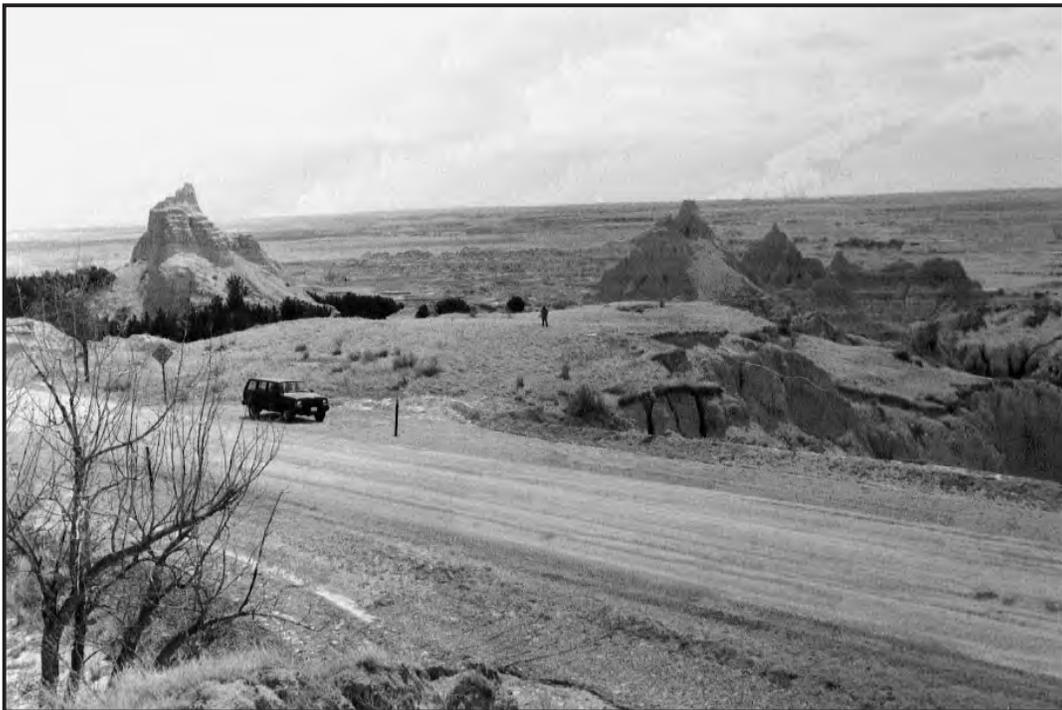


# **Archeological Investigations on the Cedar Pass Slide, Badlands National Park**



**National Park Service - Midwest Archeological Center**

**Archeological Investigations on the Cedar Pass Slide,  
Badlands National Park**

By  
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This report has been reviewed against the criteria contained in 43CFR Part 7, Subpart A, Section 7.18 (a) (1) and, upon recommendation of the Midwest Regional Office and the Midwest Archeological Center, has been classified as

*Available*

Making the report available meets the criteria of 43CFR Part 7, Subpart A, Section 7.18 (a) (1).



## **Abstract**

Midwest Archeological Center personnel undertook four separate investigations in Badlands National Park, South Dakota, in April and September 2000. All four of the projects were related to the remediation of a landslide on the Cedar Pass segment of the Loop Road in the North Unit of the park.

The first project entailed controlled-interval shovel-testing across Area 932 of the Johnny site, 39JK4, a Late Prehistoric/Plains Village occupation in the vicinity of a buttress construction project just west of the Loop Road on Cedar Pass. The Johnny site is currently the only archeological site in the park that has been determined eligible for nomination to the National Register of Historic Places. The April investigations at 39JK4 determined that cultural material in Area 932 extended across the northern two-thirds of the erosional remnant on which the component lies. The southern third of the remnant was found to lack any in situ cultural material, and an access alignment was defined across this latter area for short-term use by heavy equipment during project construction.

The second archeological project required inventory of a short section of new road corridor on Cedar Pass, an alternative to the buttress construction. The third project involved archeological inventory along the centerline of a temporary access road that would extend from the Loop Road at the foot of the Badlands Wall to the buttress construction site. Neither of the two archeological inventories identified significant archeological materials, and no further investigations are recommended for these two projects.

The fourth project entailed archeological monitoring of construction at the southwestern edge of the Johnny site. The monitoring took place in late September during the initial construction activity in South Draw adjacent to Area 932 and generated a small amount of artifactual material related to the Initial Middle Missouri occupation in this part of the site.



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## Introduction

The four investigations described in this report were conducted by personnel from the Midwest Archeological Center (MWAC) during the weeks of April 3–7 and September 26–29, 2000, in Badlands National Park, Jackson County, South Dakota. All four projects relate to a joint undertaking by the National Park Service (NPS) and the Federal Highway Administration (FHWA) that is intended to stabilize a segment of the hard surface two-lane Loop Road on Cedar Pass in the North Unit of the park (Figure 1). The road segment in question presently descends/ascends the face of the 100-m-high Badlands Wall in the vicinity of two separate landslides, Cedar Pass and Cliff Shelf. Continued movement of the Cedar Pass slide has caused repeated breaks in the road surface, prompting concerns for driver safety and for continued easy visitor access to the park.

Designed and engineered by FHWA, the landslide remediation project required the NPS to produce an Environmental Assessment, a document that was written by personnel from the NPS Denver Service Center. The draft Environmental Assessment (National Park Service 2000) identified three remediation options, the first of which, Alternative A, was a No Action alternative. The remaining two alternatives, B and C, prompted the archeological investigations described in this report.

Alternative B, the preferred alternative in the Environmental Assessment, entailed construction of a large earthen buttress in front of the Cedar Pass slide that would be engineered and built to arrest further movement. Alternative C involved construction of an entirely new road segment that would completely bypass the unstable slide area.

Alternative B was selected for implementation, and the buttress construction project began in September 2000. Much of the related construction activity will occur in the immediate vicinity of a single recorded prehistoric archeological site, 39JK4, that lies west of the Loop Road atop a pair of adjacent erosional remnants. The April investigations at 39JK4 described in this report were evaluative in nature and were prompted by a need to better define the horizontal extent of subsurface archeological deposits relative to the anticipated zone of construction impact. The specific questions to be addressed by the archeological work on Cedar Pass were defined by Denver Service Center personnel who were responsible for the compliance documentation and by FHWA engineers who were responsible for project design and construction implementation. MWAC investigations in April included the following three tasks:

- (1) Evaluate the nature and extent of the cultural deposits around the edge of the erosional remnant on which lay one component of the site, 39JK4 Area 932. MWAC personnel were also asked to identify a corridor through the site across which heavy equipment might be moved to access the steep, eroded slopes in South Draw, a large ravine below the remnant where much of the buttress construction activity will take place.

- (2) Conduct archeological inventory within a 400-m-long corridor immediately east of the existing Loop Road on Cedar Pass. This alternative represented the entirely new road alignment project (Alternative C) that would be implemented should the buttress option fail.

- (3) Conduct archeological inventory along the route of a proposed access road at the foot of the escarpment, across which heavy equipment and materials for the buttress project would be moved to the construction site.

Based upon the results of the April archeological investigations, the park and the South Dakota State Historic Preservation Office (SHPO) entered into a compliance agreement to reduce the effect of the undertaking upon the archeological site. As part of that agreement, MWAC personnel were asked to return to the buttress construction site in September in order to monitor heavy equipment and earthmoving activity at the southwestern corner of 39JK4 Area 932.

The results of all of these investigations are presented in this report.

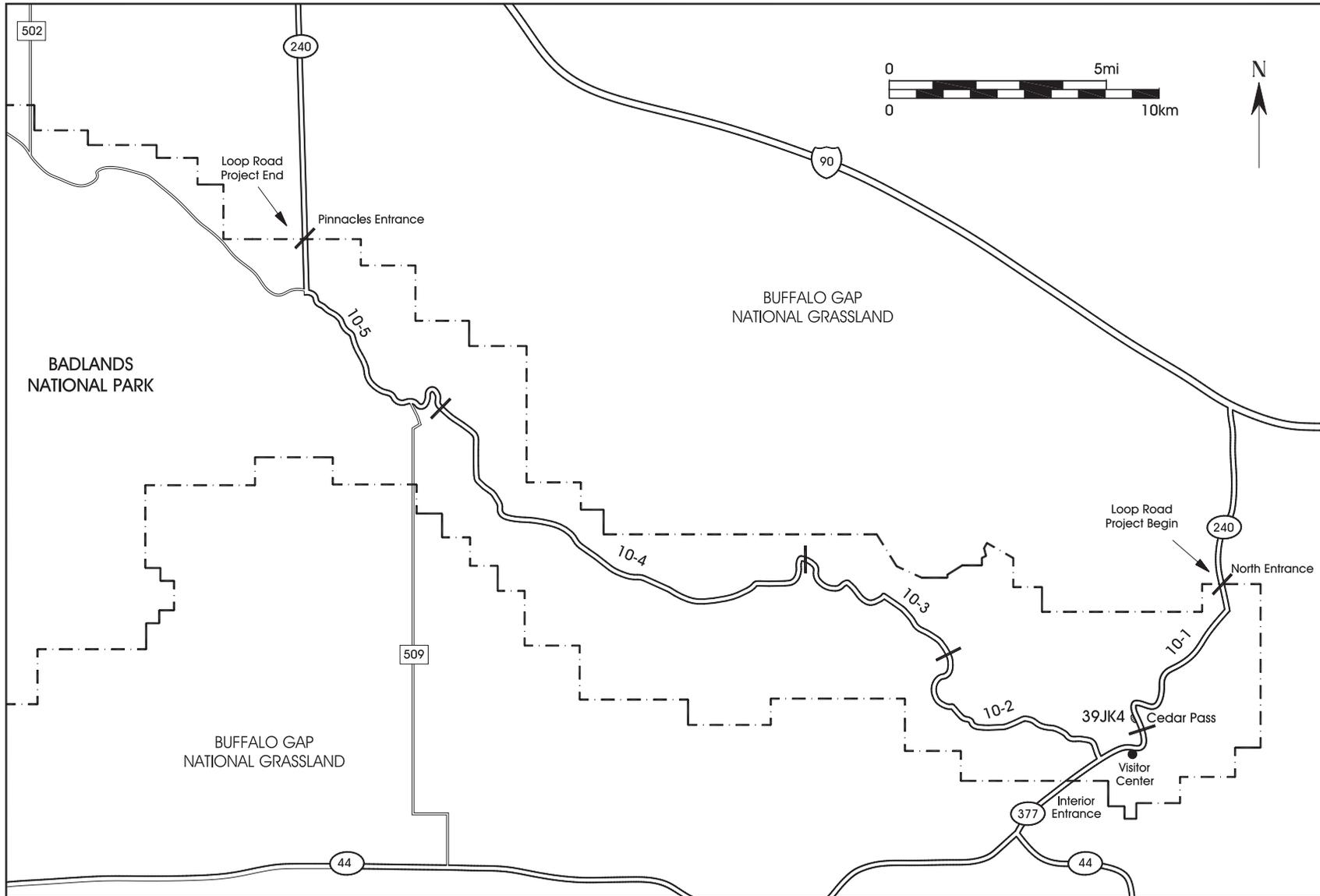


Figure 1. Location of 39JK4, the Johnny site, near Cedar Pass on the Loop Road, Badlands National Park, South Dakota.

## **Archeological Background**

Badlands National Park covers more than 97,000 ha (roughly 240,000 ac) of eroded sediments, sod tables, and steep escarpments in the White River drainage of western South Dakota. Despite the immense size of this park, however, there has as yet been little systematic or large-scale archeological research conducted in Badlands, and as recently as 1996 only about 100 archeological sites had been formally recorded in the park.

The majority of prehistoric sites identified thus far in Badlands are small scatters of chipped-stone debitage, tool fragments, bison bone, and pottery that have been exposed around sod tables or in other erosional settings. Diagnostic artifactual materials found at some of these sites have enabled those occupations to be placed in a relative time frame. Of considerable importance, however, the archeological cultures that have been thus far identified at these sites and in artifactual materials in the park appear to reflect only a fraction of the total expected prehistoric record observed elsewhere on the Northern Plains.

Evidence of the Early Holocene Paleoindian big-game hunting adaptations is nowhere abundant on the Plains, and such is certainly the case within the park. Isolated Paleoindian artifactual materials have been found as surface artifacts in both the North and South Units of Badlands (Falk et al. 1978; Jones 1993). However, the only intact Paleoindian component that has been identified and studied in the area is the Lange-Ferguson site (White and Hannus 1985; Hannus 1990), a Clovis mammoth kill and butchering site that lies on private land just outside the South Unit.

In situ evidence of the subsequent post-Clovis cultures, particularly the Early and Middle Plains Archaic and a possible Plains Woodland occupation and use of the park portion of the White River Badlands, is thus far greatly underrepresented relative to other adjacent regions of the Great Plains. Isolated artifacts representative of these cultures have been occasionally found in Badlands, but there are as yet no radiocarbon ages obtained from archeological features anywhere in the park that date prior to about 2,300 years before present (BP) (Jones 1996:119). In marked contrast, archeological evidence of the subsequent Late Prehistoric and Plains Village tradition in Badlands is relatively abundant and is documented by a substantial number of probable short-term campsites or use episodes scattered throughout the North and South Units.

This differential representation of the prehistoric archeological cultures is considerable, but a similar pattern has been noted in parallel physiographic contexts elsewhere on the Northern Plains; see below. Until the disparity can be better explained, however, major questions will still exist regarding the nature of the prehistoric use of the White River Badlands in the millennia between the occupation of the Lange-Ferguson site at circa 11,000 radiocarbon years BP and the earliest radiocarbon age from the park at 2,300 years BP.

### ***Prior Archeological Research in the Park***

The first 40 years of archeological research in Badlands National Park have been described elsewhere (Jones 1996, 2000a) and need only be summarized here. The first professional archeological investigations in the park were conducted by Paul Beaubien, who recorded more than 30 sites during a preliminary assessment of the North Unit (Beaubien 1953). Most of the sites that Beaubien recorded consisted of scatters of lithic debris and fragmented animal bone exposed on the ground surface atop the Badlands Wall. The other sites appeared as similar scatters or isolated features such as hearths or bone beds eroding out of cutbanks, ravines, or sod tables. Two major sites recorded by Beaubien were 39JK4, the Johnny site, and 39PN9, the Pinnacles site, both of which were subsequently tested by Montana State University archeologist Dee Taylor in 1958 (Taylor 1961).

Taylor's research at the Pinnacles site suggested that it reflected one or more episodes of short-term use by Initial Middle Missouri variant groups from a complex of permanent earthlodge villages along the Missouri River to the east. Assay of a charcoal sample recovered during Taylor's work at the Pinnacles site generated a radiocarbon age of  $1060 \pm 150$  years BP (AD 890) and confirmed his estimated date for

the site's most visible prehistoric occupation. The presence of abundant bison bone in the site deposits clearly documented the importance of hunting activity, and the Pinnacles site has subsequently been interpreted by the park as a bison jump/kill site. However, Plains Village ceramics recovered from the excavations indicated that the Pinnacles site should contain other actual domestic or habitation data as well. Taylor's 1958 testing at the Johnny site, almost 24 km to the east, suggested that it represented a generally similar type of occupation dating to the same general time period.

Subsequent archeological research has occurred in and around Badlands National Park on an intermittent basis. In 1974, MWAC Archeologist Marvin Kay conducted an inventory of 2,730 ac of U.S. Forest Service land in Pennington County along the southern boundary of the North Unit (Kay 1974), which resulted in the identification of 17 prehistoric sites. In 1976, University of Nebraska archeologists conducted survey research in the White River Development Area of the South Unit (Falk et al. 1978). Twenty-three additional archeological sites were found during this survey, two of which produced probable Plains Village ceramics and confirmed occupation of the area over the last millennium. Additionally, however, a lanceolate projectile point base found during the investigations suggested that the South Unit also contained intact Paleoindian or Plains Archaic deposits.

The next systematic investigations occurred in the South Unit in 1980 with the start of the White River Badlands Regional Research Project. Begun by Adrien Hannus and Les Ferguson for South Dakota State University (SDSU), this project grew into a multiyear study of badlands prehistory within and adjacent to the park's South Unit (Hannus et al. 1984). The 1980 SDSU investigations produced the first in situ evidence of Paleoindian Clovis remains in South Dakota, the Lange-Ferguson site, while later fieldwork included the examination of quarry sites, inventory of drainages tributary to the White River, and limited subsurface testing at other selected sites. Continued research in 1981 included the study of archeological resources along Fog Creek (Hannus et al. 1983), during which time 17 more sites were recorded along the park reach of that stream. The 1982–1983 SDSU White River Badlands survey (Lueck and Butterbrodt 1984) identified both a Late Paleoindian projectile point and collared ceramics at 39SH80, less than 2 km northeast of the head of Fog Creek and also within the South Unit.

In 1982, personnel from the South Dakota Archaeological Research Center conducted an inventory along 35 km of South Dakota Highway 44 between the towns of Scenic and Interior a short distance south of the North Unit (Sundstrom and Malone 1982). Forty-four prehistoric sites were identified, including surface artifact scatters, multiple-component sites, and features and materials eroding from cutbanks. The majority of the sites appeared to be associated with Middle Missouri tradition and Coalescent tradition populations, particularly those of the Initial Middle Missouri and Extended Coalescent variants. The former were dated between about AD 950 and 1250, while the latter were dated between AD 1550 and 1700. Two archeological sites in the highway corridor also produced evidence of Protohistoric American Indian occupation.

The most recent large-scale archeological research in the park took place in 1985, 1988, and 1989, and involved further investigation of the resources of the Fog Creek drainage. Working initially with the complex of sites recorded along the stream in 1981, NPS archeologists and South Dakota State Archaeologist Robert Alex ultimately examined sites adjacent to the present course of Fog Creek and farther away on Cuny Table (Chomko 1985), the high ground that forms the west flank of the watershed. Two paraprofessional training sessions held in the Fog Creek drainage (Johnson 1988; Jones 1990) focused upon archeological features that had been exposed by erosion along the stream. The second training session also attempted to resolve discrepancies between the earliest assigned site numbers and presently visible features, a problem that was magnified by the rapid erosion in the area. Finally, assay of charcoal collected from features at six Fog Creek sites generated radiocarbon ages ranging from  $1590 \pm 70$  to  $750 \pm 250$  years BP, or between approximately AD 360 and AD 1200 (Jones 1990:4; Johnson 1994).

While a substantial amount of research has been conducted in the park's North Unit since Beaubien's initial work, those investigations have not identified as many archeological sites as have been recorded in the South Unit. This phenomenon is partially due to the fact that few of the North Unit inventories have involved study of large blocks of land and have instead addressed potential resources in small construction

or development projects. These latter studies have primarily been conducted by MWAC staff and have included preconstruction surveys of a park entrance area (Calabrese 1974a, 1974b), a parking lot at the Doors and Windows trailhead (Nickel 1977), and improvements along the Sage Creek Rim Road (Lincoln 1978).

Other MWAC inventories in the North Unit have been conducted prior to trench excavation around the Cedar Pass Lodge, construction of new fencing (Mueller 1982), land exchange, new sewage lagoon construction, and new landfill sites (De Vore 1986a, 1986b). They have also included survey in the vicinities of park residences and concessionaire cabins in the headquarters area (Johnson 1987a, 1987b).

The most recent MWAC investigations in Badlands National Park occurred in 1991 and 1993, when MWAC personnel conducted archeological inventory work along the North Unit Loop Road (Jones 1993, 1996). This effort involved survey of a corridor that ranged from 25 to 400 m wide, mostly atop the Badlands Wall on either side of the present Loop Road between the Northeast Entrance and the Pinnacles Entrance, a distance of almost 50 km. Thirteen previously unidentified sites were found during this work and three known sites, including 39PN9 and 39JK4, were briefly revisited.

The 1993 reexamination of 39PN9 indicated that part of the remaining deposits at the Pinnacles site lie buried beneath 2–4 m of overburden that have washed down from high ground to the west of the Loop Road. Two charcoal samples recovered from buried lenses in this locale in 1993 (Jones 1996:45–51). The first generated a radiocarbon age of  $1260 \pm 80$  years BP, or a corrected *date* of AD 679–864. The second generated an age of  $1000 \pm 80$  years BP, or a corrected *date* of AD 876–1029 (Stuiver and Reimer 1993). Together, these two ages clearly substantiate Taylor's earlier estimate of the site's age. However, archeological materials were also identified in 1993 at the top of a high slump block west of the Loop Road and 50–125 m to the south of the deposits studied by Taylor. Salvage excavation was directed at an eroding rock-filled hearth at the top of the slump block, and charcoal from the feature generated radiocarbon ages that averaged  $2286 \pm 80$  years BP, or a corrected *date* of 406–202 BC. This Late Archaic feature is the oldest yet identified in the North Unit and is underlain by a substantial quantity of broken animal bone and fire-cracked rock that is eroding from the adjacent face of the slump block.

In summary, the first four decades of professional research in the region have generated a body of archeological evidence from the park and adjacent areas that documents American Indian use of the White River Badlands beginning as early as the Paleoindian Clovis Complex, circa 11,000 years BP, or about 9,000 BC. While there is only a small amount of supportive evidence at this point, American Indian use of the area probably continued through the Plains Archaic and the Plains Woodland traditions to circa AD 500–700.

The bison bone visible at many sites in the park indicates that the prehistoric economic focus in the area certainly included exploitation of local ungulate resources. Additionally, the analysis of pollen from a hearth or roasting pit at 39SH68 in the Fog Creek drainage has indicated that gathered plant foods, including buffalo berries and prickly pear cactus, were processed there (Cummings 1990; Johnson 1994). The adaptations during the above time period thus emphasized either big-game hunting (Paleoindian) or hunting and gathering (Plains Archaic and Plains Woodland).

Finally, if the ceramic identifications are correct, pottery recovered at several Badlands sites documents use of the area of the park by American Indian populations from the permanent Plains Village tradition farming communities along the Missouri River to the east. These groups would probably have included the ancestral Arikara as well as other Siouan-speaking Indian populations. The Plains Village activity in the White River Badlands would undoubtedly have emphasized the seasonal hunting of bison or antelope, but based upon evidence from the Johnny site, may have also included waterfowl. It is likely that many of these use episodes were short-term and probably occurred on a seasonal basis that included the spring months.

### ***Recent Archeological Research in the Park***

A systematic multiyear archeological inventory program was begun in the park in 1997, conducted through the Midwest Archeological Center by personnel from the Archeology Laboratory of Augustana College. Following the development of a research design for the program (Hannus and Winham 1998a), David Kuehn undertook a preliminary geoarcheological study in the park (Kuehn 1998), the results of which suggested that much of the Early–Middle Holocene archeological record in the North Unit of Badlands National Park has in fact been eroded away. Kuehn found that stream terrace remnants in the vast Sage Creek Basin in the western part of the North Unit have the potential to date as early as about 2,800 years BP (Kuehn 1998:41), with a few possible T3 terrace remnants potentially dating to as early as 5,900 years BP. However, the only intact Early and Middle Holocene soil deposits that have been identified thus far in the park lie atop Sheep Mountain and Cuny Tables in the South Unit.

The fieldwork related to the parkwide archeological inventory began in 1998 and continued through 2000, focusing primarily upon land in the North Unit. Almost 200 previously unrecorded sites have now been added to the Badlands database through the parkwide inventory (Hannus and Winham 1998b, 1999) and other recent small-scale surveys (Jones 1999; Hannus et al. 1999). Analysis and comprehensive reporting of this multiyear inventory project are underway.

### ***The Johnny Site***

Site 39JK4, the Johnny site, lies on a series of erosional remnants, part of a large slump block that has dropped partway down the face of the Badlands escarpment at Cedar Pass. Taylor's 1958 excavations at the site exposed cultural material from a stratum that ranged in depth from just below the surface on the west side of the remnant to 7.5–9.0 cm deep on the east side (Taylor 1961:59–73). Artifactual materials found during the excavations included Stanley and Anderson ware pottery, together with a small number of possible Plains Woodland cord-roughened sherds that would predate the former materials by several hundred years. Taylor reported that Anderson ware ceramics elsewhere in South Dakota could be associated with a date of about AD 1158. He dated the Stanley ware ceramics, associated with Post-Contact Coalescent occupations to the east, to the 18th century AD.

A variety of triangular notched and unnotched chipped-stone projectile points and a chipped-stone drill were recovered during the 1958 investigations, together with several fragments of plate chalcedony Badlands knives. In addition to abundant animal bone fragments that were not collected, modified bone implements were found that included a scored bison rib and a bison rib quill flattener (Taylor 1961; Johnson 1989b).

Analysis of eroding artifactual material recovered at the site in the years following the 1958 investigations (Johnson 1989a, 1989b) has generally corroborated the circa AD 1000 date of the Anderson ware ceramics found by Taylor, but has also prompted some reinterpretation of the Johnny site data. A single charcoal sample collected from an eroded hearth at the site in 1987 generated a radiocarbon age of  $1000 \pm 60$  years BP (Jones 1993:119) that represented an uncalibrated date of AD 950 (Johnson 1989b:20). However, a possible Late Plains Woodland sherd found at the site may reflect an earlier occupation at about AD 750, while the Post-Contact Extended Coalescent variant Stanley ware ceramics originally recovered by Taylor suggest a third and most recent occupation.

Together, the Johnny site and other archeological sites that have been recorded in the vicinity of Cedar Pass (File Search results, pp. 12–14) seem to reflect brief episodes of occupation or use by a variety of American Indian groups over the course of the last 1,200 years. Hunting is clearly documented in the archeological materials from these sites, with large mammal bone, mostly bison remains, predominating. However, a single waterfowl bone fragment and neonatal or fetal deer or pronghorn remains recovered from 39JK4 (Johnson 1989b) suggest that the Johnny site was on occasion occupied during the spring. Finally, questions remain regarding whether a second occupation level actually exists beneath the shallow one exposed by Taylor in 1958 (Jones 1993:61–64).

In 1991 (Jones 1993:11–12), park staff asked MWAC personnel to investigate cultural materials eroding from the top of a grass-covered remnant 125 m to the southeast of the location of Taylor’s research on the south side of a large ravine now known as South Draw (Figure 2). The park’s observations were confirmed, and the partial remains of a burned rock hearth were identified in the north face of the remnant. Two small triangular projectile points, one unnotched, the other side-notched, were found atop the remnant.

Systematic archeological inventory was conducted along the Loop Road on Cedar Pass in April and May of 1993 (Jones 1996), at which time additional unrecorded archeological materials were observed eroding from the top of the remnant. The new area was designated 39JK4 Area 932, while Taylor’s original excavation area to the northwest was redefined as 39JK4 Area 931.

MWAC personnel then excavated a single line of controlled-interval shovel tests along a line designated Transect A together with four 50-cm squares across Area 932. Artifactual materials were recovered at depths of 15–35 cm below the surface. Based upon the diagnostic projectile points found there in 1991 and 1993, the Area 932 component of the Johnny site was interpreted as an occupation essentially contemporaneous with the AD 1000 component that had been studied by Taylor a short distance to the northwest. At the time of the 1993 inventory, Loop Road rehabilitation plans simply called for in-place resurfacing of the road, and no further archeological investigations were recommended at 39JK4 Area 932 at that time.

The Johnny site was determined eligible for nomination to the National Register of Historic Places in June 1993 through a concurrence determination of eligibility between the South Dakota SHPO and the NPS. It is presently the only archeological site in the park that has been so determined.



Figure 2. Site 39JK4 Area 932. Figure stands atop an erosional remnant in the center of the site. View is to the southwest.

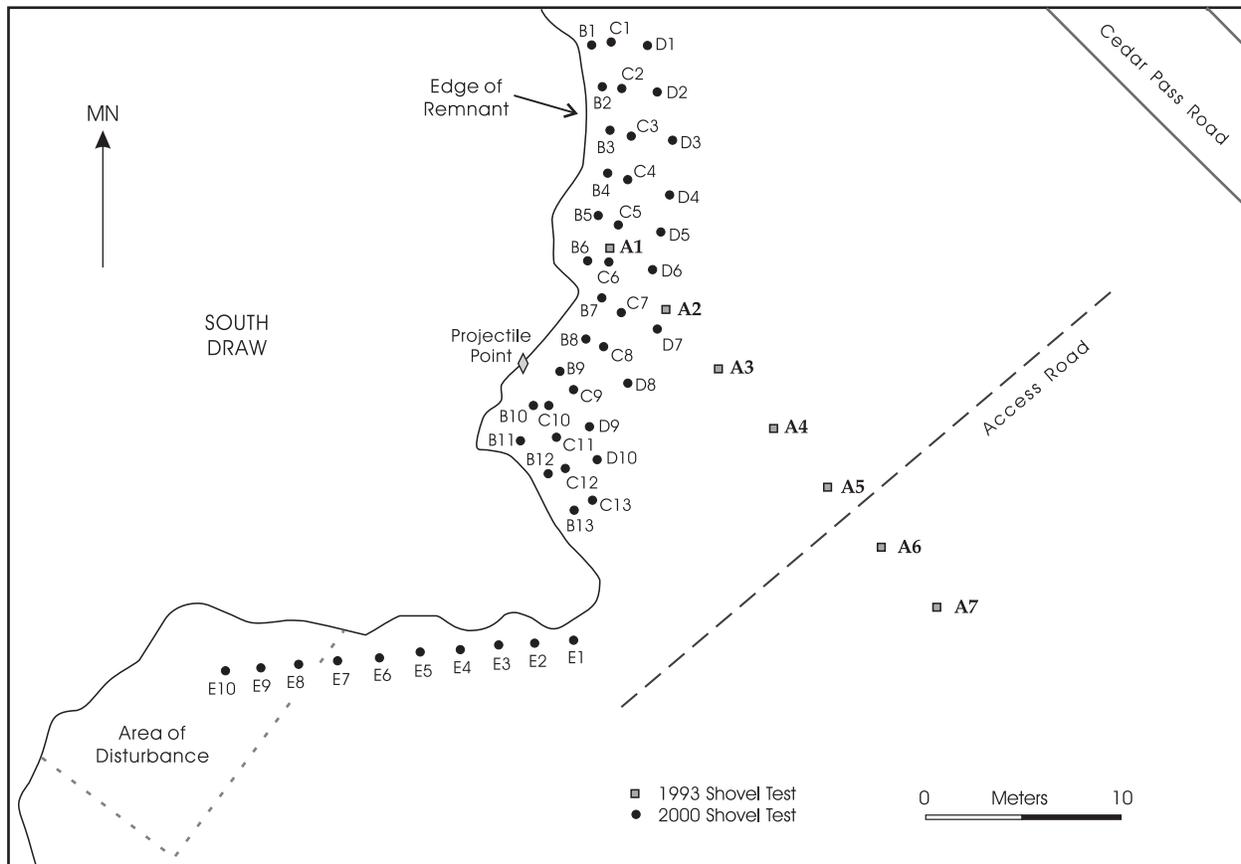


Figure 3. Transit map of the erosional remnant and the April 2000 shovel tests in 39JK4 Area 932. Transect A shovel tests from the author's 1993 fieldwork are also marked.

## The 2000 Investigations

A formal archeological site file search was required prior to components 2 and 3 of the 2000 fieldwork on Cedar Pass, the archeological inventories of the new road alignment (Project Alternative C) and the haul/access road at the foot of the Badlands Wall. The file search was requested from the South Dakota State Archaeological Research Center (SARC) on March 28, 2000, and the results were provided to the MWAC project archeologist on April 3. The search identified several known episodes of prior archeological research in Sections 26 and 27, T3S, R18E, the project locales, together with the locations of a number of formally recorded archeological sites identified within those two sections.

The April investigations in Badlands National Park were outlined in an archeological work plan generated by the project archeologist prior to the start of the work (Jones 2000a), and a preliminary statement on the results of the field investigations was provided in a trip report written at the close of the project (Jones 2000b). The September investigations were defined in a second work plan (Jones 2000c) and summarized in a second trip report at the close of the monitoring (Jones 2000d).

### *Shovel Testing at 39JK4 Area 932*

The first episode of fieldwork at 39JK4 took place on April 4–6, 2000, and was conducted by MWAC Archeologists Bruce Jones and Scott Stadler. Jones and Stadler met briefly with Superintendent William Supernaugh at the start of the fieldwork and revisited the project area together. Mr. Supernaugh also provided locational information for a projectile point that he had found eroding from the edge of the remnant above South Draw along the west side of Area 932 on March 26.

### **Methodology**

Four shovel-test transects were established along the western margin of the erosional remnant in Area 932 in order to determine the nature and extent of the subsurface archeological materials first identified in 1993. Transects B, C, and D were positioned essentially parallel to the irregular western edge of the remnant (Figure 3) and 1–2 m apart, and thus examined a strip of land roughly 5 m wide. A fourth line of tests, designated Transect E, was established in the southwestern corner of the remnant where it had hinged and dropped down to the west toward South Draw.

Individual shovel tests were excavated to sterile subsoil at 2-m intervals along all four transects. All soil fill from the tests was processed through ¼-inch screen, and notes on stratigraphy and shovel-test depth were recorded prior to backfilling. A detailed transit map was constructed at the close of the testing that plotted the edge of the Area 932 remnant, the four transects of individual shovel tests, and the relevant portion of the Loop Road on Cedar Pass. An orange plastic datum used in the mapping was left in place atop the remnant for future reference.

Forty-six shovel tests were excavated along the four transects established in Area 932. Twenty-one of the tests — almost half — were positive and produced artifactual material. Relevant data for all of the excavated shovel tests in the four transects are provided in Table 1.

### **Stratigraphy**

The stratigraphic sequence observed in the shovel tests along the west edge of Area 932 was essentially the same as that observed in the shovel tests and test units excavated across the remnant in 1993. The uppermost stratum, including the thin sod/humus zone, consisted of a medium brown loamy topsoil that extended from the root zone just below the present ground surface to a depth of 19–40 cm below surface (cmbs). The loam was in turn underlain by a dense light tan basal clay that extended to as many as 48 cmbs. The mottled contact between these two soil strata suggested in-place development of the A horizon. At the extreme south end of Transects B–D, dense siltstone gravel lay either on the ground surface or at depths of 12 cmbs or less. It is likely that the loamy topsoil has simply been eroded from the surface of the south end of the remnant, the gravel reflecting in-place weathering of underlying parent bedrock.

Artifactual material was typically recovered from depths of 10–15 cmbs, but appeared to be restricted to the uppermost brown loam stratum. No cultural material was recovered from the underlying tan clay, which is believed to be archeologically sterile.

### Artifactual Material

All archeological materials recovered during the April testing in Area 932, including the projectile point found by Superintendent Supernaugh, are curated at MWAC under MWAC Accession 907. Artifactual material included lithic debitage, two chipped-stone projectile points, bone and tooth enamel fragments, and fire-cracked rock.

The lithic debris included 10 flakes of quartzite, jasper, and agate together with a chunk of clear plate chalcedony. The flakes averaged 21 mm in maximum dimension and were largely second- and third-order, but included one large cortical quartzite flake that is part of a stream-rolled cobble. The plate chalcedony fragment probably represents part of a Badlands knife, which usually consists of a sheet of plate chalcedony with a single bifacially worked edge. The fragment recovered during the testing in Area 932 measures 16 mm in maximum dimension.

The chipped-stone projectile point recovered from Shovel Test B-10 is triangular in plan view (Figure 4a) and was manufactured on a non-cortical brown jasper flake. The artifact is planoconvex in longitudinal and transverse cross sections and has light incidental retouch along the edges of both faces with two small side notches positioned on either edge in the lower third of the blade. The point measures 17 mm in length by 11 mm in maximum width and is 2 mm thick. It is clearly an arrow point and is morphologically similar to arrow points recovered at Late Prehistoric and Initial Middle Missouri variant Plains Village sites elsewhere in South Dakota.

The projectile point recovered below the west edge of Area 932 (Figure 4b) was manufactured from a brown agate and is triangular with two side notches and a straight base. It bears light bifacial retouch scars that carry across both blade faces, and unlike the previous point, this artifact has been very carefully manufactured. It is probably an arrow point, measures 30 mm in length by 16 mm in maximum width, and is 4 mm thick. The point is morphologically similar to projectile points associated with Late Prehistoric and Initial Middle Missouri variant Plains Village components elsewhere in South Dakota, and is consistent with other artifactual material found in 39JK4 Area 932 (Jones 1996) and the collection from Taylor's work a short distance to the northwest.

The burned-rock fragments observed and collected in the Area 932 shovel tests appear to be either sandstone or decomposed quartzite and are uniformly of very small dimensions, usually less than 20 mm in diameter. Based upon their context in the tests, they probably reflect sheet trash scattered during hearth cleanout activities.

The bone and tooth material observed and recovered in the tests was usually fragmented and the bone was typically decomposed. The tooth enamel was uniformly too badly broken to enable a species determination, but the ridged character of the fragments suggests that they represent molars from large herbivores, probably bison or deer. The bone fragments are likewise too decomposed to enable species identification. They range in maximum dimension from 3 to 74 mm, and the larger fragments represent long bone and rib fragments, again probably from bison, although one small fragment is clearly bird bone.

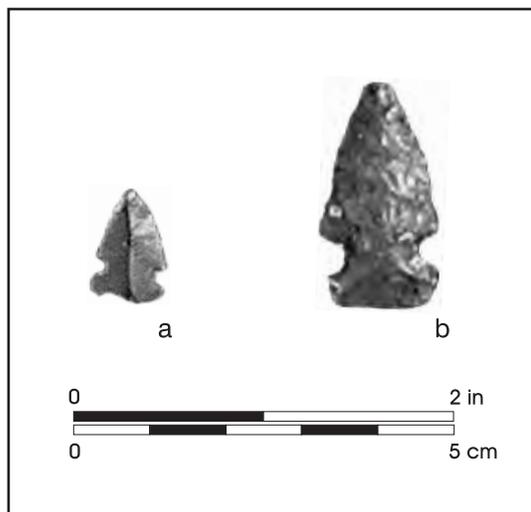


Figure 4. Projectile points recovered in 2000 from 39JK4 Area 932: (a) Shovel Test B-10; (b) from below the west edge of Area 932.

## Results

The data generated from the shovel tests and surface finds in Area 932 indicate that cultural debris relating to a Plains Village occupation is widespread across the northern two-thirds of the erosional remnant. Artifactual material is present at least 5 m in from the west edge of the remnant, and any construction activity along the west edge of Area 932 has the potential to impact both features and artifacts relating to the prehistoric occupations in this part of the site. It was therefore recommended that *no* mechanical grooming of the steep slopes along South Draw occur along the upper edge of the remnant (the western edge of Area 932), and that the western edge of the remnant *not* be laid back through mechanical excavation without prior archeological data recovery.

### Access Corridor Identification in Area 932

The results of the 1993 and 2000 test investigations in Area 932 clearly indicate that the soil overburden atop the southern part of the erosional remnant, perhaps as much as one-third of the total feature, is no longer present. The area instead contains only dense consolidated siltstone gravels that reflect in-place weathering and decomposition of the underlying bedrock. There is some low potential for isolated artifactual materials to exist across this southern part of the remnant. However, erosion of the parent soil matrix in which the materials lay has caused the primary provenience of these materials to be lost, and their depositional context is thus compromised.

Based upon the results of the 1993 and the 2000 testing at Area 932, MWAC personnel established and staked an alignment for a 5-m-wide access corridor for heavy equipment to use in crossing the southern part of the remnant. The staked alignment extends west from the Loop Road on Cedar Pass for a distance of 45 m, then drops down 30 m off the intact part of the remnant to a point above South Draw, the location where much of the buttress construction will occur.

This alignment represents the single route for heavy equipment to use when construction personnel must access South Draw from the area of the archeological site. Per the terms of a compliance agreement reached between the South Dakota SHPO and the NPS, the alignment was to be examined by an MWAC archeologist prior to its initial use by construction equipment for any archeological materials that were exposed on the ground surface. Any significant data would be collected at that time. Plywood sheets or other cushions would then be positioned along the access route, and heavy equipment would be restricted to use of that single approach to the ravine. At the close of the construction activity in the ravine, the cushion will be pulled up and the alignment reexamined by the MWAC archeologist for any materials exposed during use of the access route. No further access will be permitted across the southern part of Area 932 after the cushion is removed from the access corridor.

Additionally, present construction plans call for excavation along the lower edge of the hinged part of the erosional remnant along the south edge of South Draw (Figure 3). Specifically, engineers indicated the need to excavate back into the lower edge of the remnant in a series of vertical steps or terraces, which will involve cutting into the remnant a horizontal distance of about 10 m to establish a 1:1 slope.

This part of the remnant is unstable, and while shovel testing along Transect E indicated that subsurface archeological materials exist in this part of the remnant, it was unsafe to attempt to systematically recover data in this area prior to construction. According to the terms of the compliance agreement between the NPS and the South Dakota SHPO, MWAC personnel were asked to monitor construction activity in this lower part of the erosional remnant. If significant materials or features were exposed in the course of construction, MWAC archeologists would be provided sufficient time to recover the relevant exposed data, after which construction would resume. An MWAC archeologist was asked to be onsite or on call for the duration of the construction work above the south edge of South Draw.

## ***New Road Alignment Inventory***

### **Project Description**

Alternative C of the Cedar Pass Loop Road remediation involves construction of a section of new paved road that would completely bypass the eastern edge of the Cedar Pass Slide. The new road would extend south from the present Loop Road at the top of the pass for a distance of roughly 400 linear m and descend 16 vertical m down the face of the escarpment. At the lower (southern) end of the realignment, the new construction would reconnect with the existing route of the Loop Road and continue on downslope to the foot of the Badlands Wall. The new road segment lies from 5 to 50 m due east of the existing Loop Road, and also due east of Areas 931 and 932 of 39JK4. The width of the new road would approximate 15 m plus shoulders and side slopes.

### **File Search**

The SARC archeological file search conducted in March 2000 indicated that six other recorded sites lay within 1 km of the project in addition to 39JK4 immediately to the west of the alignment.

*39JK2.* This prehistoric/protohistoric site, also known as the Cedar Pass Butte site, was first recorded by Beaubien (1953). The precise location of the site is not clear, and it may lie either atop the Badlands Wall or below it. However, the site name suggests that it was discovered atop the escarpment, and Beaubien's map appears to place the site to the northeast of and outside the project area. Artifactual materials collected at 39JK2 at the time it was discovered included ceramic materials identified as Stanley ware, a Post-Contact Coalescent ware estimated to date to roughly AD 1700–1750 (Taylor 1961:78; Lehmer 1971:123). The site would thus reflect short-term use of the Badlands area by late Plains Village groups from the Missouri River to the east.

*39JK3.* This prehistoric/protohistoric site was recorded by Beaubien (1953) as the Reservoir site and produced Stanley ware ceramic materials at the time it was identified, suggesting that it represented a Post-Contact Coalescent occupation dating to the 18th century AD (Taylor 1961:78; Lehmer 1971:123). The site is plotted on the SARC file map as much as 1 km due north of the upper end of the new alignment *atop* Cedar Pass. Based upon its legal description, however, the Cedar Pass Butte site may in fact lie *below* the escarpment in the vicinity of the Cliff Shelf Nature Trail (Williams 1997), southeast of the new alignment. Whatever its position, 39JK3 appears to lie well outside the limits of the new road alignment.

*39JK4.* The Johnny site lies just west of and outside the construction limits of the road realignment project. Previous research at this site is summarized on page 6.

*39JK107.* This small archeological site was recorded by park employee Jennifer Chapman in 1987 approximately 600 m west-northwest of the project area atop the Badlands Wall and appeared as a scatter of lithic debris and a possible eroded hearth found adjacent to a sod table. No culturally or temporally diagnostic artifacts were recovered from the site when it was recorded or in a subsequent reexamination (Johnson 1987c). The site lies well outside the project area.

*39JK191.* This small prehistoric site was identified during the 1993 inventory of Loop Road Segment 10-1 (Jones 1996:21–22) and was represented by a scatter of chert and quartzite debitage and a chert end scraper lying on the eroding face of a sod table atop the Badlands Wall. The site is one of many small, short-term prehistoric occupations in this area which appear to have been oriented toward exploitation of gravel exposures. Because the sod table had the potential to contain more archeological materials, 39JK191 was recommended eligible for nomination to the National Register of Historic Places. However, the site lies 850 m northeast of the project and well outside the construction zone.

*39JK205.* Recorded in 1995 along the Cliff Shelf Trail 600 m southeast of the project area (Williams 1997), this site includes a complex of charcoal stains and scattered charcoal fragments, burned and unburned bone fragments, burned earth, and lithic debris. The site probably reflects one or more episodes of short-term prehistoric occupation. However, no temporally diagnostic artifacts have yet been recovered

from 39JK205, and the occupation(s) cannot presently be placed in time or assigned to a known archaeological culture. The site lies well outside the project construction zone.

39JK237. This is a small historic site that probably dates to the first half of the 20th century. Recorded in 1999 (Jones 1999), it lies along the east side of an access road a short distance south of park headquarters. Represented by a rectangular concrete pad or foundation and a light scatter of historic construction debris, this site may relate to early park operations, or perhaps to early tourism activity around what is now the Cedar Pass Lodge a short distance to the northwest. The site was recommended not eligible for nomination to the National Register of Historic Places at the time it was recorded. It lies well outside the project construction zone.

### **Methodology**

MWAC archeologists identified the marked centerline and shoulders of the new road construction alignment and conducted intensive pedestrian inventory along the entire route beginning at the north (upper) end. The lower portion of the alignment crosses a deep, inaccessible ravine, the head of South Draw, and this corridor was necessarily walked from the south end of the new construction on the east side of the Loop Road. With the exception of the actual sides and floor of the ravine itself, the entire survey area was examined. Ground surface visibility in the survey corridor was excellent and ranged from 85 to 100 percent.

### **Results**

A light scatter of recent historic trash, primarily aluminum cans and glass bottle fragments, lay within 10 m of the Loop Road at the north end of the new alignment. However, the remaining route was found to contain no remnant Holocene soil deposits and instead reflected eroded exposures of Oligocene/Miocene-age Sharps formation fossiliferous clays and siltstones (Raymond and King 1976).

The archeological inventory results along the Alternative C corridor were thus negative. Implementation of this project alternative will have no potential to impact significant archeological resources, as the depositional matrix and context for such remains no longer exists. No further formal archeological investigations are warranted for this project alternative as it is presently designed.

### ***Access Road Inventory***

#### **Project Description**

Project engineers anticipated the need for a temporary haul road at the foot of the Badlands Wall that could be used by construction personnel to access the buttress site via its lower or southern end. The location in question is a large natural alcove that is partially ringed by the escarpment. Within the alcove, project engineers requested archeological inventory along a 5-m-wide alignment that extended from the Loop Road at the foot of Cedar Pass north and east across the alcove floor to the mouths of South Draw and adjacent North Draw, a smaller drainage. They also requested inventory of an area adjacent to the access road that would be used for equipment and material storage during the life of the project. The total length of the anticipated access road approximated 550 m (2,750 m<sup>2</sup> in the corridor), while the proposed material storage area covered an additional 5,000 m<sup>2</sup>.

#### **File Search**

The March 2000 SARC file search indicated that eight recorded archeological sites lay within 1 km of the project area.

39JK2. Described earlier, this is the Cedar Pass Butte site, which was first reported by Beaubien (1953). The exact location of the site is unclear, and it is uncertain whether it actually lay atop the Badlands Wall or below the escarpment. Surface collections at the site produced what were believed to be Stanley ware ceramics, reflecting a Post-Contact Coalescent Plains Village component dating to the 18th century AD (Taylor 1961:78; Lehmer 1971:123). The precise location of this site has not been recently

confirmed, and 39JK2 may no longer exist. Beaubien's map places it 400 m northeast of and above the project area.

*39JK3.* Identified by Beaubien (1953) as the Reservoir site, 39JK3 was reported to lie 50–75 m east of the Loop Road below Cedar Pass and a short distance north of park headquarters in what is now the vicinity of the Cliff Shelf Nature Trail (Williams 1997). The site appeared as a scatter of lithic debitage and ground-stone material eroding from just below the ground surface in a dissected area. Like 39JK2, this site produced what were believed to be Post-Contact Coalescent Stanley ware ceramics dating to AD 1700–1750. The location and condition of the Reservoir site have not been recently confirmed.

*39JK4.* The Johnny site lies 65–70 vertical m above and outside the project area. Previous research at this site is summarized on page 6.

*39JK107.* This site was recorded in 1987 by Jennifer Chapman about 500 m west of the Loop Road and 400 m northwest of 39JK4. The site was described as a concentration of lithic debitage and possible hearth eroding from a sod table atop the Badlands Wall. It was reevaluated later in 1987 by Ann Johnson (1987c), who concluded that 39JK107 was in poor condition. No temporally or culturally diagnostic artifactual materials appear to have been collected at the site, which lies well outside the project construction zone.

*39JK189.* This small historic trash dump was identified in 1991 during preconstruction archeological inventory along Loop Road Segment 10-2 (Jones 1993). The site lies 500 m south of the road and 1100 m southwest of the project area. The site debris may reflect operation of an early cafe or a nearby ranch, but it was recommended not eligible for nomination to the National Register of Historic Places. The site lies well outside the project construction zone.

*39JK205.* This site was identified by SARC personnel in 1995 (Williams 1997) on either side of the Cliff Shelf Trail 700–800 m east of and above the project area. It consists of a series of charcoal stains, burned and unburned bone fragments, burned earth, charcoal, and lithic debitage eroding from the banks of a gully. No temporally or culturally diagnostic artifacts were recovered from the site at the time it was recorded, but 39JK205 appears to represent one or more short-term prehistoric occupations or use episodes. It lies well outside the project construction zone.

*39JK227.* This small historic site was recorded by the Archeology Laboratory of Augustana College during the 1998 parkwide survey, and lies southeast of headquarters and east of a north-south access road. The site consists of two concrete pads and a concrete post, and like 39JK237 below, it may relate to early operation of the park or to early tourist activity around the Cedar Pass Lodge. It lies well outside the project construction zone.

*39JK237.* This small historic site was recorded in 1999 a short distance south of park headquarters (Jones 1999) and well outside the project area. Significantly impacted by cleanup at an unknown point in the past, the site consists of a rectangular concrete foundation/pad and a light scatter of historic building materials. The site may relate to operation of the Cedar Pass Lodge during the early 20th century, or to early operation of the park. It was recommended not eligible for nomination to the National Register of Historic Places in 1999.

Prior archeological inventory along Segment 10-2 of the Loop Road in 1991 (Jones 1993) had included most of the present project area. These MWAC investigations had focused upon land and sod tables on the floor of the alcove to roughly the 755-m contour. The results of the 1991 survey of the alcove area were negative.

## **Methodology**

Neither the suggested route of the access road across the alcove to the toe of the buttress site nor the proposed location for the material storage area were clearly staked at the time of the inventory; rather, they were plotted on a 1-m-interval contour map generated by an FHWA consultant. Utilizing the map, MWAC archeologists conducted intensive pedestrian inventory in a zigzag pattern along the alignment and across the storage area at intervals of 5–10 m. Considerable ground cover was present along the floor

of the alcove, primarily grasses and some prickly pear cactus, and ground surface visibility in that area varied between 10 and 40 percent. Land around the northeast edge of the alcove near the mouths of North and South Draws and in the area of the material storage site was considerably more barren, and ground surface visibility in these latter locations ranged from 80 to 100 percent.

## Results

No significant previously unrecorded archeological resources were identified in the course of the access road/storage area inventory. A single jasper flake was observed on a 2-m-high outwash fan at the mouth of South Draw, and several chunks of broken concrete sidewalk and clay drain tile were noted partway up the lower reach of South Draw. However, it is quite likely that all of this material, both prehistoric and historic, is derived from erosion of the remnants that contain 39JK4 Areas 931 and 932 at the top of South Draw to the north and east. As recently as seven years ago, the park maintained a scenic overlook on the west side of the road on Cedar Pass immediately east of 39JK4 Area 931. It is probable that the historic debris found in the bottom of South Draw represents materials derived from mass-wasting of the remnant and erosion of sidewalks, curbs, and drainage devices in that area.

Because the 1991 and the 2000 episodes of archeological inventory on the floor of the alcove were negative, it is likely that no significant intact archeological resources exist in the project area. Prior survey investigations across the pediment elsewhere along the foot of the Badlands Wall have thus far failed to identify significant prehistoric features or materials. The sediments and the small quantity of prehistoric artifacts that have been found there all appear to reflect relatively recent outwash from the steep slopes along the face of the escarpment. The project as presently designed appears to have low potential to affect significant unrecorded prehistoric or historic remains, and no further formal archeological investigations are recommended for the access road and storage area as they are presently envisioned.

## Construction Monitoring

### Description and Methodology

The author returned to the park on September 27 and 28 to monitor construction activity along the southwestern edge of 39JK4 Area 932. This location, adjacent to a 25- to 30-m-high vertical cliff above South Draw (Figure 5), was to be laid back to a 1:1 slope by mechanically excavating 7–10 m into the lower edge of the down-hinged erosional remnant.

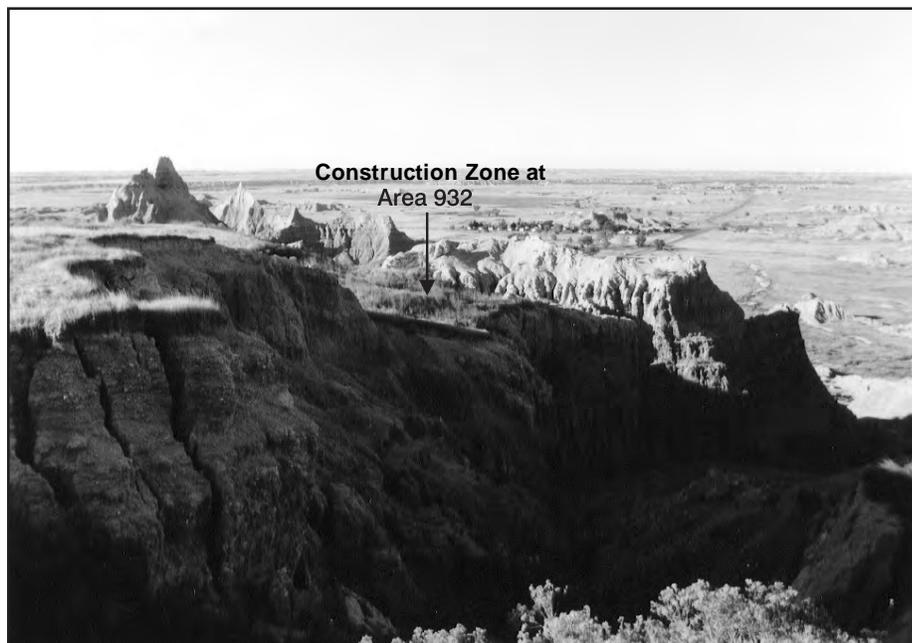


Figure 5. Construction zone at Area 932. South Draw is in the foreground. View is to the southwest.

The author briefly examined the staked access route across the southern part of the component per the terms of the NPS compliance agreement with the South Dakota SHPO. Construction personnel then guided a track hoe along the alignment over a cushion of old tires to the top of the hinged portion of the remnant. The machine was then driven downslope to the site of the excavation along the edge of the remnant above South Draw.

The area in question measured roughly 45 m northeast–southwest by 10 m northwest–southeast. However, a much smaller area at the northeast end of the construction zone, measuring about 10 by 13 m, actually contained intact topsoil and in situ archeological deposits. The track hoe operator quickly removed the topsoil from this 130 m<sup>2</sup> area to a depth of roughly 40 cmbs, piling the spoil on the slope above the upper edge of the excavation (Figure 6). The author was provided an opportunity to both examine the floor of the excavation as the track hoe worked, as well as to sample the approximately 35–40 m<sup>3</sup> of topsoil that the excavation produced.

Figure 6. Excavation underway on the 1:1 slope at the southwestern edge of Area 932 in September 2000. View is to the southwest.



Extremely dry soil conditions along the edge of South Draw made the identification of artifactual material in the spoil quite difficult. However, a small quantity of cultural material was recovered from the backdirt, confirming the results of the April testing along Transect E, previously summarized (pp. 9–11). Additionally, a complete radius/ulna and several tooth fragments, probably bison, were exposed in the floor of the excavated area at a depth of 40–50 cmbs.

All of this material was collected and removed from the excavation site. The bison remains were ultimately interpreted to represent an instance of natural deposition rather than cultural, and the radius/ulna and tooth fragments were left with the park paleontologist.

### **Artifactual Material**

Artifactual material recovered in the spoil included two chert flakes, five bone fragments, two pieces of fire-cracked rock, and a single pottery rim sherd. Per the instructions of the park’s chief of interpretation, these artifacts were added to the materials collected in April and are curated under MWAC Accession 907.

The two flakes are incomplete and non-cortical and probably represent materials obtained from the Horse Creek Chert quarries to the southwest. Neither flake bears evidence of use wear or retouch, and

they appear to simply reflect unutilized debitage. They measure 30 to 31 mm in maximum dimension. The two pieces of fire-cracked rock both represent platy material obtained from clastic dikes, probably in the nearby Miocene-age Sharps formation exposures. They measure 48 to 66 mm in maximum dimension and probably reflect refuse generated by hearth cleanout activity.

The bone material includes two fragments of a single rib, two fragments of long bone, and a piece of cancellous material. The dimensions of the larger rib fragment suggest that it represents bison remains. The broken condition of the long or limb bone fragments probably reflects crushing/breakage for marrow extraction, and none of the bone has been otherwise modified. The fragments range in maximum dimension from 34 to 132 mm.

Finally, the single pottery sherd represents an 11-mm-long section of rim from a globular vessel that had a low shoulder and short neck (Figure 7). The sherd is sand- and grit-tempered with a medium gray to tan core and has a plain exterior and interior finish. Exterior and interior smoothing has obliterated any evidence of method of manufacture. The rim appears to be gently everted and measures only about 22 mm from the lip to the neck-body juncture. The lip is flattened, and the lip bevel bears diagonal incised cross-hatching.

This sherd is morphologically similar to Anderson ware (Craig Johnson, personal communication October 17, 2000) and probably reflects the Anderson Low Rim ceramic type. Anderson ware was defined by Lehmer (1954:48–49, Plate 17) in ceramic material recovered from 39ST30, the Dodd site, a multiple-component prehistoric village on the west bank of the Missouri River in South Dakota between the mouths of the White and Cheyenne Rivers. The site contained the remains of two sequential Initial Middle Missouri variant occupations that included a lower Monroe focus habitation and a subsequent Anderson focus occupation (Johnson 1996:224). Charcoal from a rectangular house structure exposed in the latter component generated an uncorrected radiocarbon age of  $800 \pm 200$  years BP (Crane and Griffin 1960:40–41), or about AD 1150 (Lehmer 1971:59, 64–72). Calculated at one sigma, the corrected *date* for this age is probably AD 1024–1317 (Stuiver and Reimer 1993).

The Initial Middle Missouri variant Anderson ware sherd recovered during the construction monitoring is culturally consistent with the two small side-notched projectile points recovered during the testing atop Area 932 (Figure 4). Additionally, other Anderson ware ceramics have been identified in materials collected from Area 931 of the Johnny site (Johnson 1989b), although none have had cross-hatched decoration on their lips.

While the  $800 \pm 200$  BP radiocarbon age from the Anderson focus component at the Dodd site is 200 years later than the  $1000 \pm 60$  BP age from the eroding hearth in Area 931 of the Johnny site (Johnson 1989b), the two ages are contemporaneous at two sigma (Stuiver and Reimer 1993). Together they generate an average age of  $983 \pm 58$  years BP and a corrected *date* of AD 975–1172 (Stuiver et al. 1999), which should be considered an accurate estimate for the Initial Middle Missouri occupation(s) at the Johnny site. As has been indicated previously (Johnson 1989b), there may well be an earlier Plains Woodland occupation represented in Area 931, and the Stanley ware ceramics recovered by Taylor at the site in 1958 indicate an 18th century AD Post-Contact Coalescent occupation as well.

## Results

The results of the monitoring of construction at the southwestern corner of 39JK4 Area 932 confirmed the presence of sheet midden or trash deposits reflecting one or more Initial Middle Missouri vari-



Figure 7. Rim sherd, probably Anderson Low Rim type, from the southwestern edge of Area 932.

ant Plains Village occupations. No datable features were exposed during the construction, but the single Anderson ware rim sherd recovered from the construction zone is consistent with the several projectile points found in Area 932 in 1991 (Jones 1993:12) and 2000. Considered as a collection, this material clearly documents the general contemporaneity of the Initial Middle Missouri variant occupations in Area 932 with those represented in the component examined by Taylor in 1958.

## Management Summary

The 2000 MWAC investigations along the Loop Road on Cedar Pass addressed three components of the NPS/FHWA effort to remediate the effects of the Cedar Pass landslide on the Loop Road.

(1) Controlled-interval shovel testing was undertaken along the west side of an erosional remnant that contains archeological site 39JK4 Area 932. The tests indicated that intact Initial Middle Missouri variant Plains Village deposits are present in the northern two-thirds of the remnant at depths of 30–35 cmbs. Any buttress construction activity in adjacent South Draw that steepens the slope below this remnant will accelerate erosion of the archeological deposits atop the remnant and should be avoided. There should also be no effort made to lay back the slope at the top of the remnant, as this will destroy the archeological deposits along the west edge of Area 932.

The southern third of the erosional remnant, however, does not contain significant subsurface archeological materials, as all of the topsoil in this area has been eroded away. MWAC personnel staked a centerline for a 5-m-wide path across this zone that enabled heavy equipment to access the upper part of South Draw from the Loop Road on Cedar Pass via a cushion of old tires. The alignment was archeologically inventoried immediately prior to construction access and was reexamined later the same day when access to the edge of South Draw was no longer needed. No further access across the archeological site will be permitted.

In addition to inventory of the access alignment, MWAC personnel monitored construction along the lower edge of a portion of the erosional remnant that has hinged down into South Draw (Figure 3). Construction plans called for this part of the remnant to be excavated back from the lower edge in a series of vertical steps that produced a 1:1 slope. MWAC personnel recovered a small amount of archeological material from the backdirt generated by this construction activity, but no intact subsurface features were observed or identified.

(2) Project Alternative C, a segment of new road construction on the upper part of Cedar Pass, was archeologically inventoried with negative results. No significant archeological materials were identified along the 400 m of staked road alignment, and no further investigations are warranted for this project alternative as it is presently designed.

(3) Finally, archeological inventory was conducted along a proposed 5-m-wide temporary road at the foot of the escarpment that will be used by construction personnel to access North and South Draws during the buttress construction project. No significant archeological materials or features were identified during this inventory, and the route as indicated on FHWA contour maps will require no further archeological investigations.



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Table 1. Controlled-interval shovel test data from 39JK4 Area 932, April 4, 2000.

Test	Depth <sup>1</sup>	Description
B 1	42	negative
B 2	40	1 burned sandstone fragment
B 3	41	1 burned rock at 10–12 cmbs
B 4	42	2 burned rocks, not collected
B 5	46	negative
B 6	39	negative
B 7	48	1 flake, 1 bird bone fragment in 0–15 cmbs level
B 8	46	1 jasper flake
B 9	45	negative
B 10	39	7 bone fragments, 1 tooth enamel fragment, 2 chert flakes, 1 quartzite flake, 1 jasper projectile point at 0–20 cmbs
B 11	37	negative
B 12	32	negative
B 13	18	negative; dense bedrock/gravel at 12 cmbs; gravel exposed on surface further to the south around the remnant
C 1	33	1 burned rock, 1 chert flake
C 2	30	2 burned rocks
C 3	32	negative
C 4	33	negative
C 5	34	1 burned rock
C 6	35	negative
C 7	36	negative
C 8	30	negative
C 9	36	negative
C 10	32	10 bone fragments
C 11	38	1 Horse Creek chert flake, 1 bone fragment, not collected
C 12	33	1 bone fragment, not collected
C 13	5	negative; dense gravel at ground surface
D 1	30	negative
D 2	23	1 plate chalcedony fragment
D 3	33	1 burned sandstone fragment, not collected
D 4	27	1 burned sandstone fragment, not collected
D 5	28	negative
D 6	35	4 bone fragments
D 7	33	negative
D 8	35	2 bone fragments, 1 jasper flake
D 9	43	1 quartzite flake
D 10	28	negative
E 1	32	negative
E 2	37	negative
E 3	43	negative
E 4	44	2 bone fragments
E 5	23	negative
E 6	35	negative
E 7	37	1 bone fragment, not collected
E 8	38	1 quartzite flake, 2 bone fragments at 0–25 cmbs
E 9	31	negative
E 10	21	negative

<sup>1</sup> cmbs. 21 positive shovel tests out of 46 total shovel tests

