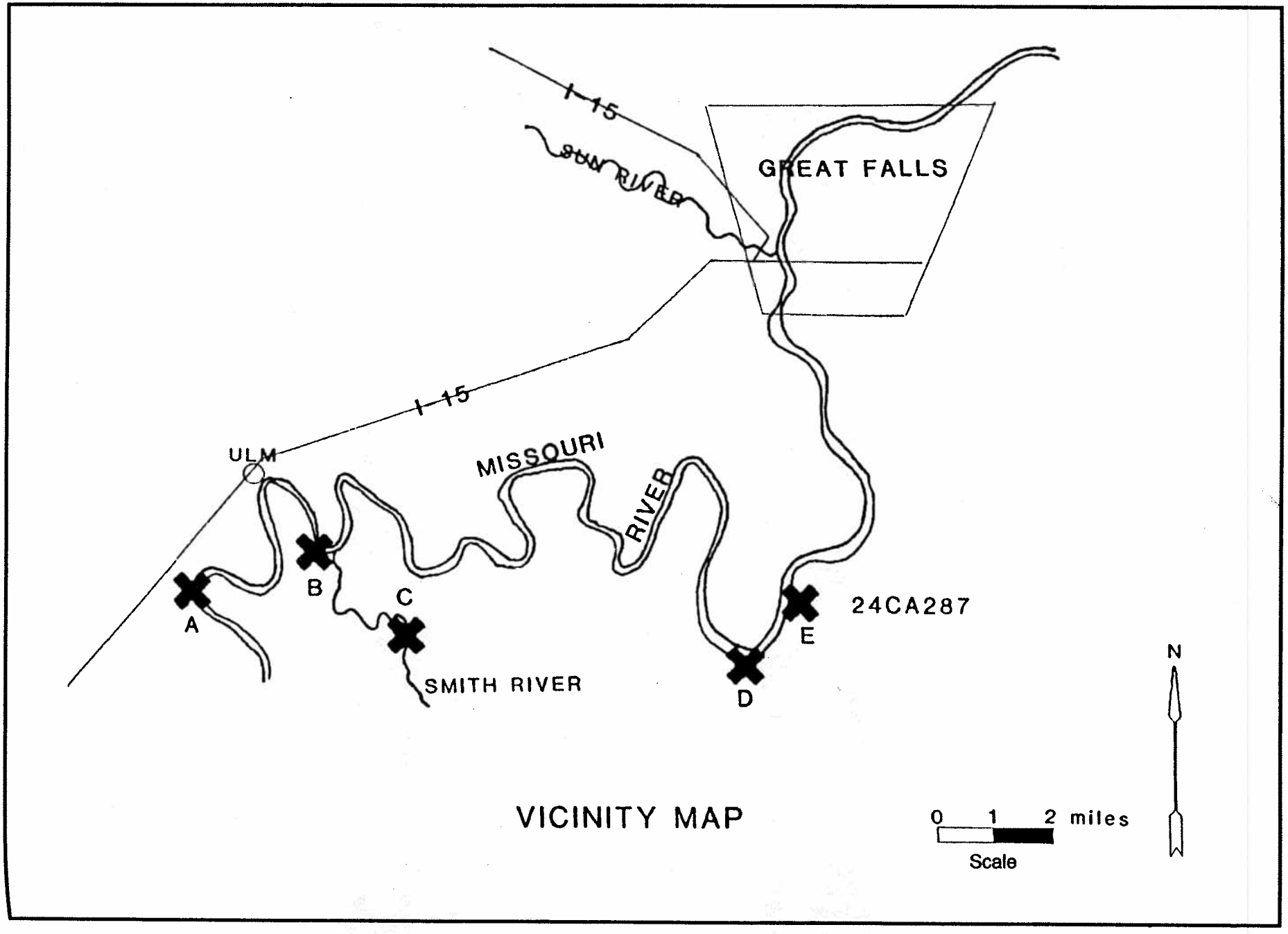

Figure 1. Vicinity map showing site 24CA287 southwest of Great Falls and the five inventoried parcels.

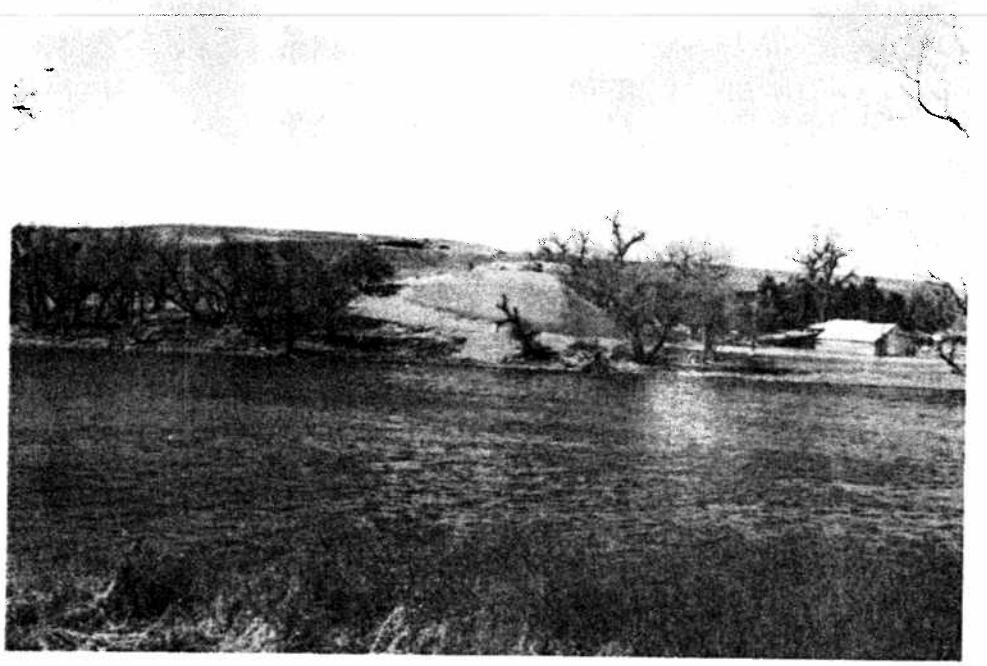

Figure 2. Active Sand Dunes along the Missouri River in the Project Area.

south and east sides of the Missouri River in the study area.

The sequence and reasons for the deep infilling of the river valley in the Cascade/Great Falls area are not clear but relate to the valley's age and the area's glacial history. The Iowan or Illinoian stage of the Kewatin Ice Sheet advanced as far south as the area just north of Great Falls 70,000 to 140,000 years ago and blocked the old Missouri River course, which drained north into Hudson's Bay. This blockage created a huge lake (Glacial Lake Great Falls) near Great Falls before the impounded waters cut a new route eastward. The spillway created when Lake Great Falls overflowed eastward is now a spectacular feature known as the Shonkin Sag southeast of Great Falls. When the ice sheet retreated, the Missouri again cut northward near Great Falls but it followed an eastward course and reoccupied the glacial channel cut by lake waters near the mouth of Belt Creek.

Glacial Lake Great Falls reached up the valley of the Missouri well past Cascade and intruded into the gorge cut through the Adel Mountains. It also extended well up the Smith River valley. Well drilling records from the Ulm area show up to 150 feet of sand as the major component of valley fill (Alden 1932). These sands are believed to be of glaciolacustrine origin laid down in Lake Great Falls (Lyons 1944). However, deltaic deposits probably formed at the mouths of the Missouri and Smith Rivers where they entered Lake Great Falls. These delta deposits included relatively coarse-grained sands.

When the glacial lake drained, the Missouri continued to migrate laterally across its old valley between Cascade and Great Falls but never changed course as drastically as further downstream. These lateral migrations no doubt reworked the glaciolacustrine deposits laid down in Lake Great Falls. Valley alluvium in this stretch of the Missouri is composed of very sandy sediments.

The dominant features of the present and old Missouri floodplains between Cascade and Great Falls are active and inactive sand dunes (Fig. 2). Some of these dunes rise more than 150 feet above the surrounding floodplain. There is almost no information available on how or when these dunes formed but it is generally believed that the sandy flood plain became unstable during the hot dry Altithermal from 4,000 to 7,000 years ago. Vegetative cover was reduced and created an environment conducive to dune formation in this very windy zone off the east front of the Rocky Mountains. Much of the area has revegetated and the dunes have become much less active.

The Missouri River in the project area is a lazy, meandering stream which falls only 85 feet in 75 miles (Alden 1932). Its bed in this reach is very sandy and clayey and the river has cut a very deep and slowly moving channel. The flood plain of the Missouri River in the project area has become much less active since the construction of three major dams upstream. River flow is much more controlled and the lateral migration much less dramatic. Before dam construction, the river likely moved its channel rapidly and dramatically in the very sandy, unstable sediments which form its flood plain.

Regional Geography

Site 24CA287 occurs beside the Missouri River approximately 300 miles downstream from its headwaters (Three Forks) and about 12 miles upstream from the Great Falls of the Missouri. The river takes on the character of a true plains stream as it meanders lazily across the Chestnut Valley, which was cut by the Missouri prior to glaciation. At the city of Great Falls, the river takes on a much different character as it is still downcutting through its relatively recent, post-glacial channel. Twenty-five miles upstream the Missouri is characterized as a mountain stream for the entire route to its headwaters. The river valley is quite ancient for its first 300 miles below the headwaters and predates glaciation.

In addition to the broad flat flood plain of the Missouri, many buttes and hills dominate the project area. The most prominent of these features is C. M. Russell's Square Butte, to the west. Many of these topographic features are lacoliths or "blisters," which formed on the earth's surface during a period of intense volcanic activity 60 to 70 million years ago. That era of vulcanism also produced the igneous Adel Mountains, the range closest to the study area, 25 to 30 miles upstream.

The Little Belt Mountains rise 30 to 40 miles southeast of

the project area while the outlier Highwood Mountains are visible 30 to 40 miles to the east. From the study area glaciated plains of northcentral Montana extend northeast and eastward into the Great Plains physiographic province.

The Smith River is the Missouri's main tributary and joins the river west of the site. The Smith originates in the mountainous area where the Big Belt and Little Belt ranges meet south of the site. The Dearborn River enters the Missouri further upstream in the Adel Mountains, while the Sun River enters north of the site. Sand Coulee is the largest intermittent stream which enters the Missouri River near the site area. Sand Coulee occupies an oversize valley, which was a preglacial channel of the Missouri.

Site Physiography

The upland slope rises abruptly from the east edge of the property, where site 24CA287 was recorded (Fig. 3). The county road and the extreme east edge of the tract rest on a bench which has formed midway between the river and upland surface. From this bench the land slopes steeply to a swale or depression that occupies most of the property's central portion. This swale appears to be part of a dune feature rather than a meander or channel scar. From this swale the land slopes gently up before dropping off again to the Missouri River. At the south end of the tract are several projecting areas of the mid-elevation bench described earlier. These slope moderately to the river. The old county road forms the north boundary of the property. Originally the county road traversed an upland ridge spur which projects out to the river's edge just downstream from the north end of Property E. At some point in the past the county road was straightened by cutting directly through this ridge spur.

Very sandy silts and clays are exposed in the river cutbank, while other erosional exposures higher on the property display nearly pure sands. Most of the site property lies well above the active flood plain of the Missouri River but the landform appears to undergo cutbank erosion during high water. Ash, willow, dogwood, cottonwood, chokecherry, and wild rose grow in a narrow but dense strip along the river's edge. Elsewhere a mixture of prairie and meadow grasses and sedges grow.

Steep upland slopes pinch in on the Missouri River both upstream and downstream from the tract. Across the river, directly opposite the property, is an extensive dune field which has formed on the flood plain. This dune field is mostly stable with good vegetative cover.

Vegetation

Much of the Missouri River valley and the uplands in the site area are farmed. The primary crops are wheat and barley. Remaining rangeland supports a mixture of short prairie grasses such as needlegrass, wheatgrasses, fescues, bunchgrasses, blue grama, sedges, and various forbs. The most conspicuous vegetative community in the project area is the riparian zone. Members of the riparian community recur with regularity in the bottom along the Missouri and Smith rivers. Interestingly, ash trees outnumber cottonwood as the dominant deciduous, semi-hardwood along the river. Upstream above Cascade to the headwaters, and particularly downstream below Great Falls for the remainder of its course, the Missouri River valley riparian forests are dominated by cottonwood. It is possible that the extremely sandy sediment of the Missouri valley between Cascade and Great Falls is preferred by ash or is where ash outcompetes cottonwood. Chokecherry, dogwood, and willow are also quite common and abundant along this stretch of river. Wild rose and Virginia creeper often dominate the understory in the bottoms along the Missouri and Smith.

The most abundant food plants in the prairie terrain of the project area would probably be wild onion (*Allium* spp.), prairie turnip (*Psoralea esculenta*), and biscuitroot (*Lomatium* spp.), although a systematic inventory of flora was not undertaken in this off-season survey. Chokecherry is an obvious and abundant foodplant of the bottomlands. Buffaloberry and gooseberry probably exist along this stretch of the Missouri, although none were seen during the survey. Wild rose is likely the most abundant of native economic plants in the project area.

Fauna

Mule deer, white-tailed deer, and pronghorn antelope were all seen in or near the site during survey. The white-tailed deer (*Odocoileus virginianus*) would seem to be the most abundant ungulate in the bottomlands of both the Smith and Missouri rivers and was the most common sighting during the project. Historically bison and elk occupied the area but neither are present today. Elk do range down into the foothills of the Big Belt and Little Belt Mountains and are present in the Highwood Mountains, all of which are within 50 miles of the site.

Other wildlife sightings during the survey included coyote, skunk, porcupine, great-horned owl, red-tailed hawk, bald eagle, Canada goose, mallard, teal, buffle head and beaver. A variety of other riverine using species would be expected in the area.

One of the most interesting observations on fauna was the regular occurrence, sometimes in abundance, of freshwater mussels and/or mussel shells along the Missouri River. Some specimens appeared recent, while others were obviously old. More specimens were seen along this stretch of the Missouri than have ever been viewed by this investigator elsewhere along the Missouri or any other river in Montana. The presence of this relatively abundant aquatic resource may figure importantly in the site archaeology and will be discussed again later.

Climate

The Missouri River between Cascade and Great Falls lies at the juncture of two major climate regions: the Pacific Northwest and the Northern Plains. For much of the year, area climate is influenced by Pacific westerly winds which bring air masses from the Pacific Ocean. Although these air masses contribute to mild conditions throughout the year, much of their moisture is lost over the Cascades and western ranges of the

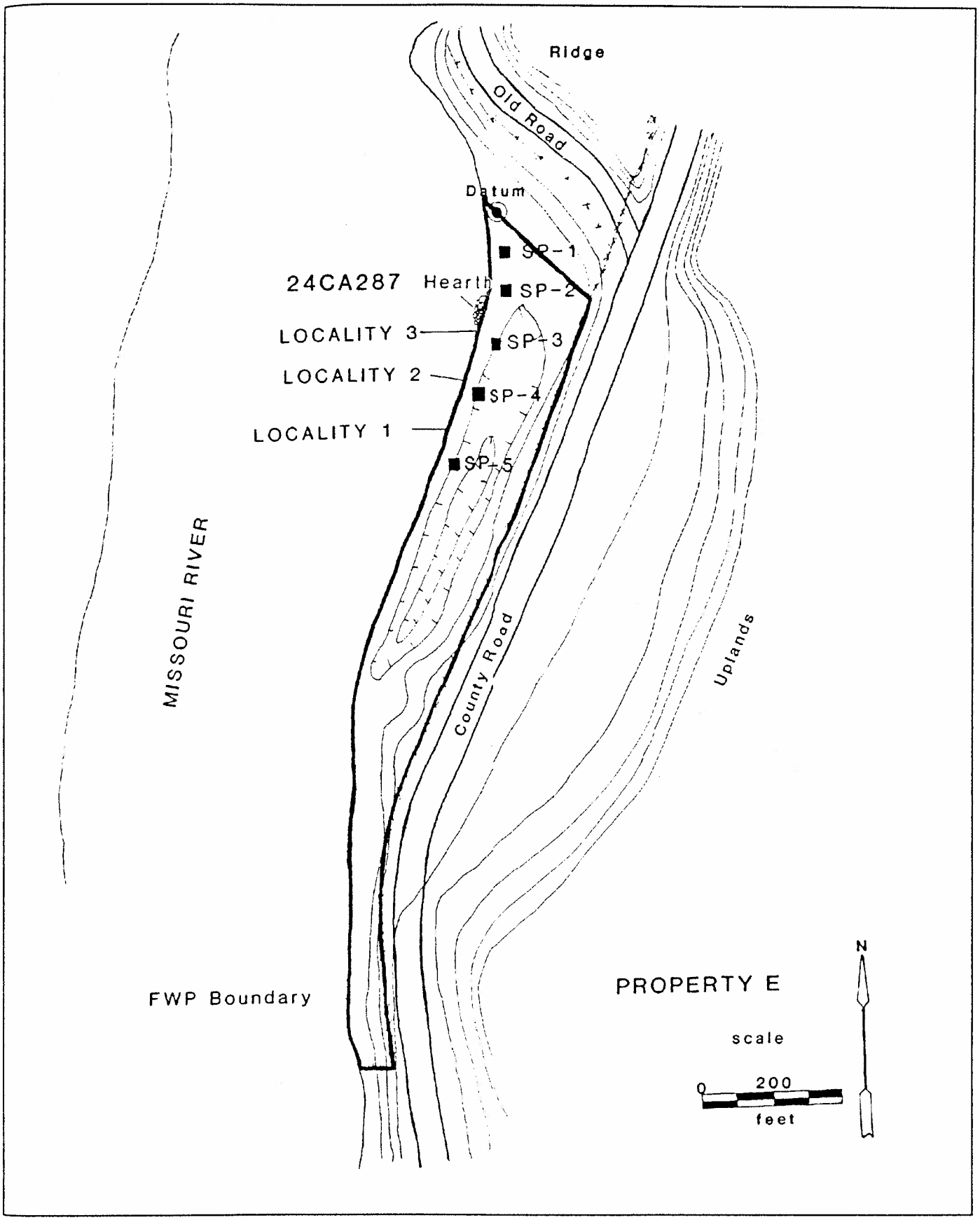

Figure 3. General Map of Site 24CA287 showing differnt localities discussed in the text. SP=shovel probe. the dark line indicates the extent of Property E survey.

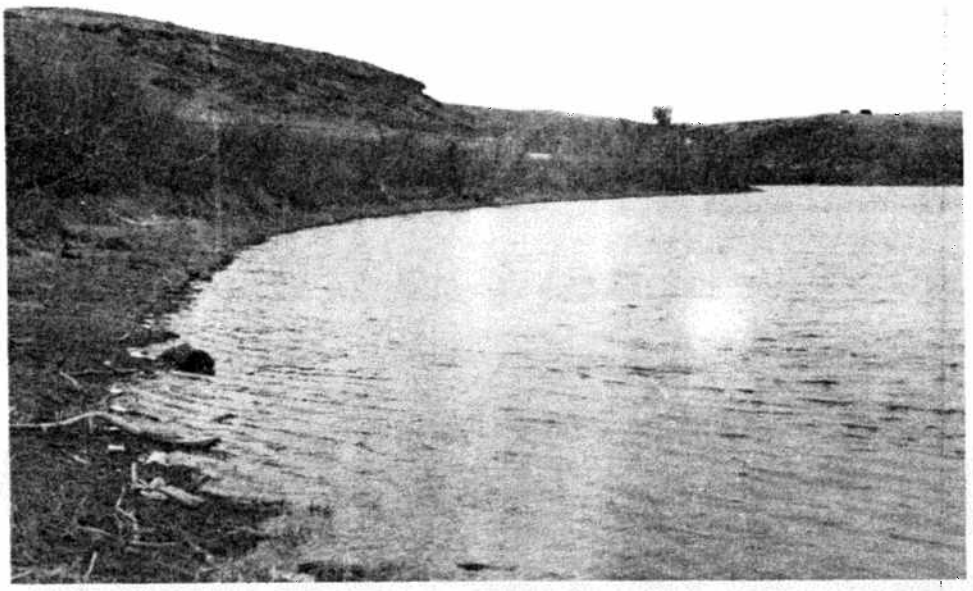

Figure 4. Photograph of shoreline, view south.

Figure 5. Mussel shell in river at site 24CA287.

Rocky Mountains. Arctic fronts which sweep down from Canada are common in the area particularly during winter months. Occasionally more continental weather fronts move in from the Plains to the east and from the Gulf to the south.

The Great Falls area also lies in the heart of the "chinook belt." Chinook winds are the warm winds which sweep down the east front of the Rockies during the winter and sometimes account for dramatic temperature rises. These westerly chinook winds develop when a Pacific air mass moves into the Rockies, cools as it rises and loses moisture on the west side of the Continental Divide, then heats as it rapidly descends the east side of the divide. This belt extends from southern Alberta to the Wyoming border along the east front of the Rockies. These warm winter winds, once accounted for a world record 47 degree temperature rise in temperature in a seven minute period at Great Falls, and regularly clear the area of snow. The area's proximity to Canada and arctic fronts also produces spectacular results in the other direction. A 100 degree temperature drop occurred near Browning (from + 44 to - 56) in a 24-hour period in 1916 (Alwin 1982).

Summer temperatures in the project area can get quite warm but are generally moderated by elevation and proximity to cooling winds of the Rockies.

Site 24CA287 Description

The archaeological site on this property was first noted while the author walked the Missouri River shoreline (Fig. 4) along the west edge of the tract. A dense scattering of freshwater mussel (*Lampsilis* sp.) was visible along the shore (Fig. 5) beginning about midway down the tract and extending beyond to the north (downstream boundary of the property and beyond for about 50 meters on to private property. In many areas bone was observed scattered among the shell (Fig. 6). Eight flakes (1 obsidian, 3 silicified sediment, 3 basalt and 1 unidentified, ultra-mafic, igneous) were also found along the beach with the shell and bone.

Fire-broken rock were observed also. Near the north edge of the tract, on state land, a very large fire-broken rock feature was discovered partially slumped out of the riverbank. This feature was about 3.5 m wide and was formed of rather large (5-25 lb) sandstone rock. Much of the rock was fire-broken and reddish colored through oxidation. The sandstone rocks appeared to have been gathered locally from material weathered from the Kootenai Formation, which is exposed

along the river's edge just downstream from the site and to the east along the upland rim. Bone and shell seen among the fire broken rock of this feature.

The Missouri River cutbank along the site is being eroded by the river but is in a state of relative stability with vegetation established on the slumping bank surface. There are a few areas with vertical, fresh, cutbank scars but the riverbank is primarily a slumping talus slope with vegetative cover. In an attempt to locate inplace cultural deposits, a shovel was used to face up the riverbank in several localities along the stretch of beach where bone, shell and fire-broken rock occurred. At three places, cultural materials were found in place.

Locality 1 (Fig. 3) lay near

Figure 6. Mussel shell and bone at site 24CA287.

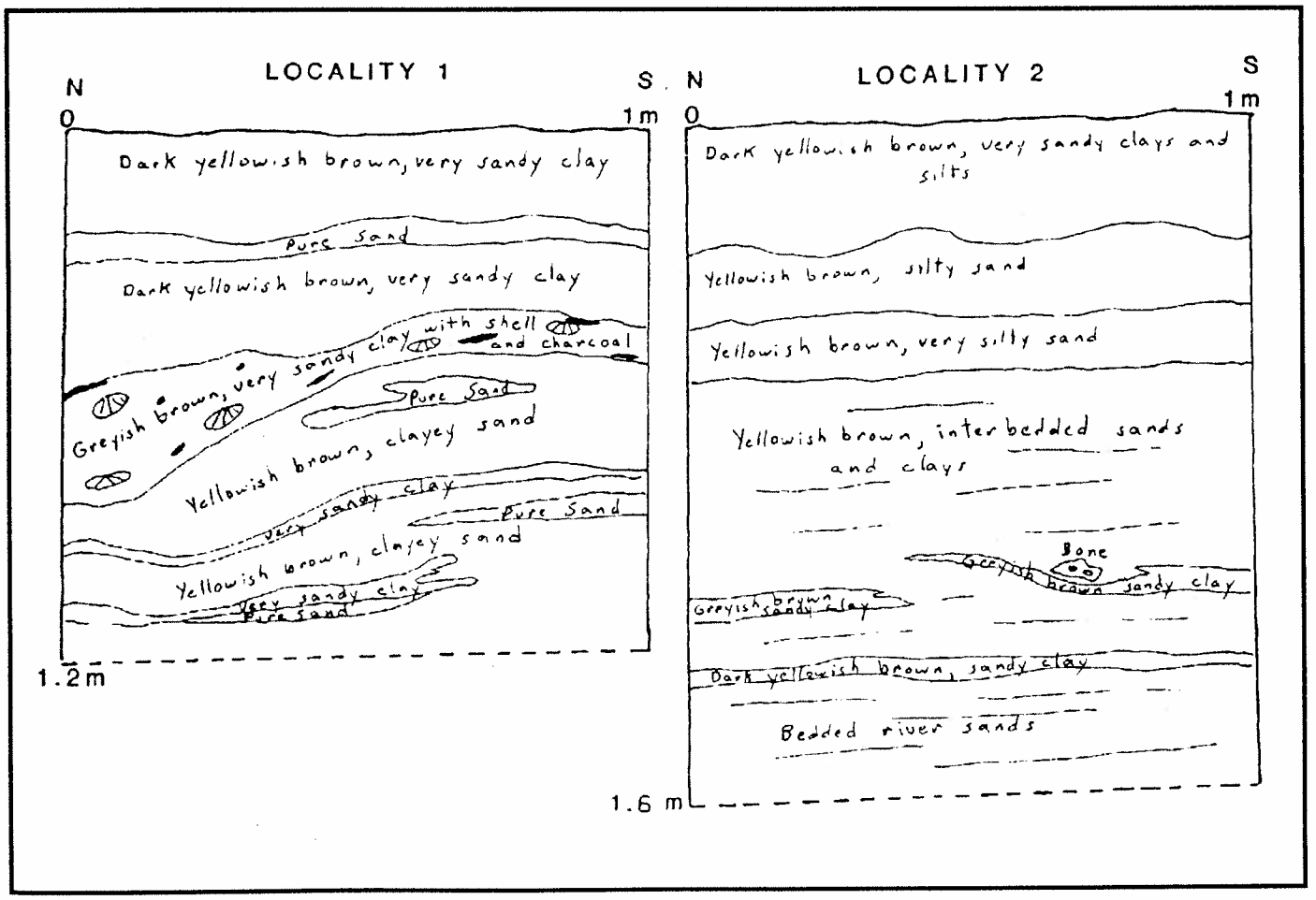

Figure 7. Soil profiles at site 24CA287, Localities 1 and 2.

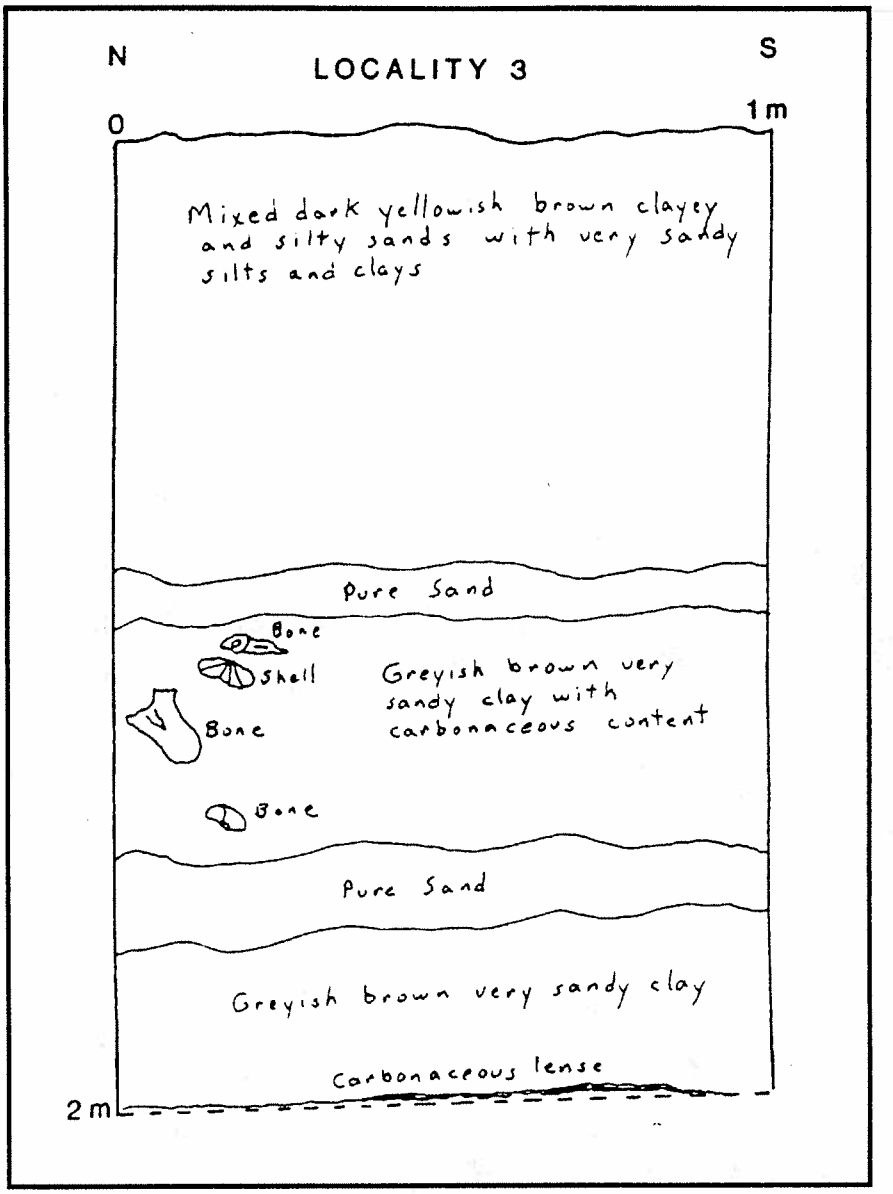

Figure 8. Profile of site 24CA287, Locality 3.

the upstream margin of the bone and shell beach scatter. Here bone, shell, and charcoal were exposed in place. A charcoal sample was collected. It was difficult to determine vertical provenance of these deposits because the entire site landform slopes down to the river's edge. At the point of profiling, bone and shell were 45-90 cm below surface in a stratum of varying thickness and irregular slope (Fig. 7).

At Locality 2, bone was found in place in very sandy deposits. This locality was about midway between Locality 1 and the large fire-broken rock feature (Fig. 3). At the profiling station the bone lay about 110 cm below surface (Fig. 7).

Locality 3 lay on the south edge of the fire-broken rock feature (Figs. 3 and 7). Bone, fire-cracked rock and freshwater mussel shell were found in a thick stratum. At the profiling station, cultural materials lay from 100 to 140 cm below surface (Fig. 8).

After inspecting the riverbank, the remainder of Property E was investigated. At that time a few bone fragments and fragmentary fire-broken rock were noted in the tailing piles created by rodent burrowing (probably northern pocket gopher). These materials were evident on the portion of the landform which paralleled the bone and shell beach deposits. A series of 5 shovel probes were placed in the surface of the site landform about 25 m back from the riverbank. They were placed at approximately 40 m intervals beginning 10 m south of the north property boundary and extending southward 200 m (Fig. 3). These shovel probes were not excavated in concise 10 cm levels but were designed to determine only if buried cultural materials were present. The probes were excavated to 75 cm below surface. Probes 1 and 2 were negative, while Probes 3 through 5 were positive.

In Probe 3 two bone fragments were found in a very sandy, grayish brown clay which lay 25-35 cm below surface. Nearly pure sand overly and underlay this stratum while a similar very sandy clay occurred in the first 15 cm below surface. The nearly pure sand extended to the bottom of the probe.

Probe 4 yielded 13 fire-broken rock and a shell fragment from a zone 30-45 cm below surface. Sediment was very similar to that which produced the bone fragments in Probe 3. Again nearly pure sand occurred deeper in the test.

A large obsidian thinning flake and 2 bone fragments were recovered from Probe 5. They occurred in the first 20 cm below surface in a sandy clay. There seemed to be much higher clay content to the first 40 to 50 cm below surface. Once again very sandy deposits lay in the lower portion of the profile to the bottom of the probe.

A final step in the investigations of site 24CA287 at Property E, was to collect all of the out-of-place bone exposed along the shoreline. This was done to distract attention from the site and with the hope of obtaining evidence of human modification of the bone (butchering marks, green bone fractures, and so on). It was also necessary to determine species present in the bone sample and identify any characteristics of seasonality. A sample of the abundant, out-of-context shell was also collected. Tables 1 and 2 list the cultural lithics and shoreline fauna remains recorded at the site.

Four species are represented among the bone recovered from the shoreline of site 24CA287: deer, a fox or coyote size canid, freshwater mussel, and bison. Of the 112 elements and identifiable bone fragments, 105 or 93.7 percent are bison, 4.5

Table 1. Cultural Lithics from site 24CA287.

Locality	Level	Artifact	Material	Number	Comments
shoreline	sur	flake	black obsidian	1	cortical
shoreline	sur	flake	slt/peppr slcfd sdmnt	1	thinning
shoreline	sur	flake	slt/peppr slcfd sdmnt	2	interior redctn
shoreline	sur	flake	grey basalt	2	cortical
shoreline	sur	flake	grey basalt	1	thinning
shoreline	sur	flake	dark grey igneous	1	primary redctn
Locality 1	100-150 cm BS	flake	slt/peppr slcfd sdmnt	1	thinning
Probe 5	0-20 cm BS	flake	black obsidian	1	thinning

Total Flakes From 24CA287 = 10

percent are deer, and 1.8 percent are canid. The deer remains could quite easily represent one animal since all the elements are immature with partially ossified bone and incompletely fused epiphyses. After only a cursory examination of the bison bone, it was determined there are a minimum of 7 animals represented in the shoreline collection. The canid mandible is too fragmentary to obtain a reliable identification at this stage of analysis but it is more likely coyote than fox. There are obvious immature animals represented in the bison bone and there are some very obvious cut marks on both the deer and bison bone. This report is not intended as a final, in depth faunal analysis; however, the bone has been cleaned, catalogued and identified and will be available for future study. It should be noted that many more bone fragments and elements, along with copious quantities of shell, were visibly submerged in the Missouri River just off shore from the site.

In the riverbank test of Locality 1, twenty-four (n=24) elements and fragments of bison bone were found while two unidentifiable bone fragments were recovered from Probe 5 (Table 3). A silicified sediment thinning flake was also found at Locality 1 and a single obsidian thinning flake was collected from Probe 5. The buried bone from Locality 1 was much more weathered than the beach bone so it was difficult to identify cut marks. One very deep cut or chopping mark was visible on the atlas fragment. Numerous freshwater mussel shells and fragments were found there also along with four burned bone fragments.

Site's Cultural and Natural Stratigraphy

The nature of the physiography and geomorphology make the stratigraphy at site 24CA287 difficult to interpret. As mentioned earlier, the tract seems to occur on what is partly an old stable sand dune which has had some colluvium from the eastward upland slope deposited on it (Fig. 4). There also appear to be river sands, silts and clays which form part of the deposit closest to the Missouri. The landform seems to slope upward from the river's edge before dipping into a low swale or dune depression.

Although the cultural stratum was not traced continuously from Locality 1 to Locality 3, there is no evidence in the riverbank to suggest multiple cultural strata. However, until these localities and their culture-bearing strata can be correlated, the possibility remains that there may be more than one cultural stratum at the site. Nor is there a way for presently relating the stratigraphy of the shovel probes with the riverbank deposit. The surface of the site tract away from the riverbank is much higher (1.5 to 2 m) than the riverside cultural stratum/strata. Cultural materials found in the shovel probes occur at a much higher elevation than those found in the riverbank. It does appear that cultural strata found at Localities 1-3 slope upward from the river. Trowelling at Locality 1 in particular revealed a rather dramatic slope to cultural deposits.

If the hypothesis that the site landform is an old dune which developed parallel to the Missouri River is correct, then it is possible that the contours of the cultural occupation followed the dune contours. In that scenario, a rounded dune would have sloped directly to the river with the crest just east of the river's edge and the backside sloping downward to the east before meeting the colluvial slope, which rises to the mid-elevation bench and uplands (Fig. 9). A backhoe trench excavated from the river's edge eastward through the dune crest would likely prove or disprove this theory.

The culture-bearing strata at Localities 1-3 do have in common a higher proportion of clay to sand. These cultural deposits are all overlain and underlain by sediments with a much higher proportion of sand to clay and sometimes nearly pure sand. There is some reason then to suspect that the culture-bearing strata are related. The relation of culture-bearing strata in the shovel probes to the riverbank is only hypothetical.

Buried soils or soil development was not apparent in either the riverbank profile localities or the shovel probes. Some organic and/or carbonaceous horizons were visible in the riverbank localities. It is not known if these horizons are depositional or pedogenic.

SUMMARY AND CONCLUSIONS

Site 24CA287 may be one of the more unique sites in Montana. For years Leslie B. Davis (personal communication) has communicated with Great Falls area amateur archaeologist, the late Maynard Shumate, concerning the occurrence of archaeological sites with substantial freshwater mussel "shell

Table 2. Shoreline Faunal Remains from site 24CA287.

Species	Element	Comments
Odocoileus sp.	1 left mandible	immature, molar partially erupted
"	1 left femur	immature, partially fused epiphyses, deep cut mark on proximal end
"	1 right humerus	immature, partially fused epiphyses
"	1 right scapula	partially ossified caracoid
"	1 axis	unfused epiphysial rings on centrum carnivore gnawing evident
Vulpes vulpes or	1 right mandible	fragmentary, mature
Canis latrans	1 second phalanx	mature
Lampsilis sp.		numerous shell fragments and complete shells
Bison bison	5 left tibiae,	3 immature, partially fused epiphyses, 2 mature with green bone fractures, cut marks on 3 specimens
"	4 right ribiae	2 immature, partially fused epiphyses, 1 mature, 1 indeterminate with green bone fractures, 3 specimens with cut marks
"	3 left scapulae	2 immature, partially ossified coracoids and glenoid edges, 1 mature
"	2 right scapulae	2 mature
"	1 unidentifiable scapula fragment	
"	3 right innominates	3 mature
"	1 left innominate	1 mature
"	6 left metacarpals	1 immature, 4 mature, 1 indeterminate, 2 with green bone fractures
"	4 right metacarpals	1 immature, 3 mature
"	3 left metatarsals	1 immature, 2 mature
"	3 right metatarsals	3 mature
"	2 unid. metatarsals	fragmentary, with green bone fractures
"	4 unid. metapodials	fragmentary
"	3 right femora	1 complete, mature, with cut marks, 1 femoral head, mature, 1 fragmentary, green bone fractured
"	2 left femora	1 immature, distal epiphysis unfused, 1 shaft with both ends missing
"	4 femoral fragments	all with green bone fractures
"	2 right humeri	1 immature, unfused epiphysis, 1 shaft with both ends missing
"	2 left humeri	1 mature, distal end, green bone fracture, 1 proximal half with end missing
"	1 humerus fragment	green bone fractured
"	7 right radii	2 immature, partially fused epiphyses, 4 mature, 1 indeterminate, 3 with green bone fractures, 1 with cut marks
"	1 left ulna	mature
"	3 right radii	2 mature, 1 indeterminate, 1 with green bone fracture, 1 with cut marks
"	1 right ulna	mature
"	3 left calcanea	1 immature, 2 mature
"	3 right calcanea	3 mature
"	2 right astragali	1 immature, 1 mature
"	1 left astragalus	mature
"	1 carpal/unciform	immature
"	1 naviculo-cuboid	mature
"	2 sacrams	1 immature, 1 mature
"	1 cervical vertebra	immature
"	5 thoracic vertebrae	3 immature, 2 indeterminate
"	6 lumbar vertebrae	4 immature, 2 mature
"	7 rib heads	2 immature, 5 mature
"	3 unid. rib fragments	
"	2 right mandibles	1 immature, partially erupted molar and premolars, 1 mature, ascending ramus removed
"	4 left mandibles	1 immature, partially erupted molar and premolars, 3 mature, 1 with cut marks, 2 with ascending ramus removed

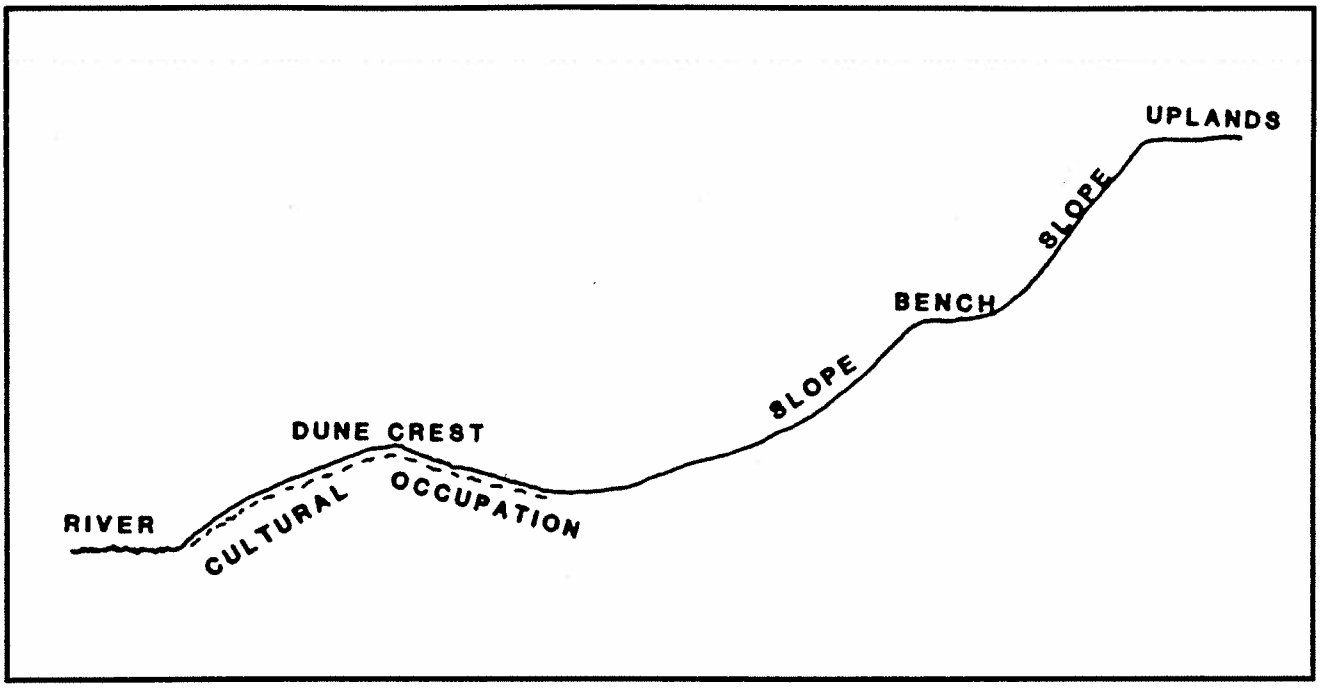

Figure 9. Profile of the valley from the river to the uplands. View North. Compare with Figure 3.

Table 3. Excavated bone from site 24CA287.

Providence	Species	Element	Comments
Locality 1 (100-150cm BS)	Bison bison	1 left metacarpal	mature
"	1 right ulna	mature	
"	1 right tibia	immature	
"	1 atlas	immature, cut mark	
"	1 rib head		
"	2 long bone frags.		
"	13 uniden. frags.	unburned	
"	4 uniden. frags.	burned	
Lampsilis sp.	numerous shells and shell fragments		
Probe 5 (0-20 cm BS)	uniden.	2 fragments	unburned

middens'' along the Missouri River between Cascade and Great Falls. Although Davis visited five of these sites, none have been investigated beyond cursory visual inspection. Through the years most of these sites have been eroded away by the Missouri River (Davis, personal communication). Nothing is known of the cultural affiliation of these sites. Site 24CA287 was unknown to Davis and Shumate.

Archaeologists throughout Montana have reported occasional shell fragments from archaeological sites but the presence of quantities of freshwater mussel shell appears unique to sites along the Missouri River in the project area. As mentioned in the first portion of this report, the presence of many freshwater mussels in this stretch of the Missouri may relate to the geologic peculiarities of the river valley.

The shells found at the site have been tentatively identified as *Lampsilis siliquoidea* (fat mucket), a unionid mussel. This species occurs widely throughout the Mississippi River drainage system in variable habitat but prefers quiet water over a muddy bottom (Smith 1977). Between Cascade and Great Falls the Missouri River flows over 270 feet of sand, silt, and clay which were probably laid down in Glacial Lake Great Falls. The channel is deep and slow moving. The Missouri River in this area appears to be ideal habitat for the fat mucket. Upriver and downriver the bed of the Missouri is composed primarily of gravels. Even in eastern Montana, the river bed contains more gravels than are present in the project area, although there are localized stretches where the bottom is muddy.

Almost nothing is known of the systematic exploitation of freshwater mussels by plains aboriginals. The presence of small amounts of shell at Montana sites has been explained as being

incidental to the procurement of shell for production of ornamental objects. Mussel use as food has been viewed largely as fortuitous collection. The occurrence of large numbers of unmodified shell at site 24CA287 suggest intentional and systematic exploitation of mussels as a food source. The mechanism of procurement is unknown.

In addition to the mussel shell at site 24CA287, significant quantities of bone (particularly bison) were collected and observed. With just a cursory examination of collected bone, a minimum of seven bison, one deer, and one canid were identified. There could be more individuals represented in this collection since no attempt was made to distinguish population on the basis of element size and pathologic idiosyncrasies. For the most part, the bone has not been thoroughly reduced by cultural processing. Many complete or nearly complete elements were collected. The presence of multiple individuals and numerous complete elements suggests an association with a bison kill or at least proximity to a kill. Bone at non-kill sites or where only a few animals were taken is generally more fragmentary due to the thorough utilization of the food source.

The presence of substantial bone remains at the site also suggests that exploitation of the freshwater mussel was not a result of resource scarcity. Rather it indicates a preferential exploitation of this aquatic species. The large hearth visible in the slumping bank at the site may hold clues about how numbers of the fat mucket were processed by prehistoric people. This feature appears to contain datable organics as bone was evident among the rocks.

Ubiquitous bone, shell, and fire-cracked rock give site 24CA287 high visibility. The paucity of skulls or skull fragments among the bone collected from the shoreline may indicate collecting activity. Most skeletal elements, including mandibles, were present in the recovered bone. Yet several tiny skull fragments were the only cranial parts present.

Distribution of artifactual materials across Property E has not been entirely determined. Cultural remains are evident along the north half to the shoreline but that does not preclude the possibility that deposits occur in undisturbed areas at the south end of the tract. Shovel probes on the surface of the property were designed to determine the presence or absence of cultural materials near the surface, not to determine site boundaries.

Finally, the site lies along a stretch of the Missouri River which presents a unique microenvironment where local subsistence adaptations by prehistoric peoples may also be unique. There have been virtually no professional archaeological excavations or in depth studies of the Missouri River valley between Canyon Ferry Dam and Rainbow Dam (down stream from Great Falls). Professional investigations at the state-owned and interpreted "Ulm Pishkun State Monument," a prehistoric bison kill only 10 miles southwest of the project area, are just beginning. More intensive investigations of these sites could provide insights into aboriginal life where little is known of the archaeological past.

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