# High Altitude Archaeology in the Mount Zirkel Wilderness, Jackson and Routt Counties, Colorado

Edited by Christopher A. Davis

Research Contribution 112
North Park Archaeological Research 1

PCRG
PaleoCultural Research Group

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## Abstract

The Mount Zirkel Wilderness Area encompasses approximately 65,000 hectares (ha) of montane woodland, subalpine forest, and alpine tundra situated within the Medicine Bow-Routt (MBR) National Forest at the northern end of the Park Range in north-central Colorado. The Park Range, in turn, forms the western boundary of North Park, a large intermountain basin that has been occupied by American Indian groups in the region for at least 10,000 years since the late Pleistocene or early Holocene. Previous work also documents that American Indians utilized the higher-elevation ecosystems in the mountains surrounding North Park for thousands of years, although most research on this topic to date has focused on the Front Range mountains to the east of the park. As such, much less is known about past use of high-altitude landscapes in the Park Range and other mountains that bound North Park to the west and south.

This report presents the results of archaeological fieldwork conducted by Paleocultural Research Group (PCRG) during the summer of 2018 in the alpine ecozone of the Mount Zirkel Wilderness. The project builds on previous research in the mountains of northern Colorado and was designed as an initial attempt to address the current lack of high-altitude data from the Park Range. The primary goals of the project were to identify, document, and contextualize alpine archaeological resources in the Mount Zirkel Wilderness. Additionally, the project aimed to assess the potential research value of conducting additional investigations in the alpine ecosystems of the Park Range and other parts of the MBR

The PCRG crew surveyed 432 ha of alpine landscape in the Mount Zirkel Wilderness, recorded nine new cultural resources, and investigated three semi-permanent ice patches for cultural material. The single Settler resource documented by the project consists of a small cairn and associated can scatter, the exact age and function of which are unclear. All of the American Indian resources are relatively small–in terms of both spatial extent and the number of artifacts–and consist entirely of chipped stone tools, flakes, or both. Most of the artifacts are non-diagnostic, but the morphology of one projectile point fragment suggests it could date to the late Archaic period (approximately 3000-1800 B.P.). None of the ice patches produced cultural remains, but floral or faunal samples were collected from the forefields of all three for further study. Dating and additional laboratory analysis indicate that all of the material is of local origin and relatively young (*i.e.,* ≤ 450 years old). Given their small size, limited diversity, and lack of diagnostic artifacts, none of the resources documented by PCRG are eligible for inclusion on the National Register of Historic Places.

Along with the small number and overall size of resources, comparative data from the Rabbit Ears, Never Summer, and Medicine Bow mountains, which bound North Park to the south and east, suggest that American Indian utilization of alpine ecosystems in the Mount Zirkel Wilderness (*i.e.,* Park Range) was probably intermittent and ephemeral. This activity may have involved small groups of people who entered the alpine zone for short periods of time to hunt, forage, or simply travel back and forth across the northern end of the Park Range. The situation may have been similar for the Rabbit Ears and Never Summer mountains, as well, given the low number and diversity of resources in both ranges. By contrast, the Medicine Bows contain a much higher frequency and diversity of American Indian resources, indicating that these mountains were visited more often, and by larger groups who undertook a wider range of activities and stayed for longer periods of time in the past.

Major funding for the project was provided by the U.S. Forest Service. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions and policies of the U.S. Government. Mention of trade names or commercial products does not constitute their endorsement by the U.S. Government.


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*Cover photo: Crew surveying near Seven Lakes. Courtesy of Cameron Benton.*

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## Table of Contents

**1. Introduction ..... 1**
*Christopher A. Davis and Christopher M. Johnston*
Previous Research in the Mount Zirkel Wilderness ..... 2
Environmental Context ..... 6
Effective Environment ..... 6
Climate ..... 8
Flora and Fauna ..... 9
Geology ..... 11
Archaeological Context ..... 14
Paleoindian Stage ..... 14
Archaic Stage ..... 15
Late Prehistoric or Formative Stage ..... 16
Post-A.D. 1300 Period ..... 17
Settler Period ..... 18
Research Goals ..... 20

**2. Fieldwork and Results ..... 23**
*Christopher A. Davis, Christopher M. Johnston, Matthew Stirn, and Rebecca Sgouros*
Results of Field Investigations ..... 25
Sites ..... 25
5JA3144 ..... 25
5JA3145 ..... 27
5JA3148/5RT3518 ..... 28
5RT3517 ..... 29
Isolated Finds ..... 29
Ice Patch Survey ..... 31

**3. Alpine Ecosystems and Archaeology in North Park ..... 37**
*Christopher A. Davis and Christopher M. Johnston*
Alpine Ecozone Extent and Resource Density ..... 38
Prior Inventories and Documented Resources ..... 39
American Indian Resource Composition and Size ..... 44
Summary ..... 46

**4. Recommendations and Conclusion ..... 49**
*Christopher A. Davis*
Summary of Results ..... 50
National Register Eligibility Recommendations ..... 51
Past Human Land Use in North Park ..... 52
Future Research ..... 53

**References Cited ..... 55**

## List of Tables

Table 1.1. Summary of prior inventories in file search area. ..... 4
Table 1.2. Previously recorded resources in file search area. ..... 4
Table 1.3. Previously documented resources by ecozone and elevation. ..... 6
Table 1.4. Climate records for northern Colorado. ..... 8
Table 1.5. Geologic deposits in the study region. ..... 13
Table 1.6. Major culture-historical divisions in the Platte and Northern Colorado river basins. ..... 15

Table 2.1. Chipped stone debitage size-grade categories..... 25
Table 2.2. Sites documented during the Mt. Zirkel Wilderness survey. ..... 25
Table 2.3. Artifact assemblage from 5JA3145. ..... 27
Table 2.4. Debitage from 5JA3145 by size grade. ..... 28
Table 2.5. Debitage counts from 5RT3517 by size grade and presence or absence of cortex. ..... 29
Table 2.6. Isolated finds documented during the Mt. Zirkel Wilderness survey... 30
Table 2.7. Wood samples collected from the forefield of ice patch 1. ..... 31
Table 2.8. Data for faunal specimens collected from ice patches 2 and 3. ..... 33
Table 2.9. AMS $^{14}C$ dating results for bone specimens from ice patches 2 and 3. 35
Table 2.10. Stable isotope results for bone specimens collected from ice patches 2 and 3. ..... 35

Table 3.1. Total area and resource density for alpine zones in the mountains around North Park. ..... 39
Table 3.2. Archaeological inventories in the alpine zones around North Park. .... 40
Table 3.3. Archaeological sites and isolated finds in the alpine zones surrounding North Park. ..... 41
Table 3.4. Distribution of alpine archaeological resource by elevation. ..... 41
Table 3.5. Site types in the alpine ecozones of the mountains around North Park. ..... 41
Table 3.6. Isolated finds and features in the alpine ecozones of the mountains around North Park. ..... 43
Table 3.7. NRHP eligibility recommendations and determinations for alpine archaeological resources in the mountains around North Park. ..... 44
Table 3.8. Resource type categories for American Indian sites and isolates in the alpine ecozones around North Park. ..... 45
Table 3.9. Resource type frequencies in the Mount Zirkel Wilderness and alpine ecozones around North Park..... 45

## List of Figures

Figure 1.1. Map of North Park and the 2018 project area. ..... 3
Figure 1.2. The U.S. Forest Service pack string. ..... 4
Figure 1.3. Map of prior inventories near project area. ..... 5
Figure 1.4. Subalpine forests and meadows of the Mount Zirkel Wilderness. ..... 10
Figure 1.5. View of the alpine tundra..... 10

Figure 2.1. Hillshade map showing the survey tracts and larger project area..... 24
Figure 2.2. Hillshade map showing archaeological resources and ice patches documented during the Mount Zirkel Wilderness survey project. ..... 26
Figure 2.3. Rock alignment from site 5JA3144..... 26
Figure 2.4. Corner-notched projectile point fragment from 5JA3145. ..... 27
Figure 2.5. Overview photo of the northern portion of site 5JA3148/5RT3518... 28
Figure 2.6. Cairn from site 5JA3148/5RT3518. ..... 28
Figure 2.7. Overview photo of site 5RT3517. ..... 29
Figure 2.8. Overview of cairn at 5JA3146. Note the modern or recent wood on the left of the frame. ..... 30
Figure 2.9. Both sides of the orange chert biface from 5RT3514. ..... 30
Figure 2.10. Overview photo of ice patch 1 (IP.1)..... 31
Figure 2.11. Google Earth satellite image showing ice patch 1 (IP.1)..... 32
Figure 2.12. Top of ice patch 2 (IP.2), looking towards the forefield. ..... 32
Figure 2.13. View from ice patch 3 (IP.3) towards the forefield. ..... 33
Figure 2.14. Long bone fragment collected from the ice patch 2 (IP.2). ..... 34
Figure 2.15. Bison metapodial collected from ice patch 3 (IP.3)..... 35

Figure 3.1. Map of alpine zones and prior cultural resource inventories around North Park. ..... 38
Figure 3.2. Map of American Indian and Settler Resources in the alpine zones around North Park. ..... 40
Figure 3.3. Distribution of alpine archaeological resources by date of recordation. ..... 42
Figure 3.4. Distribution of all alpine archaeological resources by elevation. ..... 43
Figure 3.5. Distribution of American Indian alpine sites and isolates by elevation. ..... 46

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Dr. Richard Adams volunteered his time to serve as a crew chief and deserves many thanks for his continued efforts to explore high-altitude archaeology. Matt Stirn and Rebecca Sgouros expertly led the crew, ensuring this project could be conducted in a professional and safe manner. As with all PCRG projects, the all-volunteer crew make what we do possible. The crew braved strenuous backcountry hikes, cold evenings, logistical glitches, and downed trees, all while maintaining a positive attitude and an expert work ethic. Thank you to everyone involved for helping to make this project a success.

## About the Contributors

**Dr. Chris Davis** is a PCRG Project Archaeologist who has broad training and research experience in archaeology and biological anthropology. He holds a M.A. in Anthropology from Colorado State University and a Ph.D. from the University of Texas at Austin. His dissertation research used zooarchaeological and taphonomic analyses to investigate early human behavior at the site of SM1 in northwestern Ethiopia, and was the first to systematically document riverine fishing and foraging in the Horn of Africa during the late Middle Stone Age (~60-100,000 years ago), when humans were expanding out of Africa following routes that passed through the Horn along rivers and/or coastlines. Outside his dissertation, Chris has also been involved in various projects that use digital morphological datasets and methods to understand human anatomy and evolution, including a new reconstruction of the Wilson-Leonard 2 Paleoindian skull from Texas, and several postcranial studies of the famous fossil hominin, "Lucy". Chris is currently a research team member and site manager for the Blue Highways Project in Ethiopia, and has previously worked for the South Park Archaeology Project in Colorado, the BLM in California and Nevada, and CRM firms in Colorado, Wyoming, and South Carolina. His research has been presented at regional, national, and international meetings, and he has publications in The Anatomical Record, The Medico-Legal Journal, and Southwestern Lore.

**Chris Johnston** is Operations Director and a Project Archaeologist for Paleocultural Research Group. Chris began his career as a PCRG undergraduate work-study while at the University of Colorado at Boulder. Chris earned his MA from Colorado State

University in 2016 where his thesis research was on communal bison hunting at the Roberts Ranch Buffalo Jump (5LR100). He has worked for the USDA Forest Service, in cultural resource management, and as a researcher with PCRG and the Center for Mountain and Plains Archaeology at CSU. Chris served as the Assistant State Archaeologist of Colorado from 2016-2018 where he was the lead instructor for the Program for Avocational Archaeological Certification and managed the statewide archaeological and paleontological permitting system. He has worked on a variety of contract and research projects across the Great Plains and Rocky Mountains and has authored numerous technical reports, journal articles and conference presentations. Most recently was the co-editor of The Lithic Caches of Colorado, a special issue of the journal *Southwestern Lore*.

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# 1 Introduction

Christopher A. Davis and
Christopher M. Johnston

During the summer of 2018, Paleocultural Research Group (PCRG) conducted a high-altitude archaeological survey in the Mount Zirkel Wilderness on the Medicine Bow-Routt (MBR) National Forest, in Jackson and Routt counties, Colorado. The Mount Zirkel Wilderness is owned by the U.S. Forest Service and managed by the Hahns Peak-Bears Ears and Parks Ranger Districts of the MBR. The project was undertaken as part of a multi-year Challenge Cost Share Agreement (#17-CS-11020600) between the MBR and PCRG to conduct cultural resource inventories and site evaluations on the Parks District.

Funding for the project was provided under an alternative mitigation procedure called Resource Benefit Actions (RBA) within a Programmatic Agreement (PA) that was developed for managing cultural resources in hazardous tree environments (USFS MBR Agreement No. 07-MU-11020600-056). In this instance, hazardous tree environments are those caused by the beetle kill infestation across Colorado over the last several decades. The PA, which is between multiple forests in Colorado and the Colorado State Historic Preservation Office (SHPO), develops alternative mitigation strategies for when it becomes too dangerous to conduct archaeological survey among hazard trees to identify impacts to cultural resources within an area of potential effect (APE), per the guidelines of Section 106 of the National Historic Preservation Act (NHPA). Thus, the PA sets out the RBAs as alternatives to utilize funds that otherwise would have been used for survey and mitigation within an APE that is now too dangerous. Section C (2d) of the PA, as amended, provides additional information on the RBAs.

A variety of initiatives may be undertaken as part of the RBAs, including

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cultural resource inventory in areas of high site probability, testing and data recovery at previously recorded sites, ethnographic studies, or any number of similarly related projects. In this instance, after consultation with the MBR Heritage Program Manager Kolleen Kralick and SHPO staff, all parties agreed that the project described in this report meets the guidelines set forth in the PA. It should also be noted here that this is just one of many RBAs conducted under the Cost Share Agreement between the MBR and PCRG. The details of other RBA projects under this agreement are described in the technical reports associated with each of them. The work described in this report was conducted under the guidelines of Section 106 of the NHPA.

Previous research documents that American Indian groups in northern Colorado exploited resources in subalpine and alpine ecosystems by at least the early Holocene, and perhaps as early as the late Pleistocene (Bender and Wright 1988; Benedict 1979, 1992; Benedict and Olson 1978; Black 1991; Kornfeld *et al.* 2010; LaBelle and Pelton 2013; Pelton 2017). However, most work on this topic has centered on the Front Range, with a particular focus on the Indian Peaks Wilderness and Rocky Mountain National Park (RMNP) (Brunswig and Pitblado 2007). Accordingly, much less is known about high-altitude land use in the Park and other mountain ranges to the west of the Front Range. Likewise, recent work from across the globe demonstrates the archaeological research value of ice patches, including the recovery of perishable remains. However, investigation of these potentially valuable resources in Colorado to date has generally been limited in terms of both its extent and success (Lee and Benedict 2012).

Given the above, the research design for this project focused on preliminary survey of high-elevation moraines, cirques, ice patches, and adjacent landforms in the region around Seven Lakes, Red Elephant Mountain, and Davis Peak in the Mount Zirkel Wilderness. The project area is located at the northern end of the Park Range, and the overarching goal was to evaluate the archaeological potential of alpine ecozones and semi- or permanent ice patches in this part of the MBR (figure 1.1). The plan of research was developed by PCRG Research Director Dr. Mark Mitchell, who also served as the principal investigator for the project, and PCRG board member Dr. Craig Lee. Pre-fieldwork planning efforts were coordinated by PCRG Operations Director Chris Johnston, along with PCRG Research Affiliates Matt Stirn and Rebecca Sgouros. Kolleen Kralick and MBR South Zone Archaeologist Jason Strahl were also instrumental in pre-field planning.

Fieldwork was led by Matt Stirn and Rebecca Sgouros, with assistance from Dr. Richard Adams, who volunteered as a crew chief for the project. The survey crew also included PCRG volunteers Cameron Benton, Spencer Little, Dave Upchurch, and Cassie Vogt. Additional support in the field was provided by Trepper Osburn, who led a U.S. Forest Service mule pack string that helped transport gear and supplies to and from the project base camp (figure 1.2). Glenn Ryan, the lead packer of the Region 2 pack string helped coordinate the logistics, and Jason Strahl assisted the PCRG team on their first night in camp. In total, PCRG staff and crew devoted 356 person-hours (44.5 person-days) to the field effort, of which 252 person-hours (31.5 person-days) were donated. The total value of this donated labor is $6300.

This report discusses the context, results, and conclusions of the Mount Zirkel Wilderness survey project. The remaining sections of chapter 1 provide additional background information on previous research, the modern effective environment, and the archaeological context of the region in and around the Mount Zirkel Wilderness. Chapter 1 ends with a more detailed explanation of the research goals and design for the project. Chapter 2 reviews the fieldwork effort and methods, and describes all of the resources documented during the survey, including sites, isolated finds, and several semi-permanent ice patches. Chapter 3 presents data on other high-altitude resources in north-central Colorado that help place the alpine archaeology of the Mount Zirkel Wilderness in a broader regional context. Chapter 4 concludes the report with an overview and synthesis of all the results, a summary of National Register of Historic Places (NRHP) recommendations, and a discussion of directions for future research.

## Previous Research in the Mount Zirkel Wilderness

In order to obtain data on prior inventories and previously recorded cultural resources in the Mount Zirkel project area and surrounding region, PCRG initiated file searches of databases managed by the Colorado Office of Archaeology and Historic Preservation (OAHP) and the U.S. Forest Service (USFS) on April 24, 2018. The file search area encompasses approximately 44,500 ha of the western arm of the MBR, and includes around 60 percent of

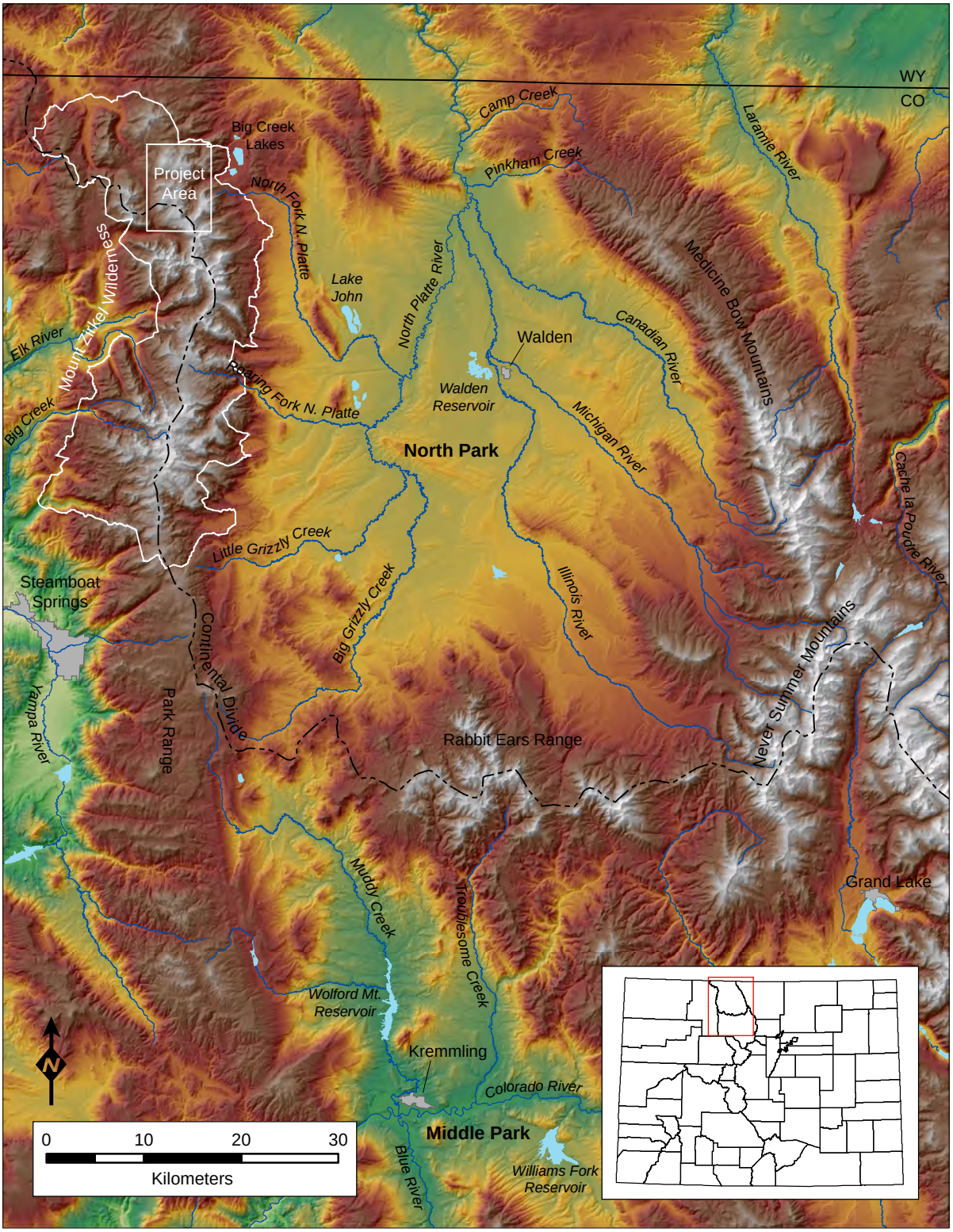


*Figure 1.1. Map of North Park showing major rivers, lakes and reservoirs, cities, the Mount Zirkel Wilderness Area, and the 2018 PCRG project area.*

*Figure 1.2. Trepper Osburn leading the U.S. Forest Service mule pack string along the Seven Lakes Trail as they transport supplies to the Mount Zirkel project camp. Photo by Richard Adams.*

the Mount Zirkel Wilderness and other immediately adjacent areas in the Park Range (figure 1.3).

The OAHP and USFS inquiries identified 33 cultural resource inventories within the file search area (table 1.1). Most of the prior inventories were conducted by the USFS, and they include block, linear, and mixed block and linear method surveys. Block surveys encompass 1741 ha and are by far the most common, representing 86.8 percent of previous coverage in the region. Linear (165.6 ha) and mixed method (100.2 ha) surveys are far less common, and make up the remaining 8.2 and 5.0 percent of the inventoried area, respectively. Importantly, the combined survey coverage (2007.2 ha) for all previous inventories represents only around five percent of the total file search area. Additionally, as figure 1.3 demonstrates, much of the prior work has been confined to lower elevation areas on the eastern and western margins of the Park Range, and even inventories conducted near the center of the search area tend to be in lower-lying canyons or valleys.

Despite its relatively massive spatial extent, only 48 cultural resources have previously been documented in the file search area (table 1.2). There are 11 resources (22.9 percent) that have American Indian components, while the remaining 37 (77.1 percent) have Settler components. No multicomponent resources are documented in either the OAHP or USFS databases for the current search area. There are five resources listed as eligible for the NRHP, all of which are Settler component sites; none of the American Indian resources are recommended as eligible for the NRHP.

Table 1.1. Summary of prior cultural resource inventories in the file search area.

| Survey Type | No. | Area (ha) | Percent of Coverage |
|---|---|---|---|
| Block | 23 | 1741.4 | 86.8 |
| Linear | 7 | 165.6 | 8.2 |
| Mixed | 3 | 100.2 | 5.0 |
| Total | 33 | 2007.2 | 100 |

Table 1.2. Previously documented cultural resources in the Mt. Zirkel file search area.

| Component type | Description | Site | Isolate |
|---|---|---|---|
| American Indian | Biface and flakes | 1 | - |
| | Biface and flake | - | 1 |
| | Projectile point | - | 3 |
| | Isolated flake | - | 6 |
| Subtotal | | 1 | 10 |
| Settler | Habitation | 7 | - |
| | Mine/Prospect pit | 4 | 2 |
| | Mining camp | 1 | - |
| | Tree carving | - | 5 |
| | Survey marker | - | 1 |
| | Road segment | 3 | - |
| | Trail segment | 7 | - |
| | Ditch segment | 2 | - |
| | Trash/debris scatter | 1 | 4 |
| Subtotal | | 25 | 12 |

All but one of the previously recorded American Indian resources are isolated artifacts. These isolated finds include three projectile points (one side-notched Archaic; one corner-notched; one non-identified),

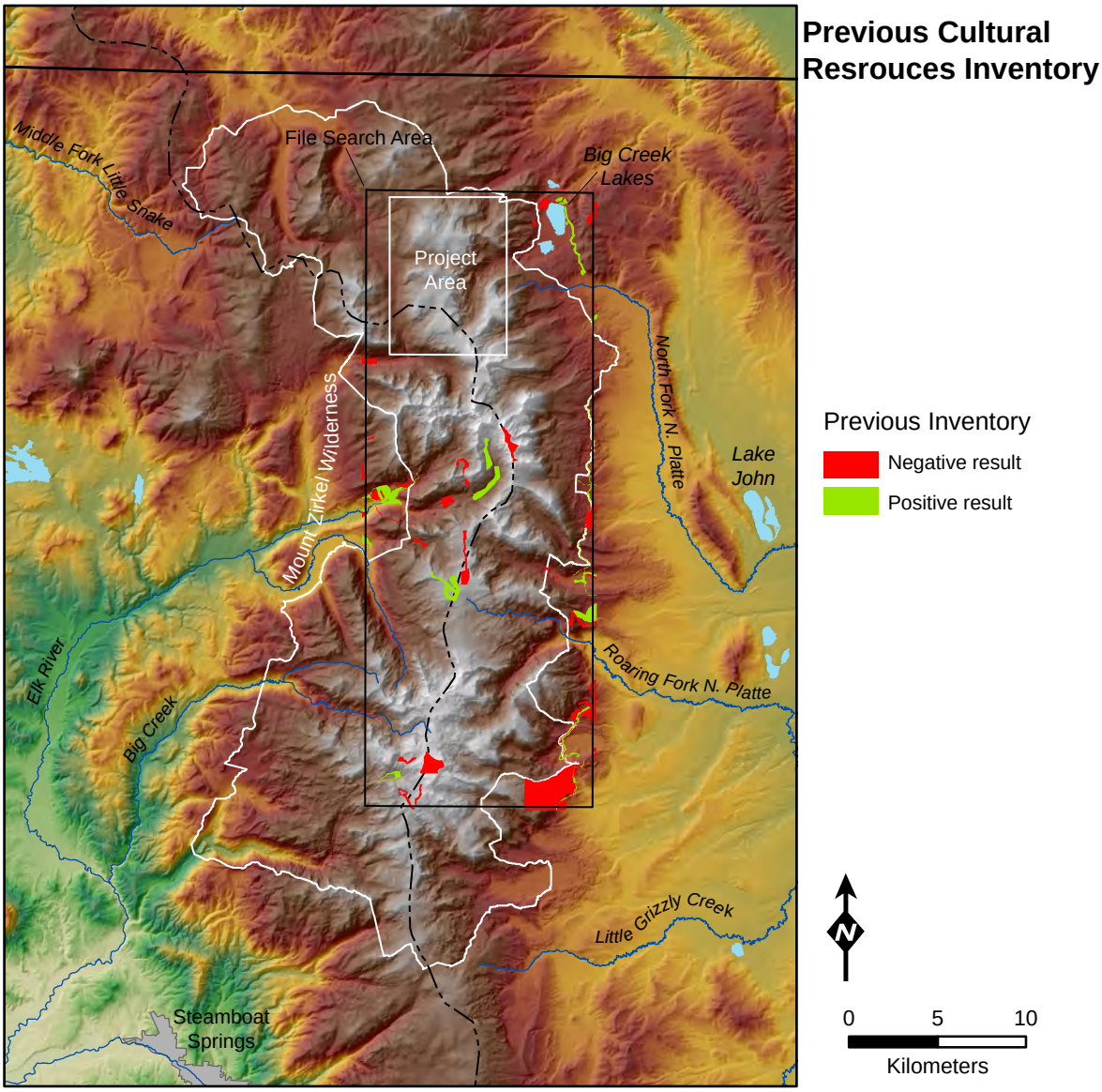


*Figure 1.3. Map showing previous cultural resources inventory near the project area.*

one chert biface with an associated chalcedony flake, and six isolated chalcedony and chert flakes. The single American Indian site is a small lithic scatter consisting of a chert biface and 13 chert flakes.

Of the 37 resources with Settler components, 25 are sites and 12 are isolated artifacts or features, many of which are related to mining activity during the late nineteenth and early twentieth centuries. Habitation structures (*e.g.,* log cabins, outhouse) represent 28.0 percent of the Settler sites, while another 20.0 percent are mines and a mining camp. Two of the cabins are documented as eligible for the NRHP. The remainder of the Settler sites are segments of historic trails (28.0 percent), roads (12.0 percent), or irrigation ditches (8.0 percent), three of which (two trail and one ditch segment) are listed as eligible for the NRHP, and a large trash scatter (4.0 percent). Isolated finds include tree carvings (41.7 percent), smaller trash or debris scatters (33.3 percent), prospect pits (16.7 percent), and a historic survey marker (n=8.3 percent).

The 46 resources for which elevation data were available are summarized by four categories that roughly correspond to montane (2400-2599 m), subalpine (low: 2600-2799 m; high: 2800-2999 m), and alpine (≥ 3000 m) ecozones within the search area in table 1.3. When all of the resources are considered

Table 1.3. Previously documented resources by ecozone and elevation categories.

| Ecozone | Elevation (m) | American Indian | Settler | Percent of Total |
|---|---|---|---|---|
| Montane | 2400-2599 | - | 8 | 17.4 |
| Subalpine (low) | 2600-2799 | 4 | 20 | 52.2 |
| Subalpine (high) | 2800-2999 | 1 | 2 | 6.5 |
| Alpine | ≥ 3000 | 5 | 6 | 23.9 |

together, 17.4 percent of them are found in the lowest montane zone, while a full 52.2 percent occur at mid-range elevations associated with the lower subalpine zone. Resources are rarest in the high subalpine zone, where only 6.5 percent of them are found. Conversely, almost a quarter (23.9 percent) of the resources are located within the alpine zone, at elevations of 3000 m or more.

Examining the elevation category data by component type, it is clear that the majority of Settler resources are located at lower elevations within the montane (22.2 percent) and low subalpine (55.6 percent) zones. Accordingly, relatively few Settler resources are found in the high subalpine (5.6 percent) and alpine (16.7 percent) zones, most of which are related to mining and prospecting activity (*e.g.,* mines, mining camp, trash scatters). By contrast, half of the American Indian resources in the search area, including the one site and four isolates, are located at or above timberline in the alpine zone. Likewise, the remaining American Indian resources are all found in the low (40.0 percent) and high (10.0 percent) subalpine zones, and no American Indian resources occur at the lowest elevations associated with the montane zone.

The dearth of previous survey coverage in the file search area, which includes over half of the Mount Zirkel Wilderness, is such that approximately 95 percent of this vast region within the MBR remains essentially unexplored. Moreover, given that relatively few inventories have been conducted in the alpine and high subalpine ecozones that extend through the center of the search boundary, the overall lack of data for the region is particularly acute in these higher elevation areas. The northern portion of the search area, in which the Mount Zirkel project parcel is located, is almost completely devoid of prior inventory, and the only previously documented resources are around Big Creek Lakes more than 5 km away from the current survey tracts. Finally, despite the fairly small number of recorded sites and artifacts overall, that half the American Indian resources are found above 3000 m documents the presence of indigenous groups in the high-altitude ecozones of the Mount Zirkel Wilderness in the past.

## Environmental Context

The following sections discuss aspects of the modern environment, including basic physiography, climate, and available faunal, floral, and stone resources in and around the MBR in north-central Colorado. The current project area consists of a relatively small section of alpine terrain located entirely within the Mount Zirkel Wilderness, which is in turn part of the more expansive MBR. However, any archaeological material in the alpine zones that comprise the project area—particularly American Indian resources—was likely deposited by groups that ranged widely across northern Colorado throughout the year. As such, the contextual discussions below encompass both the specific project area in the Mount Zirkel Wilderness, as well as the mountain ranges, river valleys, and parkland basins in the broader surrounding region, all of which are relevant to understanding past human lifeways in this part of the Rocky Mountains (Lischka *et al.* 1983).

### Effective Environment

The region in and around the Mount Zirkel project area is located within the southern Rocky Mountain physiographic province (Fenneman 1917), and encompasses all of Jackson county, and parts of Grand, Routt, Larimer, and Carbon counties, in north-central Colorado and southeastern Wyoming (figure 1.1). Elevations in this part of the Rocky Mountains vary widely, from approximately 2400 m in the valleys to well over 3700 m on the highest mountain peaks. The area can be divided into two broadly-defined zones: 1) the mountains—including alpine tundra, subalpine and montane forests, and foothill woodlands and rocky slopes—that bound the area on most sides, and 2) the largely flat and unforested river valleys and parklands that extend through much of the central part of the region.

The first zone is represented by several mountain ranges, including the Medicine Bow and Never Summer mountains in the east, the Rabbit Ears Range in the south, and the Park Range, which is home to the Mount Zirkel Wilderness, in the west (Hail 1965, 1968). The second zone is represented by a small section of the North Platte River valley on either side of the Colorado-Wyoming border, as well as two large parkland basins to the south, Middle Park and North Park, which are separated by the Rabbit Ears Range (Brunswig 2007a; Peterson 2013). Middle Park, the smaller of the two basins, is approximately 70 km south of the project area and extends partly into the broader study region along its southern boundary. By contrast, North Park is a major physiographic feature located just 10 to 15 km east of the Mount Zirkel project area, and comprises the vast majority of unforested land outside the alpine ecozones in this part of the southern Rockies. Both parks contain extensive evidence of human occupation since the late Pleistocene or early Holocene (Brunswig 2007a; Kornfeld and Frison 2000; Lischka *et al.* 1983).

Middle Park is a high-altitude topographic basin that makes up the southern part of the North Park-Middle Park structural basin, which formed during the Laramide orogeny approximately 70-50 million years ago (ma) (Dechesne *et al.* 2016; Dickinson *et al.* 1990; Tweto 1957). Middle Park has an area of approximately 1100 square kilometers (110,000 hectares [ha]), and contains the towns of Granby, Grand Lake, Kremmling, Hot Sulphur Springs, and Fraser. The Middle Park basin is also home to the headwaters of the Colorado River and several of its tributaries, including the Blue, Fraser, and William's Fork rivers, as well as a number of major lakes and reservoirs (Lake Granby, Grand Lake, William's Fork Reservoir, and Willow Creek Reservoir). The topography within Middle Park is complex, and Tweto (1957) notes that several overthrust fault belts divide it into a series of valleys and sub-basins that are not easily recognized as a single park from the ground. Middle Park is largely encircled by mountains, with the Rabbit Ears Range to the north, the Park Range to the west, the Vazquez Range to the south, and the central portion of the Front Range to the east.

North Park is a larger, and less topographically complex, intermontane basin that represents the northern part of the North Park-Middle Park structural basin (Dechesne *et al.* 2016; Dickinson *et al.* 1990; Hail 1965; Lawton 2008; Schroba 2016). The North Park basin occupies an area of approximately 2200 square kilometers (220,000 ha) and is home to Walden, the county seat and only incorporated town in Jackson County. North Park is partly bounded by the Independence Mountain block fault to the north, the Rabbit Ears Range to the south, the Medicine Bow and Never Summer mountains to the east, and the Park Range to the west.

Much of North Park is relatively flat and elevations typically range from around 2400-2500 m along the floor; however, there are several notable features of higher relief throughout the valley, such as Delaney Butte, Pole Mountain, and Sheep Mountain along the western edge, Johnny Moore Mountain in the east, and Peterson and Owl ridges near the center, with elevations of approximately 2600-2800 m. The floor of the park also features a number of small lakes and reservoirs, and a fairly extensive network of rivers and streams. Major waterways include the Illinois, Michigan, and Canadian rivers, and Little Grizzly, Grizzly, Arapahoe, Pinkham, and Camp creeks, all of which are tributaries of the North Platte River. The headwaters of the North Platte, a major river that drains large parts of northern Colorado, south-central Wyoming, and western Nebraska, rise at the confluence of Little Grizzly and Grizzly creeks in western North Park, and the entirety of the park is located with the North Platte drainage basin (Hail 1965; Peterson 2013; Shinker *et al.* 2010).

North Park is relatively isolated by the surrounding mountains and most access routes are confined to high-elevation mountain passes. Cameron Pass provides access from the east, via the canyon of the Cache la Poudre River (Lischka *et al.* 1983). From the Laramie Basin to the northeast, entry into the park is possible by crossing the southern end of the Snowy Range and into Kings Canyon, following what is essentially the current route of Colorado State Highway 127 and Wyoming State Highway 230. In the south, Willow Creek Pass connects North Park to Middle Park across the Rabbit Ears Range. In the west, North Park is also accessible from the Yampa River Valley and western slopes of the Park Range via Rabbit Ears and Muddy Passes in the south and Buffalo Pass further north. Additionally, access is possible from the north through Northgate, the location on the eastern side of Independence Mountain where the North Platte River exits the park. This northern access route is perhaps the easiest to traverse of all those discussed above, given the lower elevations and gentler topography in this area of the valley (Lischka *et al.* 1983).

*Climate*

The climate in this part of north-central Colorado is semiarid and seasonal, with long, harsh winters and short, relatively mild summers (Doerner 2007; Griffiths and Rubright 1983). There are no weather stations located within the Mount Zirkel Wilderness, but data from several stations located in North Park and the surrounding mountain ranges offer insight about regional weather patterns in and around the project area (table 1.4).

At the town of Walden, Colorado (elevation 2475 m), located in North Park approximately 40 km east-southeast of the project area, the average maximum January temperature is -1.7 degrees C, while the average minimum temperature is -15.7 degrees C (Western Regional Climate Center 2019). Average temperatures in July range from a maximum of 25.8 to a minimum of 4.5 degrees C. Total precipitation is quite low, averaging 26.7 cm annually; monthly levels are evenly distributed across much of the year, with a slight uptick between March and August, during which approximately 60 percent of yearly precipitation falls. Walden receives an average of 145.8 cm of snow per year, with around 40 percent of snowfall occurring between November and March.

Average January temperatures range from a high of 0.6 degrees C to a low of -12.0 degrees C at Encampment, Wyoming (elevation 2316 m), in the North Platte River valley approximately 35 km north of the project area. The corresponding averages in July are 26.5 and 7.9 degrees C. Total precipitation (annual mean=37.0 cm) is slightly higher than in North Park, and is once again spread evenly across most of the year, with just over half occurring in spring and summer. Snowfall accumulation averages 197.1 cm annually, and snow is possible throughout much of the year, but approximately 75 percent of snow falls between December and April. Snowfall peaks in March, during which the average total accumulation is approximately 20-25 percent higher than all other winter and spring months.

Weather data for the Park Range are available from Steamboat Springs, Colorado (elevation 2085 m), which is located approximately 45 kilometers southwest of the project area in the Yampa River Valley on the western slope of the mountains. January temperatures in Steamboat Springs average between a maximum of -1.0 degrees C and a minimum of -7.2 degrees C; by contrast, the average maximum and minimum are 28.1 and 5.3 degrees C, respectively, in July. Annual precipitation (60.2 cm) and snowfall (423.4 cm) averages are both much higher than they are at Walden or Encampment. Total precipitation levels are fairly consistent for much of the year, but there is slightly more precipitation in the winter and fall (approximately 55 percent) than in spring and summer (approximately 45 percent). Just under half (around 45 percent) of snow falls in December and January alone. Significant early spring (March and April) and late fall (October and November) snowfall is also much more common in the Park Range (or Steamboat Springs) than in the parks and river valleys on the east side of the mountains.

Weather data for the Medicine Bow Mountains derive from Foxpark, Wyoming (elevation 2764 m), approximately 50 km northeast of the Mount Zirkel project area. Except for the January minimum, Foxpark has the lowest temperatures in both January (max. = -3.3 degrees C; min. = -15.5 degrees C) and July (max. = 21.9 degrees C; min. = 2.9 degrees C) on average of all the stations surveyed here. Similar to Steamboat Springs, Foxpark (40.9 cm) also receives more total precipitation annually than both valley floor towns, although the difference with Encampment, in particular, is small. Likewise, average annual snowfall

Table 1.4. Annual climate records for weather stations in and around the Mt. Zirkel project area (Western Regional Climate Center 2019).

| | Weather Station | | | |
|---|---|---|---|---|
| Variable | Walden (058756) | Encampment (483045) | Steamboat Springs (057936) | Foxpark (483630) |
| Period of record | 1897-2016 | 1948-1998 | 1893-2016 | 1911-1979 |
| Elevation (m) | 2475 | 2316 | 2085 | 2764 |
| Average max. temperature (°C) | 11.4 | 13.1 | 13.2 | 8.4 |
| Average min. temperature (°C) | -5.8 | -2.8 | -5.5 | -6.7 |
| Average total precipitation (cm) | 26.7 | 37.0 | 60.2 | 40.9 |
| Average total snowfall (cm) | 145.8 | 197.1 | 423.4 | 424.7 |

in Foxpark (424.7 cm) is significantly higher than at Walden or Encampment, and it is much more common for Foxpark to receive significant amounts of snow in late fall and early spring. However, similar to Walden and Encampment, slightly more precipitation occurs in spring and summer (approximately 55 percent) than in fall and winter (approximately 45 percent) at Foxpark. Additionally, much like Encampment, snowfall at Foxpark peaks in early spring, rather than early-to-mid-winter as it does in Steamboat Springs.

The historical data presented above indicate that overall weather patterns are similar throughout the region around the project area. These data also highlight the smaller-scale variations noted for this climatic regime by Bailey (1995), namely that lower-elevation parks and valleys are typically warmer, drier, and receive less snowfall than the mountains, and eastern slopes tend to be drier than western ones. With respect to past human occupation of the project area, these data indicate that activity in the alpine ecozones of the Mount Zirkel Wilderness was almost certainly limited to a relatively small window in mid-to-late summer or early fall. It is likely that adverse weather conditions for much of the rest of the year would have made hunting, foraging, and other activity in this area impractical, if not impossible.

*Flora and Fauna*

Bailey (1995) classifies most of central Colorado—from the margin of the Great Plains in the east to the edge of the Colorado Plateau in the west—as part of the Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow province (M331). The broader region that includes the project area is split between two sections of this province, with a dividing line that runs essentially north-south across the eastern slope and central part of the Park Range. Everything to the east of the line (North Park; Medicine Bow, Never Summer, and Rabbit Ears mountains) is in the North-Central Highlands and Rocky Mountain section (M331H), and everything to the west (central peaks and western slopes of the Park Range; Yampa River and Elk river valleys) is in the Northern Parks and Ranges section (M331I) (McNab *et al.* 2007). The former section includes higher-elevation areas with very steep slopes and narrow valleys, while the latter is more topographically variable and encompasses everything from high mountain peaks to lower-lying, broad, and relatively flat parklands and valleys.

As noted by Bailey (1995), the occurrence of marked vegetation zones mediated by differences in altitude, latitude, prevailing wind direction, and slope, is a distinctive aspect of the southern Rocky Mountain steppe climatic regime. The floors of Middle Park, North Park, and the North Platte River Valley are mostly comprised of intermountain sagebrush steppe and shrubland. Ground cover consists primarily of several varieties of big sagebrush (*Artemisia tridentata*), along with various other shrubs, including antelope bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus sp.*), mountain snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier canadensis*), wax currant (*Ribes cereum*), and wild crabapple (*Malus coronaria*). Where present, bunchgrasses, such as fescue (*Festuca sp.*), oatgrass (*Danthonia sp.*), blue grama (*Bouteloua gracilis*), prairie Junegrass (*Koeleria macrantha*), wheatgrass (*Elymus sp.*), and mountain muhly (*Muhlenbergia montana*) typically predominate, and particularly at higher elevations, wildflowers are often abundant (GAP Analysis Project 2019; Seiple and Clark 1998).

The slopes of the mountains that ring the central parkland basins are blanketed by a mixture of shrubland, woodland, and forests (figure 1.4). Foothill shrublands are dominated by mountain mahogany (*Cercocarpus ledifolius*), chokecherry (*Prunus virginia*), sagebrush (*Artemisia sp.*), and other deciduous shrubs. Moving upslope, large aspen (*Populus tremuloides*) stands and mixed montane forests and woodlands of Engelmann spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and Douglas fir (*Pseudotsuga menziessii*), with an understory of assorted shrubs, grasses, and forbs, are common in many areas. The highest subalpine zones in the region are covered by a mix of lodgepole pine (*Pinus contorta*) forests and spruce-fir woodlands, with occasional aspen stands interspersed in some places. Understory composition in subalpine forests and woodlands ranges widely, from dense grass and shrubs to mostly vegetation-free rocky soil (GAP Analysis Project 2019).

Above timberline, the alpine tundra is largely lacking in dense vegetation (figure 1.5). Flatter and more gently-sloping areas are often covered by an alpine turf that consists of a variety of grasses, sedges, herbs, and flowers, including arctic bluegrass (*Rhizomatous perennial*), blackroot (*Carex elynoides*) and dry-spike (*Carex siccata*) sedge, cushion phlox (*Phlox subulata*), and Parry's (*Trifolium parryi*) and Uinta (*Trifolium dasyphyllum*) clover. High

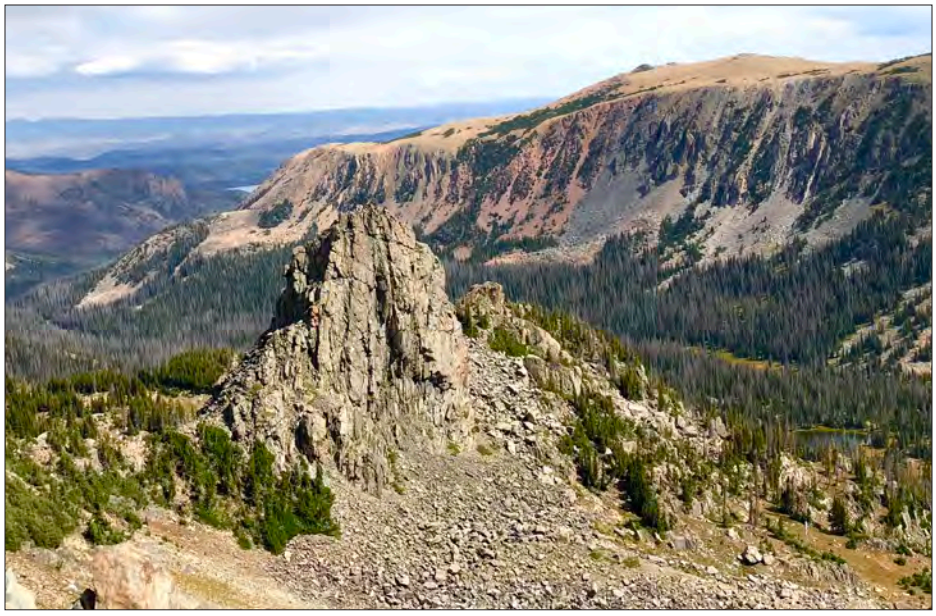

*Figure 1.4. View from the project area showing the subalpine forests and meadows of the Mount Zirkel Wilderness with Red Elephant Mountain (center right) and Big Creek Lakes (center left) in the background. Photo by Cameron Benton.*

*Figure 1.5. View of the sparsely vegetated and largely treeless alpine tundra within the Mount Zirkel project area. Photo by Cameron Benton.*

alpine mesic meadows are also common, and have ground cover that may include tufted hairgrass (*Deschampa cespitosa*), brome (*Bromis inermis*), Sitka valerian (*Valeriana sitchensis*), arrowleaf balsamroot (*Balsamorhiza sagitta*), fleabane (*Erigeron annuus*), bluebells (*Hyacinthoides non-scripta*), and various other grasses and forbs. Other parts of the alpine zone, such as scree fields, talus slopes, and steep cliff faces, are largely or completely devoid of vegetation, although shrubs, grasses, and/or lichens may grow in and around the rocks in these areas in some places.

As documented by Armstrong and colleagues (2011), the region is also home to a diverse faunal community. Elk (*Cervus canadensis*) and mule deer (*Odocoileus hemionus*) range widely across the area, often spending much of the summer at high elevations in the montane and subalpine forests. These species now winter downslope in North Park and Middle Park, but it is likely that prior to the late nineteenth century both taxa moved to even lower elevations outside the central parkland basins during the autumn and winter (Benedict 1992). Pronghorn

are also common in the grasslands and shrublands of North Park, Middle Park, and the North Platte River Valley, and were similarly abundant when the expedition of G.B. Grinnell explored the area in 1879 (Hampton 1971). Bighorn sheep (*Ovis canadensis*) are present, as well, but are largely restricted to the mountains that ring the parks and valleys. American bison (*Bison bison*) also roamed throughout the mountains, parkland basins, and river valleys in this part of the southern Rockies historically but are no longer extant in the area.

Larger carnivores include mountain lion (*Felis concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), and black bear (*Ursus americanus*), all of which are distributed across broad swaths of the mountains and parks in the region. Canada lynx (*Lynx lynx*) are present, as well, but are confined to higher-elevation areas. Several mustelid taxa, such as badger (*Taxidea taxus*), river otter (*Lontra canadensis*), marten (*Martes americanus*), and skunk (*Mephitis mephitis*), and procyonids, including raccoon (*Procyon lotor*) and ringtail (*Bassariscus astutus*), are also relatively common.

The region is home to at least three lagomorphs and numerous rodent taxa. Mountain cottontail (*Sylvilagus nuttallii*) and snowshoe hare (*Lepus americanus*) inhabit shrublands, woodlands, and forests at elevations from 1800-3500 m, while American pika (*Ochotona princeps*) occupy talus slopes above 3000 m (Armstrong *et al.* 2011). Larger rodents include American beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*), which occupy various aquatic habitats, and yellow-bellied marmot (*Marmota flaviventris*), which are often found in subalpine meadows or alpine tundra. Smaller rodent taxa live in a range of habitats, including: voles (*Microtus longicaudus; M. montanus*) and pocket gopher (*Thomomys talpoides*) in riparian/marshy areas; thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*) and prairie dog (*Urocitellus elegans*) in grasslands/shrublands; golden-mantled ground squirrel (*Callospermophilus lateralis*) and least chipmunk (*Neotamias minimus*) in woodlands; and bushy-tailed woodrat (*Neotoma cinereal*), red-backed vole (*Myodes gapperi*), and Uinta chipmunk (*Neotamias umbrinus*) in montane and subalpine forests.

Several raptor species, including bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), osprey (*Pandion haliaetus*), and Swainson's hawk (*Buteo swainsoni*) have breeding ranges that encompass large parts of the study region. Canada geese (*Branta canadensis*), white pelican (*Pelicanus erythrorhynchus*), blue heron (*Ardea herodias*), and sandhill crane (*Grus canadensis*) are abundant in and around wetlands, while sage (*Centrocercus urophasianus*) and sharp-tailed (*Tymphanus phasianellus*) grouse are common in grasslands and shrublands on the valley floors.

Cutthroat trout (*Oncorhynchus clarkia*) is the most common fish species, and is found in numerous streams and lakes in North Park, Middle Park, and the surrounding mountains. Mountain sucker (*Catostomus platyrhynchus*) is also relatively abundant, particularly in the Park and Rabbit Ears ranges. Populations of Iowa darter (*Etheostoma exile*) are found in areas around Peterson and Owl Ridges, and Independence Mountain in North Park, while roundtail chub (*Gila robusta*) occur throughout much of the central part of Middle Park. Several waterways at the southern end of the Medicine Bow Mountains also contain populations of Lake chub (*Couesius plumbeus*).

*Geology*

For much of the Cretaceous period (approximately 145-65 ma), large parts of northern Colorado and southern Wyoming were covered by the Western Interior Seaway (WIS), an inland sea within which many of the sedimentary units found across the region today were deposited (Dechesne *et al.* 2016; Dickinson *et al.* 1990). Around 70-50 ma, the WIS retreated and existing sedimentary units were folded and faulted, as tectonic activity associated with the Laramide orogeny uplifted the mountain ranges that now ring the study region and subsided the large North Park-Middle Park structural basin in between them (Dechesne *et al.* 2016; Dickinson *et al.* 1990; Lawton 2008; Tweto 1957). Formation of the Rabbit Ears Range as a result of volcanic activity during the Miocene (approximately 30 ma) divided the NP-MP basin into two topographic sub-basins (North Park and Middle Park), while subsequent erosion, sedimentation, and volcanism filled the sub-basins with additional deposits of sedimentary, metamorphic, and intrusive igneous rock throughout the Paleocene, Oligocene, and Miocene (Dechesne *et al.* 2016; Dickinson *et al.* 1990; Hail 1965, 1968).

At least three significant episodes of Pleistocene glacial activity further transformed the landscape, leaving various drift deposits across the study region

(Hail 1965, 1968; Lischka *et al.* 1983; Pierce 2003). The first, and largest, glaciation occurred during the early-to-middle Pleistocene (≥ 400,000 years ago [ka]) and left behind a thin sheet of glacial till composed of often highly weathered sand-to-boulder-sized particles with no morainal form (Hail 1965). The second episode is correlated with the Bull Lake glaciation (approximately 200-120 ka), evidence of which occurs in the form of moderately-cemented till (coarse granitic sand, pebbles, cobbles, boulders), outwash gravels, and terrace gravels. Where present, moraines have a gentle topography due to extensive weathering and erosion following glacial retreat and depressions are typically well-drained, so lakes and swamps are rare (Hail 1965).

The last major event is associated with the Pinedale glaciation (approximately 30-15 ka) and is represented by poorly-sorted till (medium-to-coarse sand, pebbles, boulders), outwash, and terrace gravels (Hail 1965, 1968). Moraines are common, often occurring as irregular and boulder-laden hummocks, and terminal and marginal ridges are well-defined and may be hundreds of feet in height. There are also numerous undrained depressions in which lakes and swamps have formed (Hail 1965). Additionally, more recent "neoglaciation" events (Richmond 1960) transported bouldery cirque deposits and till that now lie adjacent to or atop the remnants of earlier glacial episodes (Hail 1965).

Information on major bedrock formations and surface deposits in the study region is presented in table 1.5. Most of the mountain ranges in the region are cored by metamorphic and igneous Precambrian basement rocks, and the mountains serve as the primary areas of exposure for these deposits (Behrendt *et al.* 1969; Foster *et al.* 1999; Green 1992; Hail 1965, 1968). Conversely, the valley floors within the study region are dominated by younger sedimentary rocks, many of which have eroded from the surrounding uplifts and subsequently filled the interior basins (Hail 1965, 1968; Stites 1986).

Exposed bedrock in the Park Range consists largely of Precambrian granites, gneiss, and schist, interspersed with large deposits of unconsolidated Pleistocene-aged glacial drift and alluvial gravels (Hail 1965). Independence Mountain is similar, where a low-angle fault has thrust Precambrian gneiss and granite on top of younger sedimentary rocks. However, in this case, sizeable exposures of sandstone and siltstone from the Triassic Chugwater and Coalmont formations are also present, and Pleistocene drift and alluvium are largely absent (Behrendt *et al.* 1969; Green 1992; Hail 1965, 1968).

Bedrock exposed in the Medicine Bow Mountains is mostly Precambrian granite and gneiss, with additional outcrops of sandstone, siltstone, claystone, and conglomerate from the North Park and White River formations along Camp Creek near the Colorado-Wyoming border (Green 1992; Houston and Karlstrom 1992; Knight 1953, 1990). Scattered, unconsolidated glacial drift and aeolian deposits are also present, the latter of which form two large sand dunes on the western side of the mountains.

Much like Independence Mountain, the Never Summer Mountains were formed by a low-angle thrust fault that pushed Precambrian gneiss and schist over more recent sedimentary rocks, although here the basement rocks are overlain in many places by Eocene-to-Miocene-aged volcanic intrusives (Behrendt *et al.* 1969; Corbett 1966; Green 1992). Sedimentary deposits of Cretaceous-aged Pierre shale also outcrop along the eastern flank of the mountains, while older (pre-Bull Lake) Pleistocene glacial drift is present in the south (Corbett 1966; Green 1992; Hail 1965).

Unlike the other mountains in the research area, the Rabbit Ears Range is formed largely from Miocene-aged volcanics and igneous intrusives, with extensive exposures along the western flank of the mountains (Dechesne *et al.* 2016; Green 1992; Hail 1968; Nelson 1971). Likewise, in contrast to most of the other mountains in the region, there is a large amount of sandstone and conglomerate from the Coalmont Formation exposed in the central and western parts of the range (Green 1992; Hail 1968; Nelson 1971). Relatively isolated deposits of unconsolidated Pleistocene talus and colluvium also occur in several places across the Rabbit Ears Range (Green 1992).

The floor of North Park is composed largely of arkosic sandstone, shale, and conglomerate from the Coalmont Formation, while older shale deposits also outcrop in many places around the eastern and western margins of the park (Hail 1965, 1968; Peterson 2013; Schroba 2016). Other notable formations include sandstone, siltstone, and conglomerates from the North Park and White River formations, which are exposed around Peterson and Owl ridges in the center of the park, as well as to the north around Independence Mountain and along the western slopes of the Medicine Bow Mountains (Hail 1965, 1968; Schroba 2016). The section of the North Platte

Table 1.5. Geologic deposits in the study region.

| Geologic Interval | Deposit Name | Approx. age (ma) | Description |
|---|---|---|---|
| Pleistocene-Holocene | Quaternary drift | 1.6-0.01 | glacial drift |
| | Quaternary gravel/alluvium | 1.6-0.01 | gravel, alluvium |
| | Quaternary eolian | 1.8-0.0 | dune sand and silt, Peoria loess |
| | Quaternary colluvium | 1.8-0.0 | talus, rock-glacier, colluvium |
| Miocene-Pliocene | Browns Park Formation | 23-1.8 | sandstone, siltstone |
| | North Park Formation | 23-1.8 | sandstone, siltstone, conglomerate |
| | Troublesome Formation | 23-1.8 | sandstone, siltstone |
| Oligocene-Miocene | Volcanics | 33-7 | intermediate volcanic rock |
| | Ash-flow tuff | 34-23 | volcanic ash-flow tuff |
| | White River Formation | 34-23 | ashy claystone & sandstone, conglomerate |
| Paleocene-Eocene | Tertiary intrusives | 55-1.8 | plutonic rock (phaneritic) |
| | Coalmont Formation | 65-34 | arkosic sandstone, shale, coal |
| Cretaceous | Pierre Shale | 100-65 | shale |
| | Colorado Group | 145-65 | shale, limestone |
| Jurassic | Dakota Group | 200-100 | sandstone |
| | Morrison & Sundance Formations | 200-65 | sandstone, shale, claystone, limestone |
| Triassic | Chugwater Formation | 250-245 | sandstone, siltstone, shale, limestone |
| Precambrian | Granitic rocks | 1600-1000 | granite, granodiorite, quartz monzonite |
| | Biotitic rocks | 2500-1600 | gneiss, schist, marble, quartzite |
| | Felsic rocks | 2500-1600 | gneiss, meta-basalt, meta-graywacke |
| | Mafic rocks | 2500-1600 | gabbro, diorite, monzonite |

valley where the river exits North Park on the east side of Independence Mountain is floored entirely by the North Park Formation. Once again, unconsolidated deposits of Pleistocene glacial drift, gravels, alluvium, colluvium, and talus are also scattered across the floor of the park (Green 1992; Hail 1965).

The central floor of Middle Park consists largely of sandstone and siltstone from the Coalmont and Troublesome formations (Green 1992; Izett 1968). Additionally, sizeable deposits of Pierre shale are found on the eastern and western margins of Middle Park, along with isolated outcrops of sandstone and mudstone from the older Dakota, Sundance, and Morrison formations in the north near Rabbit Ears Pass and Muddy Pass (Green 1992; Izett 1968). Pleistocene gravels, alluvium, and colluvium are also dispersed throughout the park (Green 1992).

There are numerous sources of raw material suitable for producing chipped stone tools that outcrop in the formations discussed above. According to the OAHP online cultural resources database (COMPASS), there are at least 73 lithic procurement sites in Jackson (n=10), Routt (n=8), and Grand (n=55) counties (Black 2000). Approximately 40 km west of the Mount Zirkel project area, the Pinkham site (5JA808) in King's Canyon contains around 20 pits used by the aboriginal inhabitants of the region to quarry chert derived from the White River Formation (or White River Group) (McGrew 1953; Schroba 2016). The chert from the Pinkham quarry comes in opaque, translucent, and dendritic varieties, and is generally quite variable in terms of color, consistency, and quality. PCRG recently conducted testing and excavations at the Pinkham quarry and a report of the results, including more detailed data on the raw material sourced there, is pending.

Other notable raw material acquisition localities in North Park include a series of sites (5JA256, 5JA293, 5JA320) associated with multiple large outcrops of silicified wood around Peterson Ridge. Additionally, there are several sites where smaller sources of chert or quartzite may have been acquired scattered throughout the center of North Park and in the mountains to the west.

One of the best-known source sites in the broader region is the Windy Ridge Quarry (5GA872), located just south of Rabbit Ears Pass in Middle Park. Although the site boundary extends across much of the ridge, quarrying activity is concentrated in the south, where over 170 quarry pits attest to intensive,

episodic exploitation of orthoquartzite exposed in the Dakota Formation that dates back 11,000 years or more (Bamforth 1998, 2006; Black 2000; Kornfeld and Frison 2000). The orthoquartzite is fine-grained, well-sorted, and of high quality. Shades of gray predominate, although a tan to brown variety is also fairly common, and much lower frequencies of maroon and red colorations are noted, as well (Black 2000).

To the south, the Barger Gulch site complex (5GA195) near Kremmling contains a series of Paleoindian camps situated around outcrops of Troublesome Formation chert that contain extensive evidence for quarrying activity and tool production (Kornfeld *et al.* 2010; Mayer *et al.* 2007; Surovell *et al.* 2005). The chert, which may also be referred to as Kremmling chert, is typically of high-quality and white, light gray, or gray in color, with some varieties containing shades of blue-gray, tan, or pink, as well (Benedict 1990). There are several other source sites for Kremmling chert located elsewhere along the Barger Gulch drainage (5GA1144, 5GA1208) and in the surrounding area (5GA7, 5GA1172, 5GA1174) (Metcalf *et al.* 1991; Naze 2013).

Numerous additional sites with evidence for procurement of various types of chert, chalcedony, and jasper are found throughout the central portion of the Middle Park basin (Black 2000). There is also a cluster of sites with outcrops of volcanic-derived Table Mountain jasper—one atop the mountain that gives this material its name and several others along terraces above the Colorado River to the southwest—and silicified wood south and west of Lake Granby in the far eastern arm of Middle Park (Benedict 1990). Additionally, there are a number of smaller chert and chalcedony sources scattered throughout the mountains on the western side of the park.

## Archaeological Context

North Park is split between two large river-basin context regions that lie on either side of the Continental Divide in north-central Colorado: the Platte River basin to the east and the Northern Colorado River basin to the west (Gilmore *et al.* 1999; Reed and Metcalf 1999). The major chronological stages of American Indian occupation in both basins are given in table 1.6. These divisions denote technological and behavioral shifts that occurred at various points in the past, but it is important to recognize that such changes were not always identical or synchronous across all parts of the two basins. The following sections summarize general trends that characterize each stage across the region. More detailed information on the archaeology of north-central Colorado can be found in comprehensive reviews by Gilmore and colleagues (1999), Reed and Metcalf (1999), Stiger (2001), Brunswig and Pitblado (2007), Kornfeld (2013), and Kornfeld and colleagues (2010).

### Paleoindian Stage

The Paleoindian stage spans the Pleistocene-Holocene transition and is generally subdivided into three periods—Clovis, Folsom, and Late Paleoindian—based largely on differences in the form and function of chipped stone projectile points (Chenault 1999; Reed and Metcalf 1999). All three divisions are associated with hunter-gatherer groups whose toolkits are characterized by the presence of large, lanceolate dart points. Sites located in the plains are common throughout the entire stage, but there appears to be a general trend toward increasing use of high-elevation landscapes as time progresses, particularly in areas east of the Continental Divide.

Clovis components are rare in north-central Colorado and are almost entirely restricted to lower elevation areas in the eastern plains or river valleys west of the mountains (Chenault 1999; Reed and Metcalf 1999). Clovis social groups likely consisted of small, highly mobile bands who regularly hunted mammoths and other large fauna, but also exploited smaller prey and plant foods (Waguespack and Surovell 2003). Most Clovis components are short-term camps, kill and butchery locales, or isolated projectile points that are often located very close to water sources (Brunswig 2007a). Two well-known localities from the plains in Weld county are the Dent site (5WL269), where two Clovis points were found in association with mammoth bones that display evidence of human butchery (Brunswig 2007b), and the Klein site (5WL1368), where a small lithic scatter containing two Clovis points were found near the bones of extinct horse and mammoth (Zier *et al.* 1993). No high-altitude Clovis sites are known in north-central Colorado, but several isolated Clovis points or fragments have been recovered from the alpine, subalpine, and montane zones in and around RMNP in the central Front Range (Brunswig 2007a).

Folsom groups were similarly small and mobile, but the presence of more long-term camps suggests they may have been on the move slightly less than

Table 1.6. Major culture-historical divisions in the Platte River (Gilmore *et al.* 1999) and Northern Colorado River basins (Reed and Metcalf 1999).

| | Approximate Age (B.P.) | |
|---|---|---|
| Division | Platte River Basin | Northern Colorado River Basin |
| Paleoindian Stage | 12,000-7500 | 13,450-8350 |
| Archaic Stage | 7500-1800 | 8350-2350 |
| Prehistoric/Formative Stage | 1800-410 | 2350-650 |
| Protohistoric Stage | 410-90 | 850-69 |

Clovis groups. Folsom people also expanded their diets to include more small game and plant foods, and shifted their focus to hunting bison (Chenault 1999). Although many are located in the eastern plains (*e.g.,* Bijou Creek [5MR355]) and foothills (*e.g.,* Lindenmeier [5LR13]), Folsom sites are relatively common at higher elevations, as well. Middle Park, in particular, has a high concentration of Folsom sites, including Barger Gulch (5GA195), Crying Woman (5GA1208), Jerry Craig NE (5GA695), Hay Gulch (5GA1609), and Lower Twin Mountain (5GA186) (Kornfeld 2015; Kornfeld and Frison 2000; Naze 2013). Barger Gulch Locality B, a large camp where more than 65,000 artifacts have been recovered (Surovell *et al.* 2005; Mayer *et al.* 2007), has proven particularly important for understanding Folsom lifeways in the high country of north-central Colorado. Although rare, several Folsom camps (5GA2209, 5BL72) and an isolated point have also been discovered in the mountains east of Middle Park (Brunswig 2007a).

The Late Paleoindian period is characterized by increased group size and social complexity, the prevalence of communal hunting, continued expansion of diet breadth, and even more activity at high elevations (Chenault 1999; Reed and Metcalf 1999). Two geographically distinct adaptations have been recognized during this period (Frison 1992). One adaptation involved groups that were largely confined to the plains and primarily hunted bison, while the other involved groups who spent much (or perhaps all) of the year in the high country and pursued a broad-spectrum subsistence strategy that included hunting various smaller game and exploiting more plant foods. Important high elevation sites include: Jerry Craig (5GA369), a bison kill in Middle Park; Carey Lake (5LR230), an alpine/subalpine ecotone camp in the Rawah Wilderness; Lawn Lake (5LR318), a stratified campsite in the upper subalpine zone of RMNP; and Caribou Lake (5GA22) and the Fourth of July Valley (5BL120), alpine campsites located on either side of the Continental Divide in the Indian Peaks Wilderness (Benedict 1975, 1981, 2005; Chenault 1999). Late Paleoindian points have also been found in association with several high-altitude game drives in the Indian Peaks Wilderness (Benedict 1992; Brunswig 2007a).

### Archaic Stage

The early Holocene Archaic was a time of large-scale environmental turnover, accompanied by human population expansion and substantial changes in technology, settlement patterns, and subsistence strategies (Kornfeld *et al.* 2010; Stiger 2001). Relative to the Paleoindian stage, the Archaic in both the Platte and Northern Colorado basins is characterized by: greater technological diversity and a proliferation of side- and corner-notched dart points; decreased residential mobility and increased focus on seasonal exploitation of local resources; and further broadening of the resource base (both plants and animals). Additionally, architectural structures (pit and basin houses, wickiups), storage features, various ground stone tools, and other types of large food-processing implements became more common during the Archaic (Tate 1999).

In the Platte basin, Tate (1999) divides the Archaic into Early, Middle, and Late periods based largely on differences in projectile points and, to a lesser extent, subsistence behavior. Conversely, Reed and Metcalf (1999) separate the Archaic in the Northern Colorado River basin into four periods—Pioneer, Settled, Transitional, and Terminal—based on economic patterns specific to that region. The following discussion incorporates information for both basins, but employs the more broadly applicable three-part scheme used by Tate (1999) for the Platte River basin to denote the temporal divisions within the Archaic.

The Early Archaic is roughly coterminous with the extremely arid climatic conditions of the Altithermal, and represents a period when fully nomadic lifeways disappeared and were replaced by seasonal settlement

systems in which groups roamed less widely for at least part of the year (Reed and Metcalf 1999; Tate 1999). Activity in the high country also intensified during the Early Archaic, likely in part due to a decline in habitat productivity at lower elevations (Benedict 1979). Open and sheltered camps dot the foothills and hogbacks (*e.g.,* LoDaiska [5JF142], Magic Mountain [5JF223], Dancing Pants [5DA29]), while the mountains contain both campsites (e.g., Hungry Whistler [5BL67], Ptarmigan [5BL170], Fourth of July Valley [5BL120]) and high-elevation game drives (*e.g.,* Rollins Pass [5BL147], Flattop Mountain [5LR6], Trail Ridge [5LR15]) that were used during this period (Benedict 1992; Pelton 2012, 2017; LaBelle and Pelton 2013; Tate 1999).

Several models have been put forth to explain Early Archaic use of high-elevation landscapes. Benedict (1979, 1992; Benedict and Olson 1978) suggests the mountains served as refugia during the Altithermal, and posits an "up-down" system for populations living east of the Front Range. This model entails simple back and forth movements between long-term winter camps in the foothills and hogbacks and summer hunting areas along the Continental Divide. According to Benedict (1992), this fairly simplified system of landscape use is indicative of populations that were relatively new to the high country and still unfamiliar with the full range of resources available there. Conversely, the mountain tradition of Black (1991) posits groups that were fully upland-adapted and living in the mountains year-round by the Early Archaic. Black postulates that this mountain adaptation was geographically widespread and displayed significant temporal continuity, having first appeared in the Late Paleoindian period and persisted until at least 700 B.P. in many places. Various lines of evidence can be marshaled to support both models; however, the most important point here is that there can be little doubt that humans were making regular, and perhaps permanent, forays into the mountains and parks of the high country by the Early Archaic (Kornfeld *et al.* 1999; Metcalf and Black 1991).

Wetter climates prevailed for much of the Middle Archaic, during which many groups fully adopted central-place foraging strategies that entailed logistical moves around localized and predictable winter habitation areas, with higher residential mobility during the summer (Reed and Metcalf 1999; Tate and Gilmore 1999). This period also saw a marked increase in the use of milling stones for grinding various plant foods in the Platte River basin, as well as the establishment of pit and basin-style habitation structures and more seasonally-focused use of high elevations in the Northern Colorado basin (Reed and Metcalf 1999; Tate 1999). The Late Archaic is characterized by widespread resource stress, the response to which involved intensified exploitation of traditional animal and plant resources, the addition of more low-return foods (*e.g.,* seeds, nuts) to the diet, and even limited experiments with cultigens in some places (Reed and Metcalf 1999). Accordingly, the Late Archaic is also associated with the appearance of more rock-filled hearths, permanent storage features, and ground stone tools (Tate 1999).

### Late Prehistoric or Formative Stage

Several major innovations characterize the Late Prehistoric or Formative stage in north-central Colorado (Gilmore 1999, 2008; Reed & Metcalf 1999). Bow and arrow technology was introduced to all parts of the Platte and Northern Colorado river basins during this time, and was accompanied by the appearance of smaller and lighter side- and corner-notched arrow points (Gilmore 1999; Kornfeld *et al.* 2010). Ceramics also became prevalent across the region, although they tend to be more common in the eastern plains and to the west of the mountains on the Colorado Plateau. Likewise, maize horticulture was established as a fundamental part of the subsistence economy for many groups living west of the mountains.

In the Platte River basin, the Late Prehistoric is split into the Early and Middle Ceramic periods (Gilmore 1999). The Early Ceramic is characterized by an unusually high frequency of sites, a trend that likely reflects a combination of larger populations, reduced residential mobility, and various preservational factors. Long-term base camps are abundant, and often contain evidence for multiple habitation structures (*e.g.,* Kinney Spring [5LR144], Lindsay Ranch [5JF11], Magic Mountain [5JF223], Indian Mountain [5BL876]) (Cassells and Farrington 1986; Kalasz and Shields 1997; Perlmutter 2015). Sheltered campsites are particularly common in the foothills and hogbacks east of the Front Range, and have often been interpreted as likely winter habitation sites. There is also good evidence for extensive use of high-altitude game drive complexes in the Front Range throughout the Early Ceramic (Benedict 1975, 1992; Pelton 2012, 2017; LaBelle and Pelton 2013; Meyer 2019; Whittenburg 2017).

Drawing on these data, Benedict (1992) proposed a rotary model of seasonal migration for populations living on the eastern margin of the Front Range, which peaked during the Early Ceramic period. According to this model, groups were based out of long-term winter camps in the hogbacks and foothills. In early spring, small bands began moving north and then west, crossing over the Medicine Bows by late May. The summer was spent meandering south, foraging in North Park and Middle Park along the way. In late summer, groups migrated east and spent the fall hunting along high-elevation game drives on the Continental Divide. People then migrated east, returning to base camps on the in late fall, surviving the ensuing months on foods acquired during the preceding foraging round and through logistical forays around winter habitations areas in the hogbacks and foothills. Although the specific details of this rotary model are debatable (*e.g.,* see Kornfeld 2015), multiple lines of evidence from sites in North Park, Middle Park, and the Front Range strongly support the idea of sophisticated, seasonally-structured landscape use in the Early Ceramic (Benedict 1992; Gilmore 1999; LaBelle and Pelton 2013; Pelton 2017).

Widespread aridification in the Middle Ceramic resulted in a marked decline in the viability and predictability of high-elevation ecosystems, in particular, and a corresponding reduction in the number of people moving into the high country for extended periods (Gilmore 1999; Tate and Gilmore 1999). The Middle Ceramic also saw a shift away from seasonal settlement systems, and a return to higher year-round mobility among many groups. Long-term and intensively occupied campsites are relatively rare, and those that do exist typically contain little or no evidence for extensive architectural structures (Gilmore 1999).

Reed and Metcalf (1999) partition the Formative stage of the Northern Colorado River basin into four traditions that temporally overlap and are (mostly) geographically distinct: Anasazi, Fremont, Gateway, and Aspen. The Anasazi, Fremont, and Gateway traditions occur on different parts of the Colorado Plateau and all share some degree of reliance on maize cultivation, finely-made ceramics (produced or acquired through trade), rock art, and often substantial habitation structures (Madsen and Simms 1998; Gruebel 2018). The Aspen tradition is found throughout the uplands west of the Continental Divide, and is therefore particularly relevant to the current discussion.

Aspen tradition groups were much less reliant on maize horticulture than their neighbors to the west and south, and in many ways, their subsistence strategies represent a continuation of the hunter-gatherer lifeways of the preceding Late Archaic. However, important differences that distinguish the Aspen from the Late Archaic include: widespread adoption of bow and arrow technology, increased (but still quite limited) utilization of cultigens, more stone-boiling and roasting of plant foods (likely indicating increased consumption of lower-quality foods), and a possible shift to more seasonally-focused exploitation of high-elevation landscapes. Habitation features, including tipi rings, wickiups, and informal brush and rock structures, were also more common in the Aspen tradition than the Late Archaic (Reed and Metcalf 1999).

### Post-A.D. 1300 Period

The period after around A.D. 1300 was a time of often rapid cultural change, as improved climatic conditions brought with them an influx of people into the various landscapes of north-central Colorado, particularly the eastern plains (Clark 1999; Newton 2016; Reed and Metcalf 1999). As American Indian populations expanded, intergroup encounters occurred more frequently and groups became more fluid, with culturally-distinct bands often coalescing for various reasons (*e.g.,* trade, communal hunting, conflict) and durations before eventually separating once again. Increasingly crowded landscapes also led to the abandonment of horticulture, and a return to more mobile hunter-gatherer lifestyles in many places.

Another distinctive and highly significant aspect of this period in north-central Colorado is sustained contact, and eventual conflict, between aboriginal populations and American settlers (Clark 1999; Reed and Metcalf 1999). In many places, these events involved widespread introduction of horses, guns, and various other European trade items into the region, which reshaped long-standing American Indian lifeways and material culture in important ways (Clark and Corbett 2007). However, despite the unrelenting incursions into their ancestral lands and ways of life, there is also evidence that American Indians continued to utilize high-elevation game drives, kill sites, and camps, some dating at least as far back as the Archaic period, well into the nineteenth century (LaBelle and Pelton 2013).

Several named tribes inhabited north-central Colorado during the period post-A.D. 1300, including the Utes, Apaches, Comanches, Arapahos, and Cheyennes (Clark and Corbett 2007). Although sites are found in all elevation zones, the Utes were the principal inhabitants of the mountains both east and west of the Continental Divide (Reed and Metcalf 1999). The Utes were highly mobile hunter-gatherers, and by A.D. 1650 many groups had acquired enough horses to significantly expand their annual ranges and assume an essentially equestrian lifestyle. Similar to many Late Prehistoric groups, Ute settlement patterns likely combined high levels of both residential and logistical mobility, with camps in valleys and woodlands at lower elevations occupied during winter, while spring, summer, and fall were spent hunting, fishing, and collecting wild plant foods across the uplands (Gruebel 2002; LaPoint *et al.* 1981; Reed 1994). Uncompahgre Brown Ware ceramics are a particularly distinctive technological aspect of Ute culture, and wickiups and other wooden features found in the mountains are most often attributed to the Utes, as well (Maggard 2015; Reed and Metcalf 1999).

The Apaches, Comanches, Arapahos, and Cheyennes occupied the eastern plains and foothills at various, and often overlapping, times between A.D. 1300 and the late nineteenth century (Clark 1999; Newton 2011). Early on, Apache bands who produced Dismal River Gray Ware ceramics and regularly hunted bison were most prominent east of the Front Range. More sedentary groups lived in small agricultural villages where pithouses, roasting pits, and bison scapula hoes indicating some reliance on horticulture are common, while others roamed widely across the plains hunting bison and did not construct substantive habitation structures. In the early 1700s, the Apaches were largely displaced by mounted Comanche groups who descended into the plains from previously occupied territories in the high country north of the Ute homeland. The Comanches were joined on the plains in rapid succession by the Arapahos, Cheyennes, and several other groups. Most or all of these groups were equipped with horses and guns, highly mobile, and like the Apaches before them, had subsistence strategies that were heavily dependent on bison (Clark and Corbett 2007).

In the Platte River basin, the post-A.D. 1300 period ended when American settlers moved into the area permanently in the mid-to-late 1800s (Clark 1999). The same stage in the Northern Colorado River basin concluded with the final removal of the Utes to reservations in 1881 (Reed and Metcalf 1999). In both cases, the end of this period is associated with widespread and forced expulsion of American Indian populations from their ancestral homelands and the disappearance of aboriginal lifeways that had, in many cases, existed for thousands of years.

### Settler Period

Athearn (1982), along with Church and colleagues (2007), provide detailed accounts of various aspects of early European exploration and the subsequent period of American settlement in Colorado. Some of the earliest non-native visitors to Colorado were Spanish expeditions that explored the San Luis Valley in 1695, the Black Canyon of the Gunnison in 1765, and a sizeable area west of the mountains in 1776. American interest in Colorado (and other western states) was initially sparked by the Louisiana Purchase in 1803, and the Zebulon Pike expedition of 1806, which followed the Arkansas River across the southern Front Range to its headwaters near what is now Leadville, marked the first official exploration of the region organized by the U.S. government. Later expeditions led by John C. Fremont (1844 and 1845) and John Wesley Powell (1869) actually made their way well into the Platte and Northern Colorado river basins, although by this time the period of American settlement was well under way in many places.

The Settler period in north-central Colorado spans much of the nineteenth and early twentieth centuries, and is defined in large part by four industries that brought ever-increasing numbers of Americans into the mountains and parks in search of prosperity: the fur trade, mining, timber, and agriculture (Horn *et al.* 2007). The fur trade, driven primarily by European demand for beaver pelt hats, was one of the earliest pursuits to draw American settlers west of the Front Range. The heyday of the industry occurred from about 1820 to 1845, during which hundreds of trappers flooded the high country of north-central Colorado and several large fur trading companies were formed, all of whom exploited the abundant beaver and other game in North Park, Middle Park, and the Yampa, Little Snake, and Green river valleys to west. Throughout the 1830s, a series of dedicated trading posts—including Fort Davy Crockett, Fort Uncompahgre, and Bent's Fort—were constructed across western Colorado, where both non-Native (American and European) trappers and American

Indians could exchange furs, hides, guns, gunflints, glass beads, trapping equipment, metal knives and axes, and other items common to the fur trade (Horn *et al.* 2007). However, the fur industry largely collapsed in the early 1840s, due to a substantial decline in beaver populations as a result of over-trapping and changes in European fashion trends that led to significantly decreased demand for pelts (Athearn 1982).

The next major industry in American settlement of north-central Colorado, mining, began in earnest in the late 1850s. The discovery of gold in Cherry Creek in 1858 brought a major influx of prospectors to what is now Denver at the eastern edge of the Front Range, many of whom soon made their way over the Continental Divide in search of new and richer mineral deposits in the mountains to the west (Clark and Corbett 2007). Early mining activity often centered around small and ephemeral prospecting camps, although a number of larger boom towns, such as Teller City in Jackson County and Hahn's Peak in Routt County, also appeared between 1860 and 1880 (Athearn 1982). Several more substantial and enduring settlements—including Denver (1858), Boulder (1858), Breckenridge (1859), Georgetown (1864), and Leadville (1878)—sprang up around gold and silver strikes, as well. As the rush for gold and silver subsided, coal mining expanded rapidly during the 1880s and 1890s, and helped shape settlement patterns in north-central Colorado well into twentieth century, particularly in North Park and the Yampa River valley (Clark and Corbett 2007; Lischka *et al.* 1983; Wyckoff 1999).

Along with construction of the camps, boom towns, and cities just discussed, mining activity also altered the surrounding landscapes in other ways during the late nineteenth and early twentieth century. Prospect pits, dug in the early phases of exploration for buried minerals, are a common feature of below-ground mining operations. If deposits were discovered, a larger adit or mine shaft was installed and, depending on the size and success of the operation, other more substantial structures (*e.g.,* cabins, ore mills, blacksmith shops, transportation systems, storage facilities) were often constructed. Various quarries and waste dump pits were frequently dug near the opening of an adit, as well (Horn *et al.* 2007). For sluice and hydraulic mining, extensive ditch systems were often necessary to divert and transport the water used to wash away hillsides and expose valuable mineral deposits (Athearn 1982). Additionally, numerous other earthen, wooden, metal, or masonry structures and implements were built and used by miners, many of which were ultimately abandoned and remain visible across the high country of north-central Colorado today.

The need for lumber to construct and reinforce underground mine shafts was one of the primary drivers for the initial growth of the timber industry in north-central Colorado between 1860 and 1880. The rapid expansion of rail lines across Wyoming and Colorado in the late 1860s and early 1870s also created a new demand for timber to construct and repair the tracks, and eventually led to the establishment of dedicated tie-hacking (cutting and milling lumber for railroad ties) operations in the forests around North Park during this time. Likewise, throughout the late 1800s, the timber industry provided the construction materials (boards, roofing, siding, flooring) that were essential for the development of settlements of all sizes, from tent foundations and small cabins in logging and mining camps, to the larger and more well-constructed buildings in cities and towns like Denver, Boulder, and Fort Collins (Horn *et al.* 2007).

Due to the difficulty of transporting timber long distances, early logging operations often consisted of a camp and small sawmill established near a mine or town to produce largely unfinished lumber for local use (Horn *et al.* 2007). However, as the technology for felling trees (double-bitted axes), transporting timber out of the forest (donkey engines and, eventually, trucks), and milling lumber (circular saws with replaceable teeth and band saws) improved, sawmills became larger and more efficient and many timber operations began producing a wider variety of lumber products. Likewise, the continued expansion of transportation networks made it possible for many mills to start exporting their products for sale outside of local markets. The timber industry remained strong through much of the twentieth century, but the last several decades have seen a precipitous decline due in large part to impacts from the massive mountain pine beetle infestations that have overtaken many forests across Colorado and other western states (Negron and Cain 2019). Nonetheless, timber harvesting and sales are still an important economic activity in parts of the state, including the forests around North Park (Sorenson *et al.* 2016).

The other major industry that defined the Settler period in the Platte and Northern Colorado river basins is agriculture. Ranching was the primary agricultural pursuit in the high country, although

various fruits, vegetables, and grains were also grown in some places (Athearn 1982; Church and Clark 2007; Crowley 1975; Horn *et al.* 2007). The 1860s saw the initial development of cattle ranching in the region and the practice was firmly established in the Yampa and Little Snake valleys by 1871 (Athearn 1982). The first cattle were grazed in Middle Park by J.H. Crawford in 1874 and North Park by J.O. Pinkham in 1876 (Clark and Corbett 2007; Kornfeld 2013), and cattle ranching quickly became the dominant industry in these areas, as well. In the late 1890s, an increasing number of sheep ranchers also began grazing their herds across the region, leading to a period of steadily escalating conflict between cattlemen and sheep herders that continued well into the twentieth century (Athearn 1982). Yet, despite this and other setbacks over the years (*e.g.,* over-grazing, the loss of open range, coal and oil booms), ranching reigned supreme for much of the early twentieth century and remains a primary industry in the high country of north-central Colorado to this day.

Most early ranching activity involved open-range grazing, in which herds were run, often largely unattended, over expansive tracts of undeveloped and unclaimed land (Clark and Corbett 2007). Although ranch houses, corrals, and other structures were sometimes built, open-range ranching was a highly mobile endeavor overall and the physical traces of it are often ephemeral at best (Church and Clark 2007). As time wore on, various factors—including stricter federal regulation of public land and increasing competition with homesteaders—made it more difficult to graze large herds of cattle or sheep on the open range and led to the emergence of more stable and sedentary stock farms, where livestock were raised on irrigated pastures and not allowed to roam freely. This mode of ranching, which typically leaves a much larger and more visible footprint on the landscape, overtook open-range operations as the predominant form of the industry in the late 1880s and has remained so ever since (Clark and Corbett 2007).

## Research Goals

As noted above, this survey project was designed as an initial exploration of alpine cirques, moraines, ice patches, and adjacent landforms in the Mount Zirkel Wilderness Area. The primary goals of the project were to:

1) Identify what, if any, archaeological resources exist in the alpine ecozones of the Mount Zirkel Wilderness.

2) Assuming resources are present, document the alpine archaeology of the Mount Zirkel Wilderness and determine how it compares that of the other mountain ranges around North Park.

3) Evaluate the potential research value of conducting more in-depth and focused high-altitude archaeological investigations in the Mount Zirkel Wilderness and other parts of the MBR in the future.

Prior to the field effort, a variety of factors were used to identify suitable and potentially productive areas for archaeological survey in the alpine ecozones of the Mount Zirkel Wilderness. To begin with, the survey parcels had to be reasonably accessible on foot–for both the crew and mule pack string–and located in an area where it was possible to establish a base camp to house the survey crew and equipment nearby. Likewise, it was necessary to find a project area that encompassed broad expanses of relatively flat alpine terrain appropriate for pedestrian survey.

Seven Lakes was chosen as a base camp location, because it: 1) contains ample space for setting up crew and gear tents, 2) is located within a day's hike of the Big Creek Lakes campground, which could serve as both a point of departure and a place to house the pack string during fieldwork, and 3) is surrounded by broad and flat alpine landscapes that are well-suited to pedestrian survey. Additionally, the topography of this area appeared to make it a potential travel corridor between North Park in the east and the Elk River valley in the west. Other possible corridors, including Buffalo Pass, which is located approximately 25 km south of the current project area, are less severe and may have been used more frequently. However, for groups traveling through the most northern part of what is now the Mount Zirkel Wilderness, a possible corridor through the Seven Lakes region would likely have provided one of the easiest access routes across this area.

In addition to its suitable location and terrain, the area around Seven Lakes was chosen based on the identification of multiple permanent and semi-permanent ice patches in historical aerial imagery of the region on Google Earth. As noted above, although previous ice patch research in Colorado has had limited

success (Lee and Benedict 2012; Reckin 2013), the opportunity to investigate more of these disappearing resources is one that should not be ignored. Finally, as discussed earlier in this chapter, previous work in the Park Range has largely been concentrated to the south and on the eastern and western flanks of the mountains, and no prior cultural resource survey had been conducted in the northern third of the Mount Zirkel Wilderness. As such, by selecting this area for investigation, the Mount Zirkel survey project adds new and valuable data from a previously unexplored region to the alpine archaeological record of the mountains surrounding North Park.

# 2 Fieldwork and Results

Christopher A. Davis, Christopher M. Johnston, Matthew Stirn, and Rebecca sgouros

The fieldwork in the Mount Zirkel Wilderness was conducted between September 1-6, 2018. The entire survey area occurs above timberline at elevations ranging from approximately 3300-3500 m and was divided into northern and southern sections, which combined cover a total of 432 ha (figure 2.1). The northern survey tract measures 193 ha and was concentrated on the alpine meadows and talus slopes directly adjacent to Davis Peak. The southern survey tract is in a similar setting approximately 2 km away, just south of Seven Lakes and Lake Eileen and west of Red Elephant Mountain. The southern tract measures 239 ha. The Buffalo Ridge Trail connects the northern and southern tracts across a mostly marshy and heavily forested area that was not surveyed for this project.

All surveys were conducted according to the regulations implementing Sections 106 of the NHPA. Spacing for survey transects was 15 m or less, and cultural resources were recorded using standard PCRG field forms. For all identified sites, sketch maps were drawn in the field, site boundaries were walked and recorded using handheld GPS units, and overview photos were taken from various viewpoints. Likewise, artifacts and features were recorded as GPS points, measured, and photographed as warranted in the field. Individual pieces of chipped stone debitage were size-graded in the field, following a system that is regularly employed by PCRG in analyses of both chipped stone and faunal remains (table 2.1). Given the limited scope and exploratory nature of the project, no artifacts were collected in the field. Paleobiological samples were, however, collected from the ice patches. Post-field processing of GPS data was performed in ArcGIS 10.7, which was used to create final sketch and resource location maps, generate survey polygons, and calculate the total area

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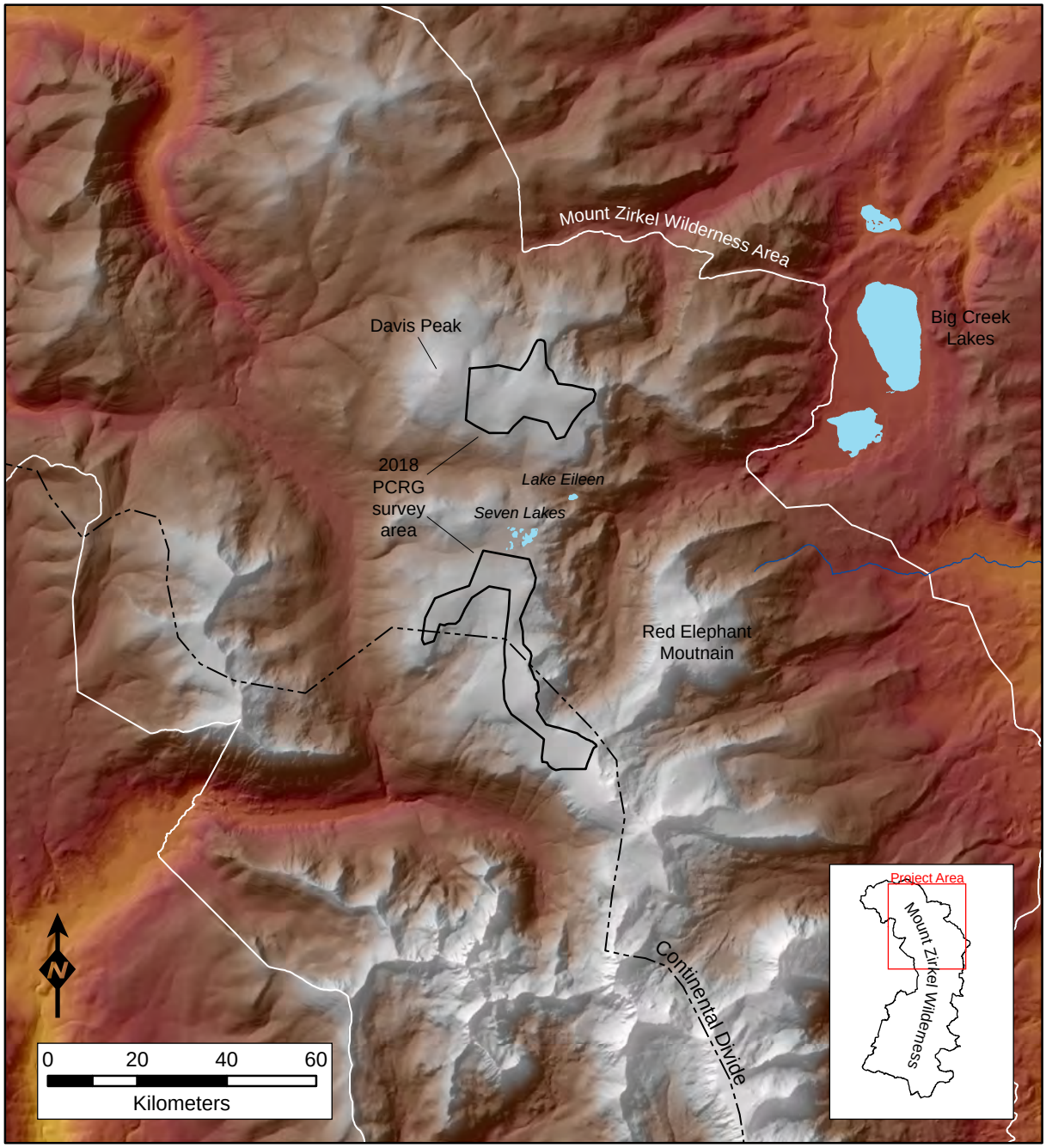


*Figure 2.1. Hillshade map showing the northern and southern survey tracts and larger project area within the Mount Zirkel Wilderness (inset).*

of survey coverage. Copies of all field forms, GPS data, and digital photographs are stored at the PCRG Laboratory in Broomfield, Colorado.

Wood fragments collected from one of the ice patches were sent to Kathy Puseman of Paleoscapes Archaeobotanical Services Team in Bailey, Colorado, for species identification. Analysis of the few faunal samples collected from the ice patch was conducted by PCRG Project Archaeologist Dr. Christopher Davis and Research Affiliate Carl Falk. In the laboratory, bones were: 1) identified as specifically as possible to taxon, element, side, and body size (Brain 1981; Reynard *et al.* 2014); 2) measured following von den Driesch (1976) and Balkwill and Cumbaa (1992);

Table 2.1. Chipped stone debitage size-grade categories.

| Size grade | Max. dimension (mm) |
|---|---|
| G0 | 25+ |
| G1 | 20-25 |
| G2 | 15-20 |
| G3 | <15 |

3) coded for several categories of taphonomic data, including subaerial weathering (Behrensmeyer 1978), burning (Shipman *et al.* 1984), fracture morphology (Villa and Mahieu 1991), and surface modification (*e.g.,* Binford 1981; Blumenschine *et al.* 1996); and 5) photographed. Once recorded, the faunal samples were sent DirectAMS in Seattle, WA, for accelerated mass spectrometer radiocarbon (AMS $^{14}C$) dating.

Two types of cultural resources, sites and isolated finds, were recorded for the Mount Zirkel survey. Sites are generally defined as a location that is at least 50 years old where patterned and repeated human activity has taken place, and which often contain multiple artifacts or features. A prehistoric lithic scatter with numerous chipped stone flakes and several projectile points would be an example of a site. Isolated finds are those resources that contain only a few artifacts or a single feature, often of unclear age and function, and which do not meet the criteria of a site. An example of an isolated find is a prehistoric projectile point with no associated flaking debris or other tools. Recent artifacts and features that appear to be less than 50 years in age were not considered cultural resources for the purposes of this project.

## Results of Field Investigations

Within the two survey tracts, the PCRG crew documented four new sites (table 2.2), one of which is assigned two site numbers because it extends across the Jackson and Routt county line, and five isolated resources (figure 2.2). Three semi-permanent ice patches were also identified and surveyed. Three sites, three isolates, and two ice patches are located in the southern survey tract; the northern survey tract contains the remaining site, ice patch, and two isolated finds.

### Sites

Three sites contain American Indian components only and one has Settler components only. None of the sites documented for this project are recommended as eligible for the NRHP (see chapter 4).

#### *5JA3144*

| | |
|---|---|
| **No. of Components:** | 1 |
| **Site Type:** | Rock alignment |
| **Cultural Affiliation:** | Settler |
| **Temporal Period:** | Pre-1950's |
| **NRHP Recommendation:** | Not eligible |
| **Date Recorded:** | September 2, 2018 |
| **Artifacts Collected:** | No |
| **Topographic Location:** | Alpine ridge |
| **Vegetation:** | Small alpine grasses and shrubs on site with a dense stand of pine trees about 15 m to the west |
| **Elevation:** | 3381 m (11,093 ft) |
| **Depositional Context:** | Colluvial and residual |
| **Dimension and Area:** | 20 m x 40 m; 668 sq m |
| **Ground Visibility:** | 60 to 75 percent |

5JA3144 is a Settler site located along an alpine ridge approximately one kilometer south of Seven Lakes and three kilometers west of Red Elephant Mountain. The main feature of 5JA3144 is a semi-circular rock alignment that is oriented so the opening faces to the northwest, away from the adjacent drainage (figure 2.3). The feature is constructed of approximately 20 flat and angular cobbles stacked in two courses, and measures 3.0 m long, 0.5 m wide, and 0.6 m tall. Several of the rocks on the bottom course are slightly buried, indicating at least some sediment

Table 2.2. Sites documented during the Mt. Zirkel Wilderness survey.

| Site No. | Survey Tract | Elevation (m) | Component Type | Description | NRHP Recommendation |
|---|---|---|---|---|---|
| 5JA3144 | South | 3381 | Settler | Rock alignment and metal can | Not eligible |
| 5JA3145 | North | 3383 | American Indian | Open lithic scatter | Not eligible |
| 5JA3148/5RT3518 | South | 3483 | American Indian | Open lithic scatter | Not eligible |
| 5RT3517 | South | 3362 | American Indian | Open lithic scatter | Not eligible |

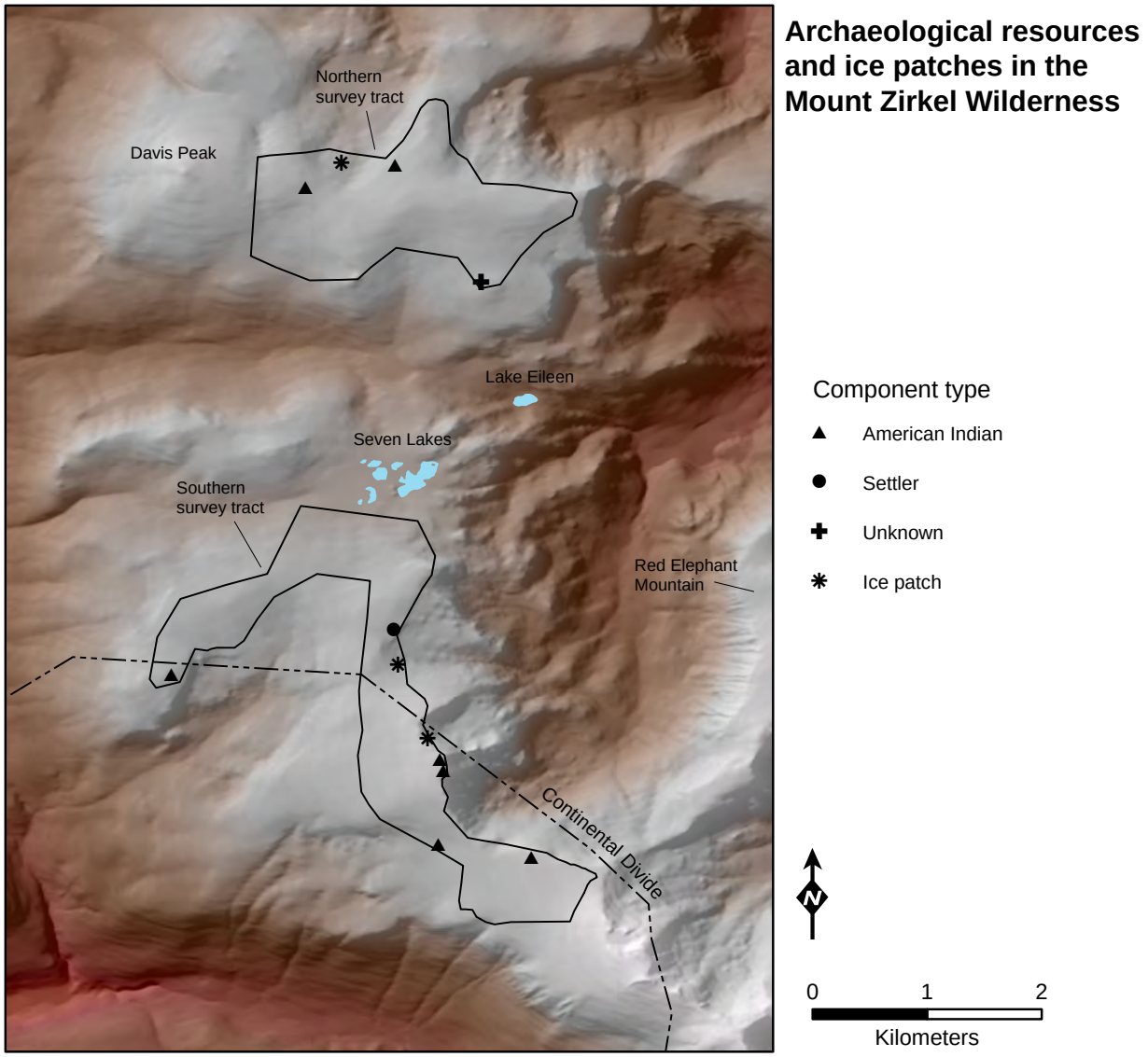


*Figure 2.2. Hillshade map showing archaeological resources and ice patches documented during the Mount Zirkel Wilderness survey project.*

accumulation has occurred around the base of the alignment since it was constructed. This fact, along with the presence of a moderate amount of lichen development in several places, indicates that the stones were not recently placed. Additionally, 30 fragments of metal can were found scattered about the center of the rock alignment. A single fragment was identifiable as belonging to a pre-1950s coffee can and it is likely that most, if not all, of the fragments are from the same container.

5JA3144 is designated as a Settler site because the only recovered artifacts are pre-1950s metal coffee can fragments. However, as noted above, sediment

*Figure 2.3. Rock alignment from site 5JA3144.*

accumulation around the base of the rock alignment seems to indicate a greater time-depth for this feature, and raises the prospect that it may represent an additional American Indian component of the site. Unfortunately, given the complete lack of associated American Indian artifacts, there is currently no way to confirm this possibility. Although no testing was undertaken at the site, sediment depths in the alpine tundra environments in this part of the Mount Zirkel Wilderness typically do not exceed 2-5 cm, so it is unlikely that substantial subsurface deposits exist at 5JA3144. As such, there is minimal potential for further investigations to produce additional data related to the age or function of the site.

*5JA3145*

| | |
|---|---|
| **No. of Components:** | 1 |
| **Site Type:** | Open lithic scatter |
| **Cultural Affiliation:** | American Indian |
| **Temporal Period:** | Unknown |
| **NRHP Recommendation:** | Not eligible |
| **Date Recorded:** | September 3, 2018 |
| **Artifacts Collected:** | No |
| **Topographic Location:** | Alpine pass |
| **Vegetation:** | Small alpine grasses and scattered pine trees |
| **Elevation:** | 3383 m (11,100 ft) |
| **Depositional Context:** | Colluvial and residual |
| **Dimension and Area:** | 94 m x 117 m; 9469 sq m |
| **Ground Visibility:** | 50 to 70 percent |

5JA3145 is an American Indian open lithic scatter located on a north-south trending alpine pass approximately 800 m east of Davis Peak. The cultural assemblage consists of two projectile points (PP1 and PP2) and a small associated scatter of chipped stone debitage (table 2.3). PP1 is a deep corner-notched projectile point made from grayish-pink quartzite, which retains most of the blade and has a broken base (figure 2.4). The morphology of PP1 is similar to corner-notched dart points from Late Archaic sites in the Great Plains and Rockies, but without the base a definitive identification is not possible. PP2 is a small projectile point midsection fragment. PP2 is made from pink-to-mottled white and brown chert, which is similar in outward appearance to raw material from the Pinkham Quarry site (5JA808), located approximately 40 km away in Kings Canyon just northeast of North Park. The point is too fragmentary for a typological classification.


*Figure 2.4. Corner-notched projectile point fragment from 5JA3145.*

The lithic scatter at 5JA3145 consists of 31 chert and chalcedony flakes of variable color and consistency (table 2.4). Most of the flakes are less than 20 mm in maximum dimension, with G2 and G3 accounting for just over 80 percent of the collection. The remaining flakes are in G1, and therefore range from 20-25 mm in maximum dimension, while no debitage larger than G0 (25 mm) was recorded. None of the flakes retain cortex on their outer surface, which combined with the relatively small size of the debris overall suggests the assemblage results from tool retouch and maintenance, rather than production.

Additional testing for subsurface deposits was

Table 2.3. Artifact assemblage from 5JA3145.

| Artifact(s) | No. | Raw Material | Description | Dimensions (mm)[1] |
|---|---|---|---|---|
| PP1 | 1 | Gray quartzite | Corner-notched; base broken | 34 x 30 x 4 |
| PP2 | 1 | Mottled white-brown and pink chert | Midsection fragment | 10 x 20 x 2.5 |
| Debitage | 31 | Orange, gray, red, and white chert and chalcedony | Flaking debris | - |

[1]Length x Width x Thickness

Table 2.4. Debitage from 5JA3145 by size grade.

| | Size Grade | | | |
|---|---|---|---|---|
| Raw Material | G1 | G2 | G3 | Total |
| Orange chert | - | 1 | - | 1 |
| Orange chalcedony | - | 2 | - | 2 |
| Gray chert | 2 | 5 | 2 | 9 |
| Gray chalcedony | 3 | 3 | 3 | 9 |
| Red chert | 1 | 1 | - | 2 |
| White chert | - | 4 | 4 | 8 |
| Total | 6 | 16 | 9 | 31 |

not conducted at 5JA3145. However, the site is once again located in an alpine tundra environment where deposition is generally shallow (≤ 5 cm deep) and consists primarily of decomposing bedrock. The Buffalo Ridge Trail, a popular hiking and horse-riding trail, also bisects the site and, assuming extensive surface deposits ever existed, there is a high probability that collecting has occurred in the past. The lack of sediment depth and the likelihood that surface deposits have been collected by previous visitors indicate that further investigation would not produce significant new information about the site.

*5JA3148/5RT3518*

| | |
|---|---|
| **No. of Components:** | 1 |
| **Site Type:** | Open lithic scatter |
| **Cultural Affiliation:** | American Indian |
| **Temporal Period:** | Unknown |
| **NRHP Recommendation:** | Not eligible |
| **Date Recorded:** | September 2, 2018 |
| **Artifacts Collected:** | No |
| **Topographic Location:** | Alpine ridge |
| **Vegetation:** | Small alpine grasses, shrubby pines, and lichen growth |
| **Elevation:** | 3483 m (11,428 ft) |
| **Depositional Context:** | Colluvial and residual |
| **Dimension and Area:** | 50 m x 65 m; 2561 sq m |
| **Ground Visibility:** | 80 percent |

5JA3148/5RT3518 is an American Indian open lithic scatter spread across a ridge at the edge of an open meadow along the Continental Divide, approximately 2.5 km south of Seven Lakes (figure 2.5). Two stacked rock cairns (Cairns 1 and 2) were also documented along the same ridge, although they are not officially considered features of the site (see below). Most of the site is in Jackson county, but the western boundary extends for several meters into Routt county, as well.

*Figure 2.5. Overview photo of the northern portion of site 5JA3148/5RT3518.*

Hence, this resource is assigned two site numbers, one for Jackson county (5JA3148) and one for Routt county (5RT3518). All of the artifacts and both cairns are located in the Jackson county portion of the site.

The only tool recorded at the site is a biface fragment made from Kremmling chert. Along with the biface, seven flakes of white, gray, and brown chert were also found. All of those size-graded in the field were in the two largest categories, G0 (n=1) and G1 (n=3), and two of them appeared to have burning damage. None of the flakes analyzed in the field retained any cortical material on their outer surface.

The two cairns are located nearby, but neither can be definitively associated with the artifacts just down the ridge. Cairn 1 sits along a cliff edge approximately 30 m southeast of the main portion of the lithic scatter, and is composed of 16-18 flat and angular granite stones (figure 2.6). Cairn 1 measures 0.7 m

*Figure 2.6. Cairn from site 5JA3148/5RT3518.*

long by 0.5 m wide by 0.8 m tall. Cairn 2, which is located 20 m south of the main scatter, is more subtle and is composed of five small granite cobbles that measure 0.3 m long by 0.3 m wide by 0.3 m tall. There is little sediment accumulation around the base of the cairns, and neither displays other obvious indicators that the stones were placed in the distant past (*e.g.*, lichen accumulation or bridging). No artifacts were found within 20 m of either cairn.

The site is in an environmental setting where deposition is minimal and there is little potential for intact subsurface deposits. The possibility that additional work would result in recovery of new evidence to expand significantly upon what is already known about the site is therefore negligible.

*Figure 2.7. Overview photo of site 5RT3517.*

*5RT3517*

| | |
|---|---|
| **No. of Components:** | 1 |
| **Site Type:** | Open lithic scatter |
| **Cultural Affiliation:** | American Indian |
| **Temporal Period:** | Unknown |
| **NRHP Recommendation:** | Not eligible |
| **Date Recorded:** | September 2, 2018 |
| **Artifacts Collected:** | No |
| **Topographic Location:** | Alpine bench |
| **Vegetation:** | Small alpine grasses and shrubs lined by pine forest |
| **Elevation:** | 3362 m (11,031 ft) |
| **Depositional Context:** | Colluvial and residual |
| **Dimension and Area:** | 24 m x 40 m; 789 sq m |
| **Ground Visibility:** | 50 to 70 percent |

5RT3517 is an American Indian open lithic site located on a gently sloping alpine bench approximately 200 m west of the Continental Divide and 3 km southwest of the summit of Red Elephant Mountain (figure 2.7). The site consists of a small scatter of chipped stone flaking debris (table 2.5). Most of the debitage is gray chert, although several flakes of yellow chert are also present. The majority of flakes are in G2 and G3 (less than 20 mm long), but there are also a few in G1 (20-25 mm long). As with 5JA3145, there is no debitage that falls in G0, the largest size grade category (25+ mm). Interestingly, all of the gray chert flakes, and none of the yellow chert flakes, retain cortex on their outer surface.

Table 2.5. Debitage counts from 5RT3517 by size grade and presence or absence of cortex.

| | | Size Grade | | | |
|---|---|---|---|---|---|
| Raw Material | Cortex | G1 | G2 | G3 | Total |
| Gray chert | Yes | 3 | 3 | 4 | 10 |
| | No | - | - | - | - |
| Yellow chert | Yes | - | - | - | - |
| | No | - | 3 | - | 3 |
| Total | | 3 | 6 | 4 | 13 |

Ground cover in the area includes mostly short grasses and a few shrubs, with shallow, sandy sediments that are no more than 5 cm deep. Thus, there is a very low probability that intact subsurface deposits are present or that numerous surface items remain which were not identified by the survey crew. The potential for the site to produce significant additional data is therefore extremely limited.

## Isolated Finds

The isolated artifacts and features documented during the Mount Zirkel Wilderness survey are summarized in table 2.6. Beyond the designation of the four chipped stone tools as American Indian components, none of the isolated resources are diagnostic of a specific temporal stage or cultural group, nor do they have the potential to provide additional information on American Indian or Settler occupation in the region. As such, all of the isolated occurrences are recommended as not eligible for the NRHP.

5JA3146 is a multicourse stone cairn situated at the edge of an alpine meadow approximately 1 km northwest of Lake Eileen and 2 km southeast of Davis Peak (figure 2.8). The cairn is constructed of 16 granite cobbles and angular slabs that measure 1.2 m long, by 1.3 m long, and 0.8 m tall. Two pieces of timber found

Table 2.6. Isolated finds documented during the Mt. Zirkel Wilderness survey.

| Isolate No. | Survey tract | Elevation (m) | Component type | Description |
|---|---|---|---|---|
| 5JA3146 | North | 3368 | Unknown | Stone cairn |
| 5JA3147 | North | 3376 | American Indian | Flake tool |
| 5RT3514 | South | 3448 | American Indian | Biface |
| 5RT3515 | South | 3374 | American Indian | Scraper |
| 5RT3516 | South | 3487 | American Indian | Drill fragment |

leaning against the cairn are recent in age and their placement may post-date that of the original stones, although there is currently no obvious way to test this possibility. The lack of sediment accumulation around the base of the stones suggests that the cairn may not have been constructed in the distant past. No artifacts were found in or around 5JA3146 and, while it likely meets the criteria for documentation as an archaeological resource (50+ years old), its specific temporal and cultural affiliation are not known.

The other four isolated finds are American Indian resources, and all consist of a single chipped stone tool. 5JA3147 is a flake tool that was located in the middle of an alpine meadow approximately 600 m east of site 5JA3145. The tool is made from chalcedony and measures 31 mm in length, 14 mm in width, and 2.3 mm in thickness. Flakes were removed from at least one margin of both the ventral and dorsal surfaces, with evidence of edge modification on both lateral margins on the dorsal side. The age and function of the flake tool are unknown.

5RT3514 is a biface found on the slopes of an alpine ridge approximately 650 m east of site 5RT3517 and 60 m southwest of the Continental Divide. The biface is made from orange chert with black inclusions and measures 72 mm in length, 34 mm in width, and 4.7 mm in thickness (figure 2.9). The tool is mostly complete, albeit with slight damage to the distal end. There are multiple step fractures along one lateral margin, which likely would have hindered additional flake removals.

5RT3515 is a scraper made from gray quartzite that is very similar to raw material from the Windy Ridge quarry located approximately 60 km to the south. The artifact was found in an alpine meadow just south of the Continental Divide and approximately 1.5 km west/southwest of site 5JA3144; it is the only resource located in the far northwestern arm of the southern survey tract. The scraper measures 31 mm in length, by 21 mm in width, by 5 mm in thickness. High-angle flakes have been removed from one margin of the scraper, which is relatively steep-sided, and the distal end is damaged.

5RT3516 is a drill fragment discovered along a ridge just 15 m west of the Continental Divide and 80 m north of site 5JA3148/5RT3517. The drill fragment is made from white chert, and includes a complete base and partial midsection. The base is 22 mm in

*Figure 2.8. Overview of cairn at 5JA3146. Note the modern or recent wood on the left of the frame.*


*Figure 2.9. Both sides of the orange chert biface from 5RT3514.*

width, while the midsection is 34 mm long by 4 mm wide. The maximum thickness of 4 mm was measured at the base of the drill.

Ice Patch Survey

The PCRG survey team investigated three semi-permanent ice patches that were identified as having the potential to yield archaeological remains. Although no cultural material was found in or directly adjacent to any of the ice patches, floral or faunal samples were collected from all three for further study and dating. Because no cultural material was found, none of the ice patches (IP) were assigned official resource numbers and they are simply referred to here using their field designations: IP.1, IP.2, and IP.3.

IP.1 is a set of twin ice patches located on the eastern slope of ridge approximately 300 m south of site 5JA3144 (figure 2.10). At the time of survey, the two ice patches were separated and both were fairly small in terms of their overall spatial extent. However, satellite photos from the past decade document that the two patches comprising IP.1 often merge into a single larger ice patch for at least part of the year, during which it extends several hundred meters over much of the eastern slope of the ridge (figure 2.11).

The forefield of IP.1 is largely flat, and abundant organic matter was observed melting out of the ice all along its margins. Several wood fragments were observed in the forefield of IP.1, at least one of which was of a size and shape that resembled a broken arrow shaft to the survey crew. In order to evaluate the possibility that wood fragments from IP.1 may be related to human activity, four samples were collected for species identification (table 2.7) All four samples derive from spruce (*Picea sp.*) or fir (*Abies sp.*) trees, both of which abound in the high-elevation forests and woodlands of the Mount Zirkel Wilderness. While the possibility of a cultural origin cannot be discounted completely, that all of the wood fragments are from locally common trees suggests that they are naturally-occurring and were introduced into the ice patch from the surrounding environment by non-human processes. The presence of a small amount of bark still adhering to the possible archaeological specimen further indicates that, despite its similar size and shape, it is likely not an arrow shaft.

IP.2 is located just off the Continental Divide approximately 700 m south of IP.1 (figure 2.12). Despite the steep gradient of the slope on which the ice patch is located, there is a broad and relatively flat lateral forefield located about halfway down IP.2, which yielded a rather large quantity of organic material. A single bone fragment (catalog number

Table 2.7. Wood samples collected from the forefield of ice patch 1.

| Catalog No. | No. | Taxon | Common Name |
|---|---|---|---|
| 1003 | 1 | *Picea sp.* | Spruce |
| 1004 | 1 | *Picea sp.* | Spruce |
| 1005 | 2 | *Abies sp.* | Fir |

*Figure 2.10. Overview photo of ice patch 1 (IP.1).*


*Figure 2.11. Google Earth satellite image from September 2014 showing ice patch 1 (IP.1) extending over most of the eastern slope of the ridge along which it is located.*

*Figure 2.12. Top of ice patch 2 (IP.2), looking down (east) towards the forefield.*

1002) was collected from the forefield of IP.2 for additional faunal and taphonomic analysis and radiocarbon dating.

IP.3 is located on the northeast-facing slope of a drainage between site 5JA3145 (250 m to the west) and isolate 5JA3147 (370 m to the northeast). This large ice patch is situated on a gentle incline and has a completely flat forefield that abuts a broad alpine meadow to the north (figure 2.13), making it the most ideal of the three ice patches to preserve and yield archaeological material. While no artifacts were found, abundant bone and other organic material was

*Figure 2.13. View from ice patch 3 (IP.3) towards the forefield.*

recorded in the forefield of IP.3. A single specimen (catalog number 1001) was collected for additional study and radiocarbon dating.

Catalog number 1002, from IP.2, is an epiphyseal long bone fragment, perhaps from a humerus or femur, but is otherwise non-identifiable (figure 2.14; table 2.8). The overall size and robusticity of the fragment suggest it is from a very large animal, roughly the size of a bison or moose, and measurements of its cortical thickness support this conclusion. The bone is heavily weathered, indicating a substantial period of subaerial exposure before burial or, perhaps more likely, repeated periods of exposure as the ice patch continuously thawed and refroze over the years since it was deposited. Both longitudinal ends display curved fracture outlines, and one has oblique fracture angles, which are indicative of fresh bone breakage, as would be expected if the bone was fragmented by humans for marrow extraction. However, other evidence that may indicate human activity, such as cut and percussion marks or burning, is lacking. Similarly, no tooth marks, gastric etching, or other signs of carnivore damage were observed on specimen 1002.

Specimen 1001, from IP.3, is a complete right metacarpal from an American bison (*Bison bison)* (figure 2.15; table 2.8). The size of the element and presence of a fused distal epiphysis on which the fusion line is still visible indicate that it belonged to an older subadult or young adult individual. No obvious signs of human (*e.g.,* cut or percussion marks; burning) or carnivore (*e.g.,* tooth marks) modification were observed on the metacarpal, although it is possible that extensive weathering has obscured marks that once existed on its surface. However, several apparently recent marks were observed on the cranial surface of the bone, which may have occurred during collection or transport of the specimen.

The bone specimens were submitted to DirectAMS for AMS radiocarbon dating (table 2.9). Stable isotope analysis was also conducted on the

Table 2.8. Taxonomic, metric, and taphonomic data for faunal specimens collected from ice patches 2 and 3.

| Catalog No. | 1002 | 1001 |
|---|---|---|
| Ice Patch | IP.2 | IP.3 |
| Element | Long bone shaft | Metacarpal |
| Side | Indeterminate | Right |
| Taxon | Indeterminate | *Bison bison* |
| Age | Indeterminate | Young adult |
| Weight (kg) | 900+ | 900+ |
| Weathering Stage | 4 | 3 |
| Burn Category | Unburned | Unburned |
| Human Modification | No | No |
| Carnivore Modification | No | No |
| ML[1] (mm) | 143.2 | 213.7 |
| MW[2] (mm) | 52.0 | - |
| CT[3] (mm) | 8.5 | - |

[1]Maximum length, [2]Maximum width, [3]Cortical thickness


*Figure 2.14. Long bone fragment (specimen no. 1002) collected from the forefield of ice patch 2 (IP.2).*

two specimens by the Stable Isotope Core Laboratory at Washington State University (table 2.10). AMS dating results show the bones are not from modern or near-modern animals, indicating both ice patches have been present for at least 600 years. The extensive weathering on both specimens does suggest multiple episodes of exposure since their initial deposition, indicating the ice patches have not been completely stable during this time.

Stable carbon isotope data have been used to indicate the foraging range of bison bone samples collected from ice patches elsewhere in Colorado (Lee *et al.* 2005). Animals that graze predominantly on high-elevation and high-latitude grasses, many of which utilize the $C_3$ photosynthetic pathway, typically have $\delta C^{13}$ values averaging around -26‰. Conversely, animals that graze on low-elevation and -latitude grasses that often utilize the $C_4$ pathway tend to have $\delta C^{13}$ values around -12‰ on average (Koch 1998).

The stable carbon isotope data from the two Mount Zirkel specimens indicate these animals grazed on a mix of cold-climate ($C_3$) and warm-climate ($C_4$) grasses. Both specimens have similar values to each other and are also comparable to one specimen that Lee and colleagues (2005:37-38) note likely grazed more on cold-climate (high-elevation) grasses. Thus, both animals appear to have been primarily mountain dwellers, perhaps with occasional trips to the lower parkland basins.

Lee and Benedict (2012) compiled a list of 14 radiocarbon dates on bison bone from ice patches along the Front Range. Eleven of their samples are


*Figure 2.15. Bison metapodial (specimen no. 1001) collected from the forefield of ice patch 3 (IP.3).*

Table 2.9. AMS $^{14}$C dating results for bone specimens collected from ice patches 2 and 3. Calibration for calendar date ranges performed with OxCal Version 4.3.2 (Bronk Ramsey 2009, 2017), using the IntCal 13 atmospheric calibration dataset (Reimer *et al.* 2013).

| Catalog No. | Lab No. | Taxon | Ice Patch | Corrected Age ($^{14}$C yr B.P.) | 2-σ Calibrated Date Range |
|---|---|---|---|---|---|
| 1001 | D-AMS 037350 | *B. bison* | 3 | 309±22 | A.D. 1495 to 1602 (73.1%)<br>A.D. 1616 to 1647 (22.3%) |
| 1002 | D-AMS 037351 | Indet. | 2 | 432±22 | A.D. 1429 to 1480 (95.4%) |

Table 2.10. Stable isotope results for bone specimens collected from ice patches 2 and 3. Analysis completed by the Stable Isotope Core Laboratory, Washington State University. Carbon and nitrogen isotopic compositions are based on Coplen *et al.* (2006) and Coplen *et al.* (2002), respectively.

| Catalog No. | DAMS Lab No. | WSU Lab No. | $\delta^{13}$C‰ | C% | $\delta^{15}$N‰ | N% |
|---|---|---|---|---|---|---|
| 1001 | D-AMS 037350 | G-211859 | -18.84 | 34.78 | 7.10 | 12.69 |
| 1002 | D-AMS 037351 | G-211860 | -18.97 | 31.98 | 5.72 | 11.65 |

older than the Zirkel specimens, but at least two (both from Buchanan Pass in the Indian Peaks Wilderness) are younger than the Zirkel specimens. To date, very few archaeological remains have been found in Colorado ice patches, especially compared to elsewhere in the Rocky Mountain and across the world (Reckin 2013). This should not, however, preclude the continued investigation of these finite resources. The 2018 survey only sampled a small number of ice patches in the Zirkel Wilderness. While likely not archaeological, the specimens confirm that ice patches in the Mount Zirkel Wilderness have longevity and may preserve organic remains that date back at least several hundred years. Continued

effort should be made to identify and survey these disappearing resources in the Park and surrounding mountain ranges.

# 3

# Alpine Ecosystems and Archaeology in North Park

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The results presented in chapter 2 document that archaeological remains are present in the alpine ecozones of the Mount Zirkel Wilderness, and indicate that both American Indians and Settlers utilized the area around Seven Lakes and Red Elephant Mountain in the past. In order to provide a broader regional context for these data, this chapter examines the alpine ecosystems and archaeological record of the major mountain chains that bound North Park to west, east, and south in more detail. The first two sections review various aspects of the alpine dataset that are relevant from a management perspective, while the third examines several variables that may offer additional, albeit limited, insight about American Indian activity in the region. These data are discussed in more general terms throughout the chapter and summarized in the final section. Results from chapters 2 and 3 are then synthesized and discussed specifically in the context of past human behavior and alpine landscape use in chapter 4.

Information on archaeological resources and prior inventories in the mountains around North Park were obtained through a file search of the Colorado OAHP database initiated by PCRG on February 19, 2020. The file search area includes all of North Park and the immediately adjacent Park Range, Rabbit Ears Range, Never Summer Mountains, and Medicine Bow Mountains. The spatial extent of alpine ecosystems in the study area was determined by extracting polygons classified as Alpine Zone (21a) from a shapefile of the U.S. Environmental Protection Agency Level IV ecoregions for the state of Colorado (U.S. Environmental Protection Agency 2012). The extracted polygons were then used to narrow down the initial file search results to only those sites and surveys that occur within the alpine ecozone, which

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encompasses grassy meadows, wind-swept tundra, rocky slopes, and snow- and ice-capped peaks that occur above treeline (approximately 3100 m and higher) throughout the southern Rockies (Chapman *et al.* 2006) (figure 3.1).

### Alpine Ecozone Extent and Resource Density

The process described above identified a total 44,310 ha of alpine zone across the four mountain chains that bound North Park to the west (Park), south (Rabbit Ears), southeast (Never Summer), and east (Medicine Bow) (table 3.1). The Park Range (12,914 ha) and Never Summer Mountains (12,698 ha) contain the largest expanses of alpine ecozone in this region. (It should be noted here that, although the Park Range technically extends well south of North Park, all of the alpine zone in these mountains is actually located within the Mount Zirkel Wilderness at their northern end.) There is slightly less alpine ecozone in the Medicine Bow Mountains (10,952 ha), while the Rabbit Ears Range (7746 ha) has the smallest extent of all the mountains considered here.

Archaeological resource density was calculated based on the total area of alpine ecozone within each mountain range, although it is worth noting that the likelihood of human activity and occupation is not the same for all parts of this landscape (*e.g.,* alpine meadows are more likely to have been utilized than steep and rocky talus slopes). The available data indicate that resource density is relatively low in all of the alpine ecosystems around North Park (table 3.1). Densities are highest in the Medicine Bow Mountains and Rabbit Ears Range, where there are around

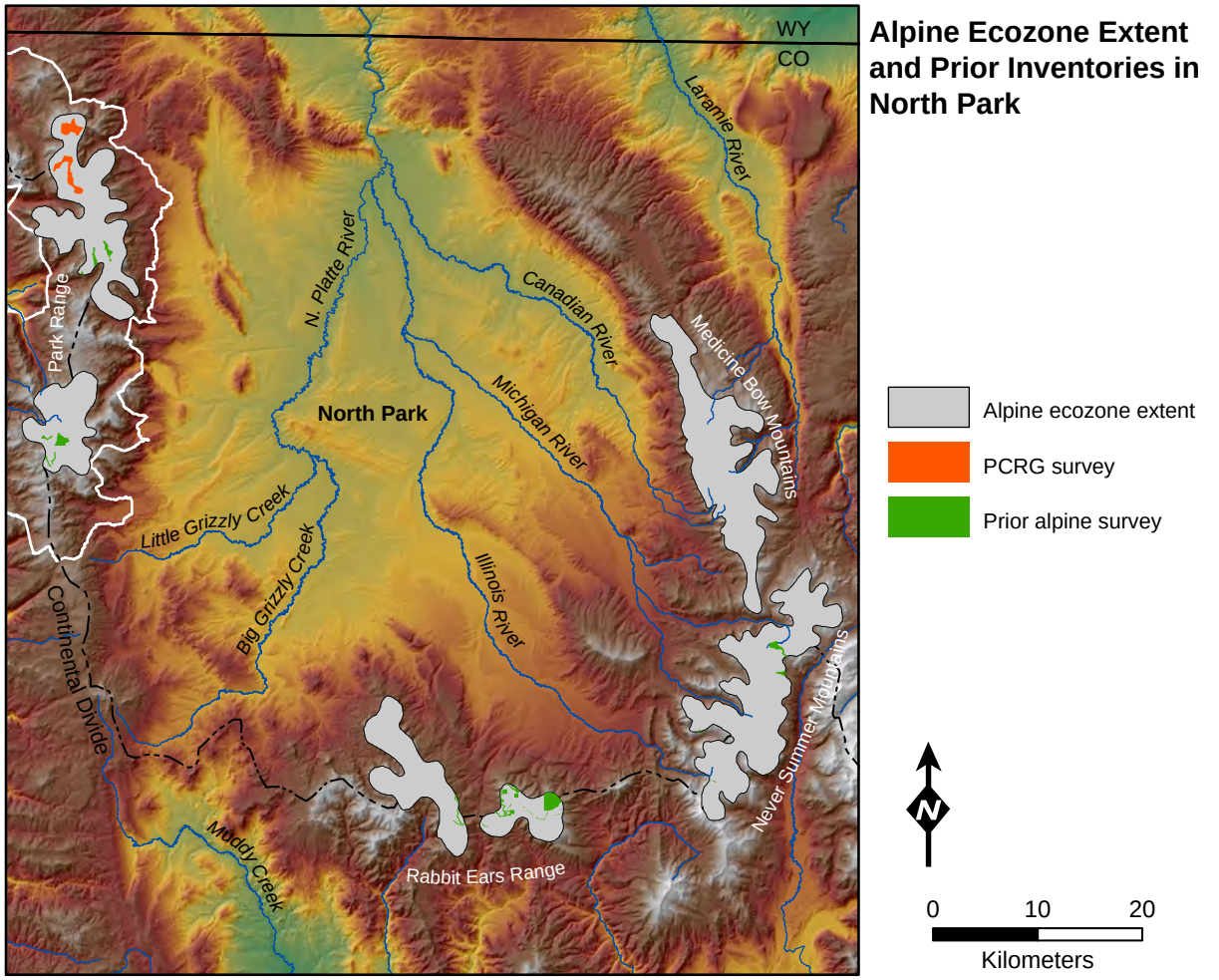


*Figure 3.1. Hillshade map showing the location and extent of alpine zones and prior cultural resource inventories in the mountains around North Park.*

Table 3.1. Total area and resource density for alpine zones in the mountains around North Park.

| Mountain Range | Area (ha) | Resources per ha |
|---|---|---|
| Medicine Bow | 10952 | 0.003 |
| Never Summer | 12698 | 0.001 |
| Park Range | 12914 | 0.001 |
| Rabbit Ears | 7746 | 0.003 |
| Total | 44310 | 0.002 |

three resources for every 1000 ha of alpine ecozone. Archaeological resources are much less dense in the Park Range and Never Summer Mountains–approximately one resource for every 1000 ha of land–despite these chains having larger expanses of alpine ecosystem. Resource density for all of the alpine zones combined is equal to approximately two resources per every 1000 ha of land. In all cases, alpine resource density is quite a bit lower than that for the floor of North Park proper, where there are approximately 6 archaeological resources for every 1000 hectares of land surface.

**Prior Inventories and Documented Resources**

Data on prior alpine inventories are available for the Park Range, Rabbit Ears Range, and Never Summer Mountains (figure 3.1). No prior alpine survey coverage is recorded for the Medicine Bow Mountains in the OAHP database, which is interesting, since this area actually contains the highest density (see above) and frequency (see below) of alpine archaeological resources among the four mountain ranges. However, a closer look at the file search data reveals that most or all of the fieldwork in the Medicine Bows was conducted during the 1970s by Dr. Elizabeth Morris and her students from Colorado State University, who did not record the extent of coverage at the time of survey (Morris *et al.* 1993; Buckner 2019). As such, the lack of inventory data reflects the fact that these academic projects did not have the same reporting requirements for survey coverage as federally-sponsored undertakings, rather than an actual absence of systematic investigation in the alpine ecosystems of the Medicine Bow Mountains.

The number, type, and extent of alpine inventories varies across the three mountain ranges for which data are available (table 3.2). Block surveys (62.1 percent of inventories; 84.6 percent of coverage) are the most common, while linear surveys (24.1 percent of inventories; 12.7 percent of coverage) are less abundant and mixed method surveys (13.8 percent of inventories; 2.7 percent of coverage) are the rarest.

Total survey coverage is highest in the Park Range (682 ha). The area of previous survey is somewhat smaller in the Rabbit Ears Range (458 ha), although the percentage of local alpine ecozone inventoried is actually slightly higher in these mountains (5.9 percent) than in the Park Range (5.3 percent). By contrast, prior inventory in the Never Summer Mountains is much less extensive with respect to both total coverage (105 ha) and percentage of alpine area (1.0 percent) surveyed. The survey data also indicate that less than three percent of the alpine ecozones around North Park for which data are available has been systematically inventoried for archaeological resources in the past.

Based on the available data, 86 archaeological resources–51 sites and 35 isolates–were identified in the alpine zones of the mountains around North Park (figure 3.2; table 3.3). Resource frequencies are highest in the Medicine Bow Mountains (38.4 percent) and Rabbit Ears Range (29.1 percent), and much lower in the Never Summer Mountains (17.4 percent) and Park Range (15.1 percent). Importantly, just under 70 percent of the resources, and all of the American Indian sites and isolates, now documented in the alpine zones of the Park Range were recorded by the current project.

Examining resources by the original date of recordation reveals that the majority of those recorded in the Medicine Bow Mountains were documented during the 1970s (91.0 percent), with the rest in the 1980s and 1990s (figure 3.3). Several resources in the Never Summer Mountains were also recorded between the 1970s and 1990s, although most (60.0 percent) were documented in the early-to-mid-2000s. Documentation in the Park Range is limited to two projects: one that recorded four resources (30.8 percent) in the 1980s and the current endeavor, which recorded nine others (69.2 percent) in 2018. Likewise, a handful of sites (20.0 percent) were documented during the 1980s and 1990s in the Rabbit Ears Range, but most recordation (80.0 percent) has occurred since 2000, and over half the resources were found in the last decade.

The distribution of sites and isolates by elevation is depicted in figure 3.4 and elevation data for each mountain range are summarized in table 3.4. Alpine archaeological resources range in altitude from approximately 3070 m to 3750 m, although they are not evenly distributed across all parts of

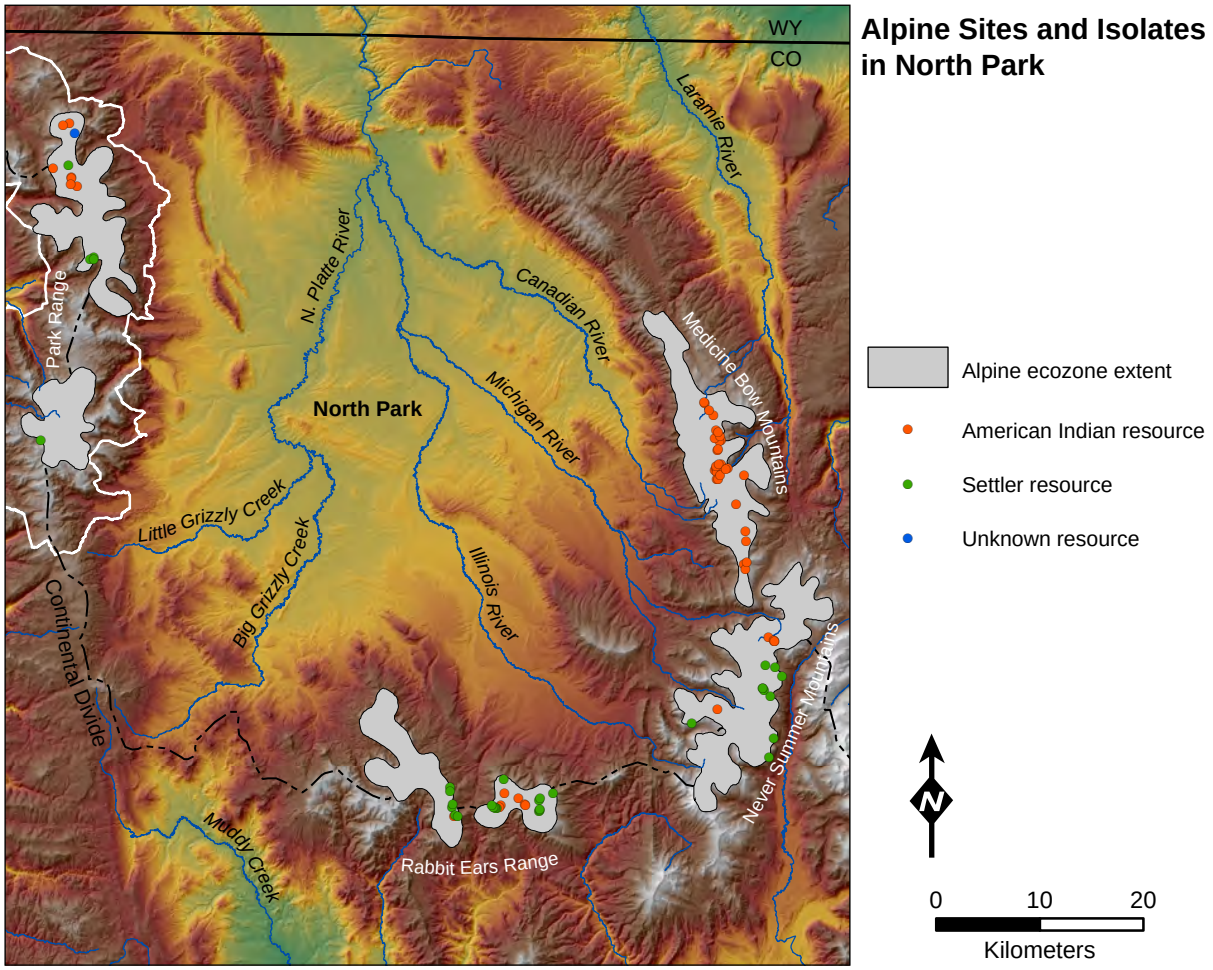


*Figure 3.2. Hillshade map showing the location of American Indian and Settler Resources in the alpine zones around North Park.*

Table 3.2. Archaeological inventories in the alpine zones around North Park.

| Mountains | Survey Type | Inventory Parcels | Hectares | Percent of Alpine Area |
|---|---|---|---|---|
| Never Summer | Block | 2 | 103 | - |
| | Linear | 1 | 2 | - |
| Subtotal | | 3 | 105 | 1.0 |
| Park Range | Block | 10 | 682 | - |
| Subtotal | | 10 | 682 | 5.3 |
| Rabbit Ears | Block | 6 | 269 | - |
| | Linear | 6 | 156 | - |
| | Block & Linear | 4 | 33 | - |
| Subtotal | | 16 | 458 | 5.9 |
| Total | | 29 | 1245 | 2.8 |

this interval. The majority of resources are found at mid-range elevations, with 57.0 percent between 3200-3399 m and 23.2 percent between 3400-3599 m. Another 16.3 percent of finds are located at the lowest elevations (3000-3199 m) and, accordingly, only 3.4 percent occur at the highest elevations (3600-3799 m). Minimum and maximum elevations in the Medicine Bows (3202 m; 3502 m) and Park Range

Table 3.3. Archaeological sites and isolated finds in the alpine zones surrounding North Park.

| Mountain Range | Site | Isolated find | Isolated feature | Total |
|---|---|---|---|---|
| Medicine Bow | 28 | 5 | - | 33 |
| Never Summer | 10 | 2 | 3 | 15 |
| Park Range | 8 | 4 | 1 | 13 |
| Rabbit Ears | 5 | 4 | 16 | 25 |
| Total | 51 | 15 | 20 | 86 |

Table 3.4. Distribution of alpine archaeological resource by elevation.

| | Elevation (m) | | | | | | |
|---|---|---|---|---|---|---|---|
| Mountain Range | 3000-3199 | 3200-3399 | 3400-3599 | 3600-3799 | Min. | Max. | Mean |
| Medicine Bow | - | 25 | 8 | - | 3202 | 3502 | 3359 |
| Never Summer | 4 | 6 | 5 | - | 3128 | 3465 | 3300 |
| Park Range | - | 11 | 2 | - | 3204 | 3487 | 3353 |
| Rabbit Ears | 10 | 7 | 5 | 3 | 3067 | 3748 | 3305 |
| Total | 14 | 49 | 20 | 3 | 3067 | 3748 | 3332 |

(3204 m; 3487 m) are quite similar, and there is a correspondingly small difference in the overall range for both mountains (Medicine Bow: 300 m; Park Range: 287 m). Minimum (3128 m) and maximum (3465 m) elevations are slightly lower in the Never Summers, which also have a somewhat larger total range (337 m). By contrast, the Rabbit Ears Range contains both the lowest (3067 m) and highest (3748 m) resources in the sample, as well as an altitudinal span between the two (681 m) that is more than twice that for all the other mountains.

Approximately 75 percent of the alpine sites identified for this review are American Indian, while the remaining 25 percent date to the Settler period (table 3.5). American Indian sites are most abundant in the Medicine Bow Mountains (73.7 percent), and much less common in the Rabbit Ears Range (10.5 percent), Park Range (7.9 percent), and Never Summer Mountains (7.9 percent). Conversely, the majority of Settler sites are found in the Never Summer Mountains (53.8 percent) and Park Range (38.5 percent), with far fewer in the Rabbit Ears Range (7.7 percent) and none in the Medicine Bows.

Just under 85 percent of American Indian sites are open lithic scatters, while the remainder are classified as open camps based on the presence of ground stone or faunal remains in addition to chipped stone (table 3.5). All of the open camps are found in the Medicine Bow Mountains, as are many of the open lithic sites. Accordingly, all of the sites located in the Never Summer, Park, and Rabbit Ears ranges are open lithic scatters consisting entirely of chipped stone tools, debitage, or both. Habitation sites–including isolated log cabins, mining or construction camps, and a

Table 3.5. Site types in the alpine ecozones of the mountains around North Park.

| | | Mountain Range | | | |
|---|---|---|---|---|---|
| Component | Site type | Medicine Bow | Never Summer | Park Range | Rabbit Ears |
| American Indian | Open camp | 6 | - | - | - |
| | Open lithic | 22 | 3 | 3 | 4 |
| Subtotal | | 28 | 3 | 3 | 4 |
| Settler | Habitation/Camp | - | 6 | 2 | - |
| | Cairn & can scatter | - | - | 1 | - |
| | Mine | - | - | 1 | - |
| | Fire lookout | - | - | - | 1 |
| | Artifact scatter | - | - | 1 | - |
| | Water control | - | 1 | - | - |
| Subtotal | | - | 7 | 5 | 1 |

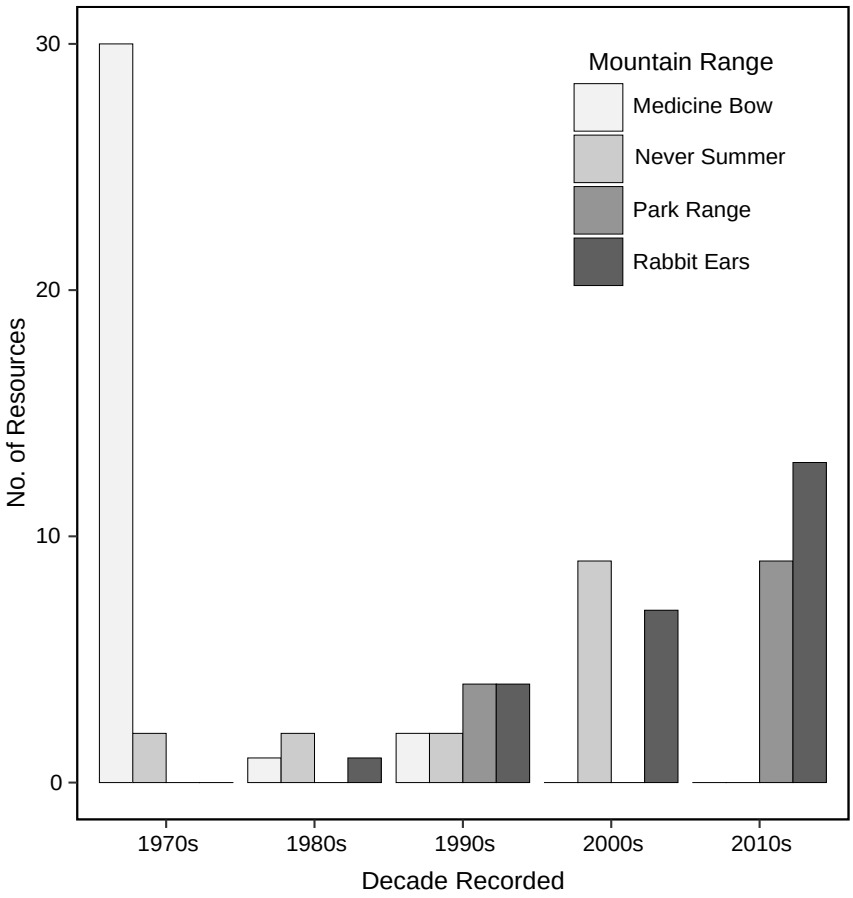


*Figure 3.3. Distribution of alpine archaeological resources by date of recordation.*

deserted mining town–are the most common type of Settler site (61.5 percent). The other Settler sites are all represented by a single occurrence (7.7 percent) and include a water control feature, an abandoned mine, a fire lookout, a cairn and associated can scatter, and an isolated artifact scatter.

Among the isolated finds and features, those related to Settler activity (57.1 percent) are more abundant than American Indian (42.9 percent) material; there is also one isolated feature (2.9 percent) for which the component type is unknown (table 3.6). Once again, the Medicine Bow Mountains (35.7 percent) contain the highest frequency of American Indian isolates, but they are also fairly abundant in the Park (28.6 percent) and Rabbit Ears (21.6 percent) ranges. American Indian isolates are least common in the Never Summer Mountains (14.3 percent). Settler isolates are confined entirely to the Rabbit Ears Range (85.0 percent) and, to a much lesser extent, the Never Summer Mountains (15.0 percent). The single isolate of unknown origin is located in the Park Range and was recorded as part of the current project.

American Indian isolates are fairly evenly split between chipped stone debitage (50.0 percent) and tools (42.9 percent), with an additional find that includes both (7.1 percent) (table 3.6). Settler component isolated finds and features are once again fairly diverse, with log platforms (25.0 percent), wood piles (20.0 percent), and prospect pits (20.0 percent) being the most common. Additionally, several corrals (8.6 percent), cairns (5.7 percent), a hearth (2.9 percent), and an artifact scatter (2.9 percent) are also present. The unknown isolate is also a cairn (see chapter 2 for more detail).

NRHP eligibility recommendations for the 86 alpine resources are summarized in table 3.7. The vast majority of American Indian resources (92.3 percent) are listed as not eligible for the NRHP in the OAHP database. The few exceptions include three open lithic scatters (5GA319, 5JA1256, 5LR1834) and one open camp site (5LR221) in the Medicine Bow and Never Summer mountains that are recommended as needs data. There are currently no American Indian resources in the alpine ecozone around North Park

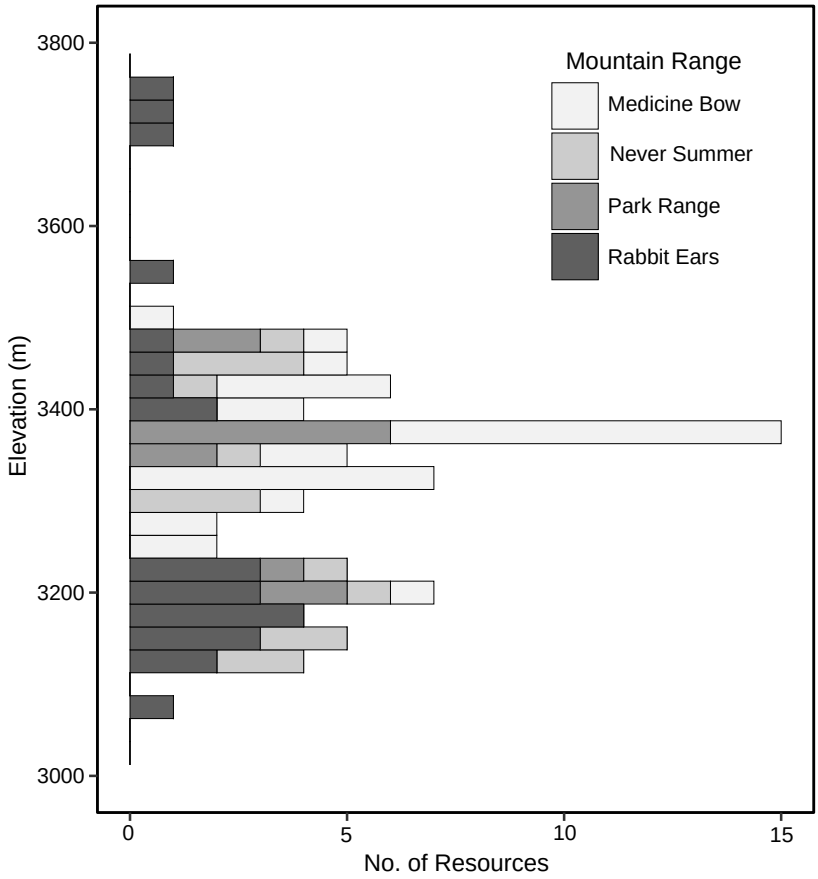


*Figure 3.4. Distribution of all alpine archaeological resources by elevation.*

Table 3.6. Isolated finds and features in the alpine ecozones of the mountains around North Park.

| | | Mountain Range | | | | |
|---|---|---|---|---|---|---|
| Component | Description | Medicine Bow | Never Summer | Park Range | Rabbit Ears | Total |
| American Indian | Debitage | 2 | 2 | - | 3 | 7 |
| | Stone tool(s) | 2 | - | 4 | - | 6 |
| | Debitage & tool(s) | 1 | - | - | - | 1 |
| Subtotal | | 5 | 2 | 4 | 3 | 14 |
| Settler | Cairn | - | 2 | - | - | 2 |
| | Corral | - | - | - | 3 | 3 |
| | Hearth | - | 1 | - | - | 1 |
| | Log platform | - | - | - | 5 | 5 |
| | Prospect pit | - | - | - | 4 | 4 |
| | Wood pile | - | - | - | 4 | 4 |
| | Artifact scatter | - | - | - | 1 | 1 |
| Subtotal | | - | 3 | - | 17 | 20 |
| Unknown | Cairn | - | - | 1 | - | 1 |

that are officially considered NRHP eligible. Likewise, most of the Settler sites (78.8 percent) are ineligible for the NRHP. However, there are four Settler resources–the Grand Ditch (5GA301), two associated construction camps (5GA301.4; 5GA301.7), and the Dutchtown mining community (5GA807)–already listed on the NRHP. Two other sites–Parkview Mountain fire lookout (5GA1303) and an unnamed series of log cabins (5GA2204)–are officially eligible for inclusion on the NRHP, while an additional log

Table 3.7. NRHP eligibility recommendations and determinations for alpine archaeological resources in the mountains around North Park.

| | | Mountain Range | | | | |
|---|---|---|---|---|---|---|
| Component | NRHP Eligibility | Medicine Bow | Never Summer | Park Range | Rabbit Ears | Total |
| American Indian | Needs data | 2 | 2 | - | - | 4 |
| | Not eligible | 31 | 3 | 7 | 7 | 48 |
| Settler | Listed | - | 4 | - | - | 4 |
| | Eligible | - | 1 | - | 1 | 2 |
| | Not eligible | - | 4 | 5 | 17 | 26 |
| | Needs data | - | 1 | - | - | 1 |
| Unknown | Not eligible | - | - | 1 | - | 1 |

cabin (5GA2703) is also recommended as needs data. Interestingly, all of these sites are in the Never Summer Mountains except the fire lookout, which is located in the adjacent Rabbit Ears Range.

**American Indian Resource Composition and Size**

File search data on the number and types of artifacts associated with archaeological resources may offer insight about the types of behaviors (*e.g.,* hunting and foraging; raw material acquisition; seasonal travel) that drew people into the Mount Zirkel Wilderness and other alpine zones around North Park in the past. As noted above and in chapter 2, with the exception of one Settler period cairn and associated can scatter and one isolated cairn of unknown age, all of the new finds documented by the Mount Zirkel survey project are American Indian (see chapter 2). Accordingly, the following discussion will focus specifically on American Indian sites and isolates, as they are the most relevant to understanding the new data from the Mount Zirkel Wilderness. Likewise, because the new finds represent the only alpine American Indian components currently documented in the Park Range, this section will simply refer to the Mount Zirkel Wilderness instead of the Park Range when discussing this material.

In order to better understand the general composition of American Indian resources from the Mount Zirkel Wilderness and other alpine zones, sites and isolates were grouped into several fairly broad categories based on the types of archaeological remains they comprise (table 3.8). When all of the resources are considered, lithic scatter sites with tools and flakes (51.9 percent) and flaking debris scatters (23.1 percent) of various size (range = 1-25 flakes; mean = 6 flakes) are the most abundant. Additionally, camp sites (11.5 percent), distinguished by the presence of ground stone tools or faunal remains, and isolated stone tools (9.6 percent) are also relatively common. Isolated projectile points or fragments (3.9 percent) make up the remainder of American Indian components and are the rarest resource type in the alpine zones around North Park.

American Indian resources in the Mount Zirkel Wilderness include two lithic scatters with chipped stone tools and associated flakes, a single sizeable scatter of flaking debris only, and four isolated stone tools other than a projectile point (table 3.9). Slightly less diversity is observed in the Rabbit Ears Range and Never Summer Mountains, where only two types of resource are found. More specifically, the Rabbit Ears Range contains two lithic scatters and five flaking debris sites, while American Indian components in the Never Summers include three of the former and two of the latter. The largest diversity of resource types is found in the Medicine Bows, which is not necessarily surprising, given that over 60 percent of the alpine American Indian components are located in these mountains. The majority of resources (n=20) are lithic scatters, many of which consist of sizeable collections of projectile points, other stone tools, and flakes. All six of the alpine camp sites documented in the mountains around North Park are also found in the Medicine Bows. The remaining resources in these mountains consist of several isolated projectile points or fragments–including one diagnostic James Allen Paleoindian type–and an isolated stone tool with an associated flake.

Information on basic artifact counts, which are used here as a proxy for overall site size, are available for 35 of the American Indian sites; however, it is important to note that the available data likely represent only minimum counts for at least some of these sites, particularly those recorded during the 1970s in the Medicine Bows. Alpine sites in the

Table 3.8. Resource type categories for American Indian sites and isolates in the alpine ecozones around North Park.

| Resource Type | Description |
|---|---|
| Lithic scatter | Multiple chipped stone tools with or without flakes or a single tool with multiple flakes |
| Camp | Chipped stone tools or flakes with ground stone or faunal remains |
| Flaking Debris | Flake or flake scatter with no associated stone tools (includes sites and isolates) |
| Isolated Projectile Point | Isolated projectile point(s) or fragment(s) |
| Isolated Stone Tool | Isolated chipped stone tool (non-projectile point) |

Table 3.9. Resource type frequencies in the Mount Zirkel Wilderness and alpine ecozones around North Park.

| | Mountain Range | | | | | |
|---|---|---|---|---|---|---|
| Resource Type | Mount Zirkel | Medicine Bow | Never Summer | Rabbit Ears | Total | Percent of Total |
| Lithic scatter | 2 | 20 | 3 | 2 | 27 | 51.9 |
| Camp | - | 6 | - | - | 6 | 11.5 |
| Flaking Debris | 1 | 4 | 2 | 5 | 12 | 23.1 |
| Isolated Projectile Point | - | 2 | - | - | 2 | 3.9 |
| Isolated Stone Tool | 4 | 1 | - | - | 5 | 9.6 |

mountains around North Park vary in size from one to just over 140 artifacts, but the mean of 28 artifacts per site indicates that the majority are on the lower end of that range (table 3.10) When all four alpine zones are considered together, relatively small sites containing less than five artifacts (31.4 percent) or between six and 25 artifacts (34.3 percent) are by far the most common. Slightly larger sites with 26-50 artifacts (17.1 percent) are also fairly abundant, while those composed of 51-100 (11.4 percent) or 101+ (5.7 percent) artifacts are the rarest.

The largest American Indian sites are found in the Medicine Bow Mountains, and contain anywhere from one to 142 artifacts, although the mean of 31 items per site suggests that most of them fall near the lower end of that span (table 3.10; figure 3.5). Sites in the Rabbit Ears Range display a similarly large variation in size, from 2 to 134 artifacts, and actually have a slightly higher mean of 36 artifacts per locality. However, this value is clearly driven by a single outlier and when it is removed the mean drops dramatically to a mere seven artifacts per site in the Rabbit Ears Range. Sites in the Mount Zirkel Wilderness span a much more restricted size range than those in the Medicine Bow and Rabbit Ears mountains, with the smallest and largest containing eight and 34 artifacts, respectively. Likewise, the mean value of 18 artifacts indicates that the Mount Zirkel sites are smaller on average, particularly when compared to those from the Medicine Bow Mountains. Likewise, the Never Summer Mountains contain the smallest sites overall, in terms of both the total size range (between one and eight artifacts) and the average number of artifacts (five per site).

Table 3.10. Site frequency by artifact count (as a proxy for site size) at American Indian sites in the alpine zones around North Park.

| | No. of Artifacts | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Alpine Zone | < 5 | 6 - 25 | 26 - 50 | 51 - 100 | 101 - 150 | Min. | Max. | Mean |
| Mount Zirkel | - | 2 | 1 | - | - | 8 | 34 | 18 |
| Medicine Bow | 7 | 8 | 5 | 4 | 1 | 1 | 142 | 31 |
| Never Summer | 1 | 2 | - | - | - | 1 | 8 | 6 |
| Rabbit Ears | 3 | - | - | - | 1 | 2 | 134 | 36 |
| Total | 11 | 12 | 6 | 4 | 2 | 1 | 142 | 28 |

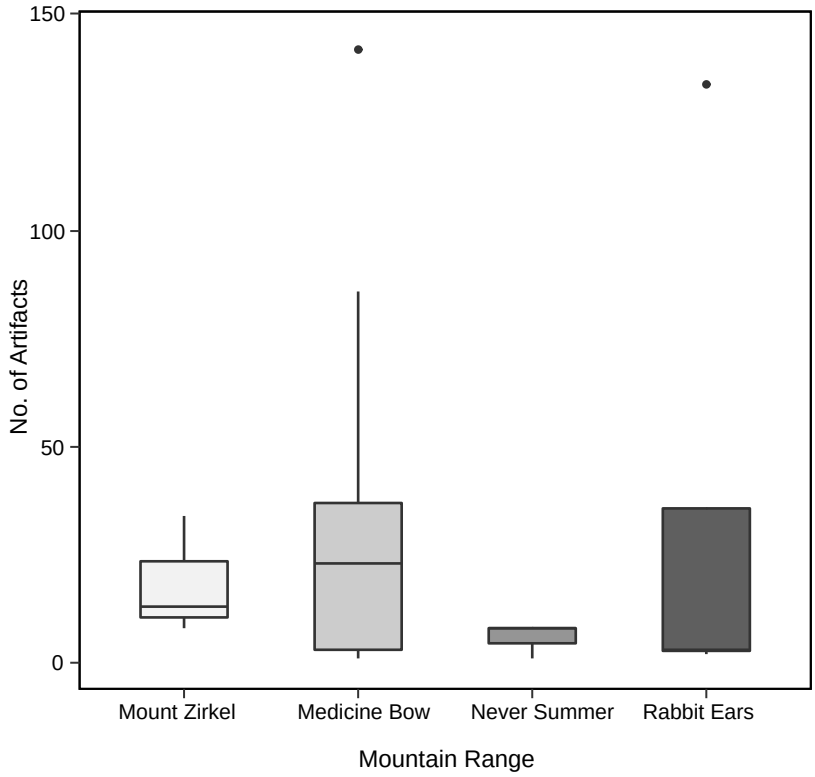


*Figure 3.5. Distribution of American Indian alpine sites and isolates by elevation.*

**Summary**

When the surrounding mountains are included, alpine ecosystems account for just under 10 percent of the total land surface area in and around North Park. File search data indicate that archaeological resource density is quite low in the alpine zones, which is not really surprising, given that less than three percent of this landscape has been systematically inventoried in the Park, Rabbit Ears, and Never Summer mountains. Survey data do not exist for the Medicine Bows, but the distribution of documented resources indicates that past work has been largely concentrated in the Rawah Wilderness on the eastern side of the mountains, while areas to the north and west–including State Forest State Park, which encompasses most of the western slope–remain largely unexplored.

More than 65 percent of the alpine archaeological resources are located in the Medicine Bow Mountains and Rabbit Ears Range, while the remainder are split fairly evenly between the Never Summer Mountains and Park Range. Additionally, most of the resources (approximately 80 percent) are located at mid-range elevations between 3200-3599 m, while relatively few are found at the highest or lowest altitudes in the alpine zones. Over half the resources were recorded between the 1970s and 1990s, although another quarter of them have been documented within the last decade, as well. All of the most recent work (in the 2010s) has focused on the Park and Rabbit Ears Ranges, while much of the recordation in the Never Summer Mountains took place in the early 2000s. By contrast, almost all of the work in the Medicine Bows was conducted in the 1970s and no sites in the OAHP database were recorded more recently than 1994. Additionally, most of the alpine resources (approximately 80 percent) are located at mid-range elevations between 3200-3599 m.

American Indian components represent just over 60 percent of the sites and isolates, while the rest are Settler components and a single feature of unknown age and affiliation. American Indian resources include open lithic and camp sites, as well as a number of isolated tools and flakes. Most of the Settler resources are related to mining activity and perhaps timber harvesting. There are also several sites associated with the century-old Grand Ditch water diversion project in the Never Summer Mountains. None of the American Indian resources are eligible for the NRHP, but four are listed as needs data and could be recommended as eligible upon further investigation. There are six Settler sites that are either

listed or eligible and one that needs data; all the rest are ineligible for the NRHP.

Among the American Indian resources, lithic scatters–typically containing multiple chipped stone tools and debitage–are the most abundant, followed by those that consist only of flaking debris. Camp sites, which are essentially lithic scatters that also have ground stone or faunal remains, are also fairly common. The rarest resource types are isolated chipped stone tools and projectile points or fragments (in that order). American Indian sites range widely in size, although more than 65 percent of them contain 25 artifacts or less and those with 100 or more artifacts are quite rare. With the exception of a single large outlier, sites in the Rabbit Ears Range and Never Summer Mountains are generally quite small, with less than 10 artifacts apiece. Artifact counts tend to slightly higher at sites in the Mount Zirkel Wilderness, and the largest sites overall are found in the Medicine Bow Mountains.

# 4

# Recommendations and Conclusion

**Christopher A. Davis**

In 2018, PCRG was contracted by the U.S. Forest Service to conduct pedestrian survey in the alpine zones of the Mount Zirkel Wilderness at the northern end of the Park Range in the larger MBR National Forest. The Mount Zirkel Wilderness contains the entirety of the alpine ecozone in the Park Range, and this fieldwork effort is the first to focus specifically on alpine ecosystems in this mountain range. The research builds on previous work documenting human activity in the high country of north-central Colorado, including foraging and other activity in the often-inhospitable alpine zone, that dates back at least 10,000 years (Athearn 1982; Benedict 1979, 1992; Benedict and Olson 1978; LaBelle and Pelton 2013; Pelton 2017). The goals of the project were to: 1) document and identify alpine archaeological resources in the Mount Zirkel Wilderness, 2) understand how humans utilized these landscapes in the past, and 3) determine the potential research value of undertaking additional high-altitude projects in this region in the future.

The rest of this chapter synthesizes data presented in chapters 2 and 3 specifically in the context of addressing these three research goals. The first two sections summarize the results of fieldwork in the Mount Zirkel Wilderness and review the four newly-recorded sites, NRHP recommendations, and justifications in each case. The next section discusses the potential behavioral implications of alpine archaeological data from the Park and other mountain ranges that bound North Park. The chapter ends with suggestions for future research opportunities in the Mount Zirkel Wilderness and other alpine zones that are part of the MBR in north-central Colorado.

2020 *High Altitude Archaeology in the Mount Zirkel Wilderness, Jackson and Routt Counties, Colorado,* edited by Christopher A. Davis, pp. 49-54. Research Contribution 112. Paleocultural Research Group, Broomfield, Colorado.

## Summary of Results

The 2018 fieldwork identified nine newly-recorded cultural resources in the alpine ecozones of the Mount Zirkel Wilderness, including seven American Indian, one Settler, and one with a component of unknown age or affiliation. Prior to this work, only four Settler sites had been documented in the alpine zones of the Mount Zirkel Wilderness and, by extension, the entire Park Range, all of which were found in the late 1990s and are located 5 km or more south of the PCRG survey area. As such, the new finds constitute the majority of the alpine archaeological record for the mountains west of North Park and are the first cultural resources to be recorded in this area in over two decades.

All of the American Indian sites are open lithic and contain relatively small assemblages of a few chipped stone tools and associated debitage or flaking debris only. Tool types recovered from the sites are limited to non-diagnostic bifaces and two projectile point fragments, one of which resembles a corner-notched Archaic dart point but is too broken for definitive identification. Debitage is typically rather small (*i.e.,* G2 or G3) and lacks cortex, suggesting that most flaking was aimed at tool maintenance or repair, as opposed to nodule reduction or tool production. Isolated finds all consist of a single artifact, and include a biface, a scraper, a drill fragment, and simple flake tool. Chert is the most common raw material for both tools and debitage, although the possible Archaic point and scraper were made from quartzite and several chalcedony flakes were also found at one site.

Approximately 70 percent (n=5) of American Indian sites and isolates are located on gently-sloping benches and rocky ridges along or directly adjacent to the Continental Divide west of Red Elephant Mountain, while the remaining 30 percent (n=2) are situated within the broad alpine meadows and passes around Davis Peak several kilometers to the north. Clearly, the concentration of resources along alpine ridges, benches, and meadows is due in part to the fact that much of the survey area consists of just such flat and open landforms. However, there are a number of reasons why these locations make sense from a behavioral standpoint, as well.

The expansive views from alpine ridges along the divide would have made them advantageous spots for hunters to scout, stalk, and perhaps even ambush game, particularly ungulates. Additionally, the mountain passes around Davis Peak may well have represented one of the easier travel routes through the area and, much like today, the broad meadows and benches would have provided more sheltered and comfortable places to rest, retool, or even camp for groups traversing the region on foot. Thus, it seems likely that many of the resources documented along the Continental Divide are related to hunting forays, while those found in the meadows to the north may represent places where hunters rested, retooled, or made short-term camps during such trips. It is also possible that some of the material was left behind by groups using the area primarily as a travel corridor (see below). In either case, the small size of sites and limited diversity in tool types and raw materials suggest that these activities involved relatively small bands, who entered the alpine zone for a specific purpose and did not stay there for extended periods of time.

The single Settler resource documented by the current project is a small cairn and associated scatter of fragments from an early-to-mid-20$^{th}$ century metal coffee can. The site is located on an alpine bench just off the Continental Divide and there is some indication that placement of the rocks may predate Settler activity in the area. However, no other evidence was found to support this conclusion and, beyond the metal can fragments that date it to the Settler period, the precise age and function of the site are not known. The project also recorded a single isolated cairn of unknown age, function, and affiliation at the edge of an alpine meadow several kilometers southeast of Davis Peak.

In addition to the cultural resources, the field crew investigated three semi-permanent ice patches for archaeological remains. No obvious cultural material was found in or around any of the ice patches, but floral or faunal samples were collected for laboratory analysis from the forefields of all three. Wood samples from the forefield of IP.1 were all found to derive from species of pine and fir tree that are locally abundant, with no indication that any of them were introduced or modified by cultural agents. Similarly, there was no evidence for anything other than natural accumulation of the two faunal bones collected from the forefields of IP.2 and IP.3, and $^{14}C$ dating indicates that both specimens are relatively young and date to within the last 500 years. Despite the fact that no artifacts or fossils were discovered, these investigations nonetheless attest that organic material may be preserved for several hundred years or more in the ice patches in the Mount Zirkel Wilderness.

**National Register Eligibility Recommendations**

Although the current project was not tied to a specific undertaking, cultural resources in the Mount Zirkel Wilderness were evaluated for their eligibility to be included on the NRHP. To be recommended as eligible for inclusion on the NRHP, resources must maintain aspects of their integrity relative to location, setting, design, materials, workmanship, feeling, and association, and meet one or more of the following criteria:

A) Associated with events that have made a significant contribution to the broad pattern of our history.
B) Associated with the lives of persons significant in our past.
C) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction.
D) Has yielded, or may be likely to yield, information important in history or prehistory.

Resources that clearly do not meet one or more of the criteria listed above are recommended as not eligible for inclusion on the NRHP. Alternatively, cultural resources may also be recommended as needing additional data, meaning that further work is necessary at a site in order to fully evaluate NRHP eligibility.

None of the resources recorded for the Mount Zirkel Wilderness survey project are recommended as eligible for the NRHP or requiring additional to fully evaluate eligibility. Rather, all four of the sites and the five isolated finds are recommended as not eligible for the NRHP. The following section provides a brief review of each site and justifications for the NRHP recommendation. All of the resources are discussed in detail in chapter 2.

**5JA3144** is a Settler site located along an alpine ridge around one kilometer south of Seven Lakes in the southern survey area. The main feature of the site is a semi-circular rock alignment with a small amount of sediment accumulation around the base and lichen development that may indicate the stones were placed in the distant past. Other cultural material includes approximately 30 metal can fragments found within the arc of the alignment, all of which are likely from the same pre-1950s coffee can. No features that could yield dateable remains are present and all of the artifacts were discovered on the surface. Sediment layers are shallow (approximately 2-5 cm) and, accordingly, the possibility for substantial buried deposits that might further clarify the function or cultural affiliation of 5JA3144 is extremely low. Taken together, the data document a site of very limited spatial extent, with a single feature of uncertain age and affiliation, a small scatter of Settler-period debris, and essentially no potential for further investigation to provide significant new data. For these reasons, 5JA3144 is recommended as **not eligible** for the NRHP.

**5JA3145** is an American Indian open lithic scatter located along an alpine pass several hundred meters east of Davis Peak in the northern survey area. The scatter contains two fragmented projectile points (PP1 and PP2) and 31 pieces of debitage. PP1 is a corner-notched blade fragment, the overall morphology of which appears similar to a Late Archaic dart point. However, that the entire base is missing precludes a more definitive identification. PP2 is an otherwise non-identifiable midsection fragment. Debitage is mostly rather small (> 20 mm in maximum dimension) chert flakes that may result from one or more episodes of tool retouch and maintenance. No dateable features were recorded at 5JA3145, and the site is located in an area with minimal sedimentation and soil deposition. Although no obvious signs of collecting (*e.g.,* collector piles) were observed, the popular Buffalo Ridge Trail runs directly through 5JA3145, raising significant concerns that surface materials have been picked over by visitors in the past. In sum, this site contains a limited and largely non-diagnostic artifact assemblage and has minimal potential to preserve additional archaeological deposits, either on the surface or below it, that can offer further insight about the site or its inhabitants. 5JA3145 is therefore recommended as **not eligible** for the NRHP.

**5JA3148/5RT3518** is an American Indian open lithic scatter spread across a ridge along the Continental Divide approximately 2.5 km south of Seven Lakes. The site spans the Jackson and Routt county line, although all of the artifacts are actually located in Jackson county. The lithic scatter consists of one biface fragment and seven chert flakes. Two cairns were also noted 20-30 m south of the main scatter, but were not officially documented as part of the site or

separate resources, because there were no associated artifacts or obvious indicators of substantial antiquity. Sediments consist of shallow layers of mostly eroded bedrock, and light ground cover offers high visibility throughout the area. As such, 5JA3148/5RT3518 contains a small assemblage of artifacts which, while interesting, cannot be used to date the site or offer significant information about its inhabitants. The research potential of the two cairns is similarly limited by their uncertain age, questionable affiliation with 5JA3148/5RT3518, and lack of associated artifacts. Further, low rates of sedimentation and high visibility in the area leave very little chance for intact buried deposits or additional surface material beyond that recorded by the survey crew, which could potentially provide new data about the site. For these reasons, 5JA3148/5RT3518 is recommended as **not eligible** for the NRHP.

**5RT3517** is an American Indian open lithic scatter located a few hundred meters west of the Continental Divide and several kilometers southwest of Red Elephant Mountain. The scatter contains 13 pieces of chert debitage. Most of the flakes are relatively small (*i.e.,* > 20 mm in maximum dimension) and a few retain cortex on their outer surface. As with all the other sites, where present, sediments are extremely shallow and light ground cover provides high visibility in and around 5RT3517. Given the above, it is clear that 5RT3517 is a site with an extremely limited artifact assemblage, which consist entirely of non-diagnostic flaking debris and contains no dateable artifacts or features. Likewise, there is once again essentially no chance for preserved subsurface deposits or overlooked material on the surface that might offer additional information about the site or its inhabitants. As such, 5RT3517 is recommended as **not eligible** for the NRHP.

### Past Human Land Use in North Park

Data from the current project and the OAHP database document that American Indians and Settlers were present in the alpine landscapes of the Park Range (*i.e.,* Mount Zirkel Wilderness) west of North Park, as well as in the Rabbit Ears Range, Never Summer Mountains, and Medicine Bow Mountains that bound the park to the south and east. American Indian components make up just over 60 percent of the alpine archaeological resources, and are found in all four of the mountain ranges around North Park. Settler components represent just under 40 percent of the resources, and are confined to the Park, Rabbit Ears, and Never Summer mountains only. The single unknown component is in the Park Range.

American Indian components include open lithic and open camp sites, as well as numerous occurrences of isolated chipped stone tools and flakes. Although American Indian sites and isolates are found in all four of the alpine zones around North Park, the Medicine Bow Mountains contain the greatest frequency and diversity of components by far. Importantly, all of the camp sites–which contain ground stone or faunal remains in addition to chipped stone tools and debitage–recorded in the OAHP database are located in the Medicine Bows, while sites in the other three alpine zones are limited to open lithic scatters, many of which are quite small and homogenous in terms of artifacts and raw materials.

These data suggest that the Medicine Bows were used in a different manner than alpine zones in ranges to the south and west. More specifically, it appears that American Indians utilized the Medicine Bows more often and probably more intensively than they did the other alpine zones in the region. The proximity of the Medicine Bows to the Front Range, where populations were likely larger and denser than in North Park, may help to explain this pattern. Likewise, the Medicine Bows may have offered additional advantages to attract human occupation and use in the past, including the many high alpine lakes and cirques that dot these mountains, which often feature well-protected places to camp out of the elements and would have provided reliable supplies of freshwater and, perhaps, food (*e.g.,* in the form of fish or mammals that regularly visit to drink). This contrasts with the more exposed and open terrain in the higher elevation zone of the Mount Zirkel Wilderness, particularly in the areas surveyed by the PCRG crew, and other alpine ecozones in this region. Whatever the case, it is also interesting to note that regular use of the Medicine Bows would generally be consistent with the "up-down" and "rotary" models of alpine landscape use proposed by Benedict (1979, 1992; Benedict and Olson 1978).

The data in chapters 2 and 3 clearly demonstrate that alpine areas in the Park Range (*i.e.,* Mount Zirkel Wilderness), Rabbit Ears Range, and Never Summer Mountains were also used by American Indian groups in the past. However, the relatively low site frequency, artifact density, and tool diversity in these mountains suggests their utilization was patchier and more intermittent, and may have involved only occasional

short-term forays that were focused on a particular task, such as hunting or foraging for certain plant foods. Conversely, higher archaeological density and diversity in the Medicine Bows indicate that they were utilized by larger groups of people who likely stayed for longer periods of time and engaged in wider array of activities.

It is also possible that many of the smaller sites in the Mount Zirkel Wilderness, Rabbit Ears, and Never Summers were left behind by people simply traveling these areas as they moved back and forth between North Park and adjacent areas, such as the Yampa River valley, Middle Park or the Front Range. Yet, most of these ranges would appear to be unlikely travel corridors into and out of North Park, given that there are much easier, albeit often longer, routes that avoid going directly up and over high mountain peaks. For instance, it seems more likely that groups heading out of North Park into Middle Park would have gone west and then south through Muddy Creek Pass (along what is now Highway 40), rather than traversing the middle of the Rabbit Ears Range. Similarly, a route following Muddy Creek Pass and Rabbit Ears Pass, or over Buffalo Pass to the north, would almost certainly have been much easier for groups traveling from the southern end of North Park to the Yampa River valley (and vice versa) than going straight across the peaks of the Park Range.

Conversely, for groups moving west into the Yampa or Elk river valleys from the far northern end of North Park, a route over Red Elephant Mountain and through the Seven Lakes area in the Mount Zirkel Wilderness may actually have been easier and more accessible than traveling approximately 30-50 km south to cross Buffalo Pass or Rabbit Ears Pass. Thus, while it seems somewhat implausible in many cases, the possibility that at least some high alpine areas in the Mount Zirkel Wilderness, Rabbit Ears Range, and Never Summer Mountains were utilized as travel corridors by American Indian groups in the past. The small size and homogenous nature of many sites in these three ranges, which suggest American Indian presence was intermittent and visits often rather short-lived, may also support this conclusion.

Many of the Settler resources that dot the alpine landscapes around North Park are likely related to mining activity and, perhaps, timber harvesting. These components include old mines (*e.g.,* Slavonia Mine), abandoned mining towns (*e.g.,* Dutchtown) and camps, and cabin ruins, as well as a number of prospecting pits, log platforms, and wood piles, over half of which are located in the Rabbit Ears Range. Additionally, there are at least three Settler sites associated with the 23 km long Grand Ditch water diversion project, which was constructed over a period of roughly 40 years in the Never Summer Mountains, and one is a historically significant fire lookout (also in the Rabbit Ears Range).

As discussed in chapter 1, the main industries that drew large numbers of Settlers into the high country of north-central Colorado beginning in the early nineteenth century include the fur trade, mining, timber, and agriculture (*e.g.,* ranching and farming). The prominence of the fur trade was early and short-lived, and the harsh climate and rugged terrain of the alpine zone make it particularly unsuitable for most types of agriculture. Thus, it is not really surprising that much of the Settler activity in the alpine landscapes around North Park is likely related to the extractive industries, namely precious metal mining and possibly timber harvesting. Likewise, the Grand Ditch project diverts streams headed for the Colorado River into the Cache la Poudre River in order to supply water to the Front Range, and could therefore also be considered a form of resource extraction. Nonetheless, it is possible that some of the more ambiguous resources (*e.g.,* isolated cairns and corrals; artifact scatters) are associated with other unrelated activities, such as open-range ranching; however, it is equally plausible that many, if not most, of these features are also associated with mining, timbering, or other extractive activities.

## Future Research

Perhaps the biggest takeaway from both the American Indian and Settler datasets discussed above is the overall dearth of archaeological information that is currently available for the alpine zones around North Park. This situation results, at least in part, from a lack of cultural resource survey in these areas, which in turn reflects the fact that Section 106 and other projects that would trigger such inventories are fairly rare in the alpine zone. Nonetheless, it is clear that all of the high-altitude areas around North Park were utilized by American Indians, Settlers, or both, and therefore may contain a variety of cultural resources that can add to our understanding of human behavior and alpine landscape use. Moreover, previous work in the Medicine Bows, in particular, demonstrates that a research-oriented approach to investigation of alpine landscapes can result in the identification

of numerous archaeological resources containing a wealth of important information about the past. The results of this project further document that targeted survey of specific high-probability areas is an efficient and productive way to identify archaeological remains, even in regions where human activity was sporadic and resources are accordingly rather sparse.

Given the high density of resources in the Rawah Wilderness on the eastern slopes of the Medicine Bows, future alpine research should focus in part on the land owned by the Colorado State Forest that lies directly to the west of this area, as well as the largely unexplored region to the north in the MBR. The sheltered valleys around Kelly Lake, Jewel Lake, Clear Lake, and other similar areas, are particularly promising targets for future investigation on the western side of the Medicine Bows. Additional work in the Park Range, Rabbit Ears Range, and Never Summer Mountains is also warranted, although the current state of the alpine record suggests it may be somewhat less productive, so particularly close attention should be paid to identifying specific high-probability survey areas during the planning phase of these projects. Once again, work in these mountains should concentrate heavily on alpine lakes, meadows, ridges, and other potential high-probability landforms and largely avoid regions where such features do not exist. Ultimately, this sort of targeted regional investigation of alpine ecosystems and collection of additional archaeological data will reveal new and important information about how both American Indians and Settlers utilized North Park and the surrounding landscapes in the past.

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