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Historical Trails Research on the West Side of the San Luis Valley, Saguache and Rio Grande Counties, Colorado

Edited by Christopher M. Johnston

Research Contribution 117
Archaeological Investigations in the San Luis Valley 7

PCRG
PaleoCultural Research Group

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Edited by
Christopher M. Johnston

With Contributions By

Christopher A. Davis
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Mark D. Mitchell
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2020

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Abstract

The Old Spanish National Historic Trail (OSNHT) was officially designated in 2002. The OSNHT was a pack route primarily used in the early to mid-nineteenth century by merchants traveling between Santa Fe and Los Angeles to exchange blankets and other woolen goods for horses and mules. The routes these pack caravans traveled were blazed in the late eighteenth century, and many perhaps centuries earlier by American Indians. The Old Spanish Trail (OST) was not just one route but instead a braided system of trails that took many divergent paths. The Main Route drifted northwest from Abiquiu towards central Utah, where it turned west across the Mojave and ending up in the Los Angeles Basin. In addition to this main route there were many lesser used routes that followed different paths but ultimately linked Santa Fe and Los Angeles.

One of these lesser known routes is the West Fork of the North Branch, which traveled north from Ohkay Owingeh (San Juan) in New Mexico, then further north along the west side of the San Luis Valley in Colorado where it ultimately joined the East Fork of the North Branch near Saguache, and then continued on ultimately joining the main route near Green River in Utah. Unlike other sections of the OST, little is known about the West Fork and it was not included in the OSNHT designation, due in large part to a lack of evidence for use during the period of significance for the trail (1829-1848). Few archaeological investigations have been conducted specifically around the West Fork, likely in large part due to not being included in the OSNHT designation.

In the summer of 2017, Paleocultural Research Group, in partnership with the Bureau of Land Management, conducted a citizen science project focused on historical trails research on the west side of the San Luis Valley. The research was done in two parts. First, field crews conducted survey to see if historical trails were present in the area and could be seen during pedestrian survey. Second, using geospatial data such as lidar and historical maps, the research team set out to build a framework for future research on the West Fork and historical trails in the San Luis Valley.

Field crews documented five archaeological sites, nineteen isolated finds, and noted an additional eleven site leads. Two of the sites contain linear features, although the field research could not conclusively link them or any of the other resources to the West Fork. Using geospatial data, the research team identified 30 linear features that could plausibly be trail traces, or swales, which may be related to the West Fork. Future research can utilize these combined datasets to advance historical trails research in the San Luis Valley, and specifically to continue the investigations on the West Fork.

Major funding for this project was provided by the U.S. Department of the Interior Bureau of Land Management. 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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Table of Contents

List of Tables

List of Figures

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Gratitude to the staff at the Colorado Office of Archaeology and Historic Preservation, especially Stephanie Boktor, Sarah Rothwell, and Kallie Sanders, for promptly providing file search documents and offering insights on potential recorded segments of the Old Spanish Trail in the San Luis Valley. Finally, a special thanks to our four volunteer crew members: Jeff Brown, Jake Dupree, Alex Wesson, and Greg Wolff. PCRG volunteers make projects happen and valuable archaeological research could not happen without their dedication, stewardship, and positive attitude. Thank you to all involved for making this project a success.

About the Contributors

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*.

Dr. Chris Davis is a Project Archaeologist for Paleocultural Research Group 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.

Dr. Mark D. Mitchell is Research Director for Paleocultural Research Group. His research explores the archaeology of two different regions: the Northern Plains in western North Dakota, and the Southern Rocky Mountains in Colorado and New Mexico. Mitchell's Southern Rockies research focuses on American Indian mobility and land use in the San Luis Valley and adjacent mountains. He is particularly interested in how technological and environmental change affected native peoples' economic decisions. Mitchell's Northern Plains research focuses on the political and economic development of post-A.D. 1200 farming villages of the Missouri River valley. He also studies historic American Indian rock art and the history of archaeology. Mitchell's research has appeared in *Plains Anthropologist*, *Antiquity*, *American Antiquity*, *Southwestern Lore*, *Colorado Archaeology*, *Quaternary International*, and in a number of book chapters. He is the author of *Crafting History in the Northern Plains: A Political Economy of the Heart River Region, 1400-1750* (University of Arizona Press, 2013) and co-editor of *Across A Great Divide: Continuity and Change in Native North American Societies, 1400-1900* (University of Arizona Press, 2010).

Amy Nelson was a Project Archaeologist for Paleocultural Research Group, a position she began in August of 2016. Previously, she served as a Project Director at Metcalf Archaeological Consultants (MAC) where her role included conducting inventory, data recovery and monitoring projects as well as supervising field technicians and project reporting. She joined MAC in 2005 as an archaeological field technician. Since that time, she has worked in many of the western states and has supervised survey and data recovery projects in Colorado, Utah, and Wyoming. She has also been involved in an ongoing project in the Kingdom of Jordan and in the Boundary Waters Canoe Area Wilderness. Ms. Nelson is currently working toward a Master's of Science degree in Anthropology/Cultural Resource Management Archaeology at St. Cloud State University in Minnesota. Amy is now retired, although still occasionally dabbles in archaeology when not traveling.

1

Introduction

Christopher M. Johnston, Mark D. Mitchell, and Amy Nelson

Rarely can three simple words simultaneously evoke a clear and vivid image yet also be near-wholly inaccurate, but the phrase "Old Spanish Trail" does just that. In their 2001 feasibility study on the Old Spanish Trail (OST), the National Park Service (2001:5) notes the common saying that the OST was neither "old" nor "Spanish". The first use of the name appears to have come from John C. Frémont in the 1840s. Journal entries from travelers along or near the trail (Heap 1854; Ruffner 1874) simply refer to it as the "Spanish Trail", as Frémont did, because at the time it was obviously not "old". The OST also was not a trail, at least in the modern thinking of the term. Instead, as Merlan and others (2011:10) note, the OST was a "braided system of roads in a corridor or path of least resistance, not a single track".

It may have been historians Leroy and Ann Hafen who popularized the phrase 'Old Spanish Trail' in their 1954 seminal review of the trade route between Santa Fe and Los Angeles. The Hafen's (1993:19) branded the OST as the "the longest, crookedest, most arduous pack mule route in the history of America." During the trail's heyday in the 1830s and 1840s, traders used its braided routes to carry New Mexican blankets and other woolens to California, where they were exchanged for horses and mules (figure 1.1). Merchants in Santa Fe sent annual trading caravans over the trail to Los Angeles beginning in 1829. Caravan traffic ended in 1848 with the Mexican Cession following Mexico's defeat in the Mexican-American War.

The routes that the caravans would eventually travel were blazed in the closing decades of the eighteenth century and the opening decades of the nineteenth century by explorers, fur trappers, and likely even earlier by

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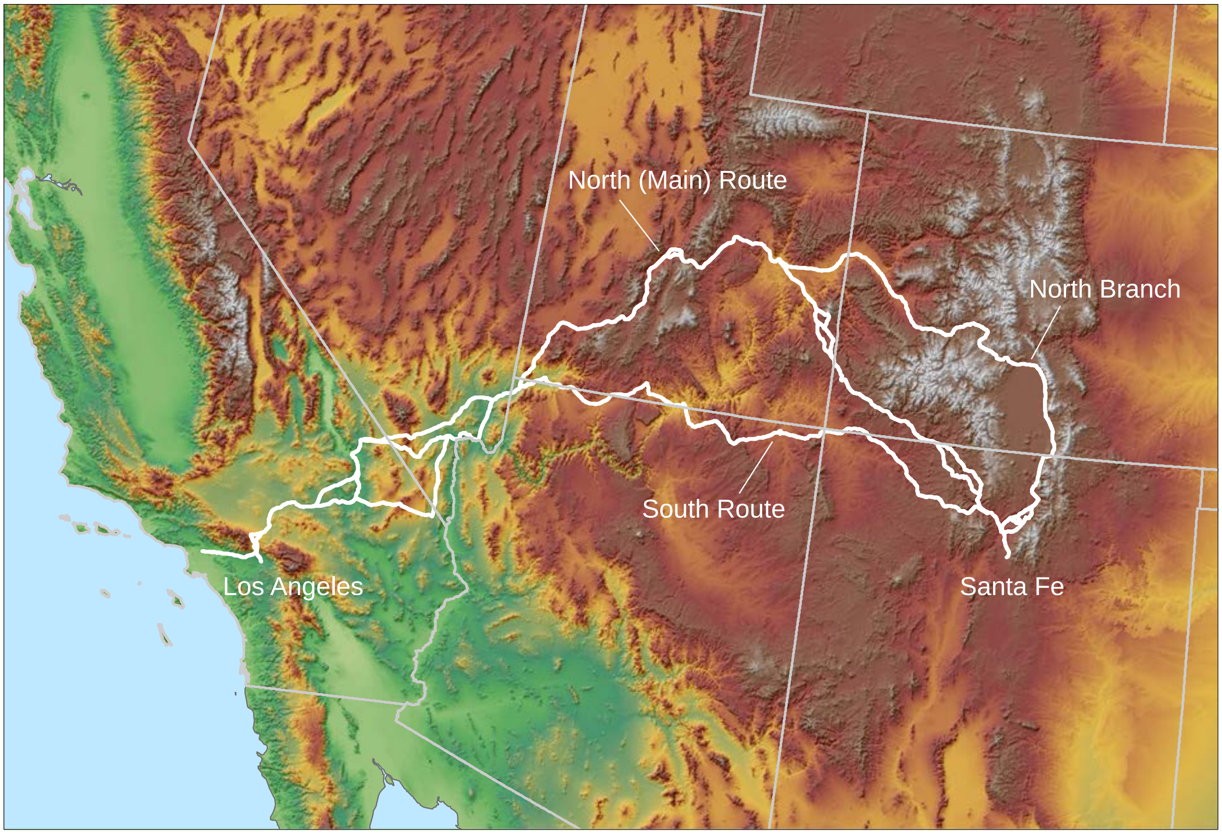

Figure 1.1. Map showing the routes of the Old Spanish Trail from Santa Fe, New Mexico, to Los Angeles, California. The illustrated routes represent the Congressionally designated Old Spanish National Historic Trail (NPS 2001; spatial data provided by National Park Service, National Trails Intermountain Region, electronic dataset, https://irma.nps.gov/DataStore/Reference/Profile/2238915, accessed September 15, 2019).

American Indians. Although they shared mercantile objectives their efforts were mostly uncoordinated, resulting in a tangled network of trails rather than a single well-defined route.

One such trail is the lesser known West Fork of the North Branch—hereto referred to as the West Fork—which extended from Ohkay Owingeh (San Juan) Pueblo to Ojo Caliente in New Mexico, then further north along the west side of the San Luis Valley in Colorado where it ultimately joined the East Fork of the North Branch near Saguache (figure 1.2). The West Fork of the North Branch is not included with the National Historic Trail Designation for the OST. Investigations on the West Fork became the focus of a cooperative citizen-science project carried out in the summer of 2017 by Paleocultural Research Group (PCRG), a nonprofit research and education organization, and the Bureau of Land Management's San Luis Valley Field Office.

Finding the Old Spanish Trail

The Hafens' evocative description of the trail also neatly summarizes the challenges archaeologists face in finding traces of the OST on the modern landscape. The most important element of their definition that has implications for the archaeology of the OST is the fact that it was a pack mule route. Unlike many historic trail routes—such as the contemporaneous Santa Fe Trail that connected Franklin, Missouri with Santa Fe—wagons or other wheeled vehicles were seldom used on the OST. Consequently, the original trails of the OST are rarely marked today by the swales or other landscape features that are characteristic of trails pioneered by freighters or immigrants. In fact, the route of the OST was faint even during its period of use. Locating the actual routes of the OST today therefore depends on circumstantial rather than direct evidence, including identification of swales produced by the wagons of explorers who were

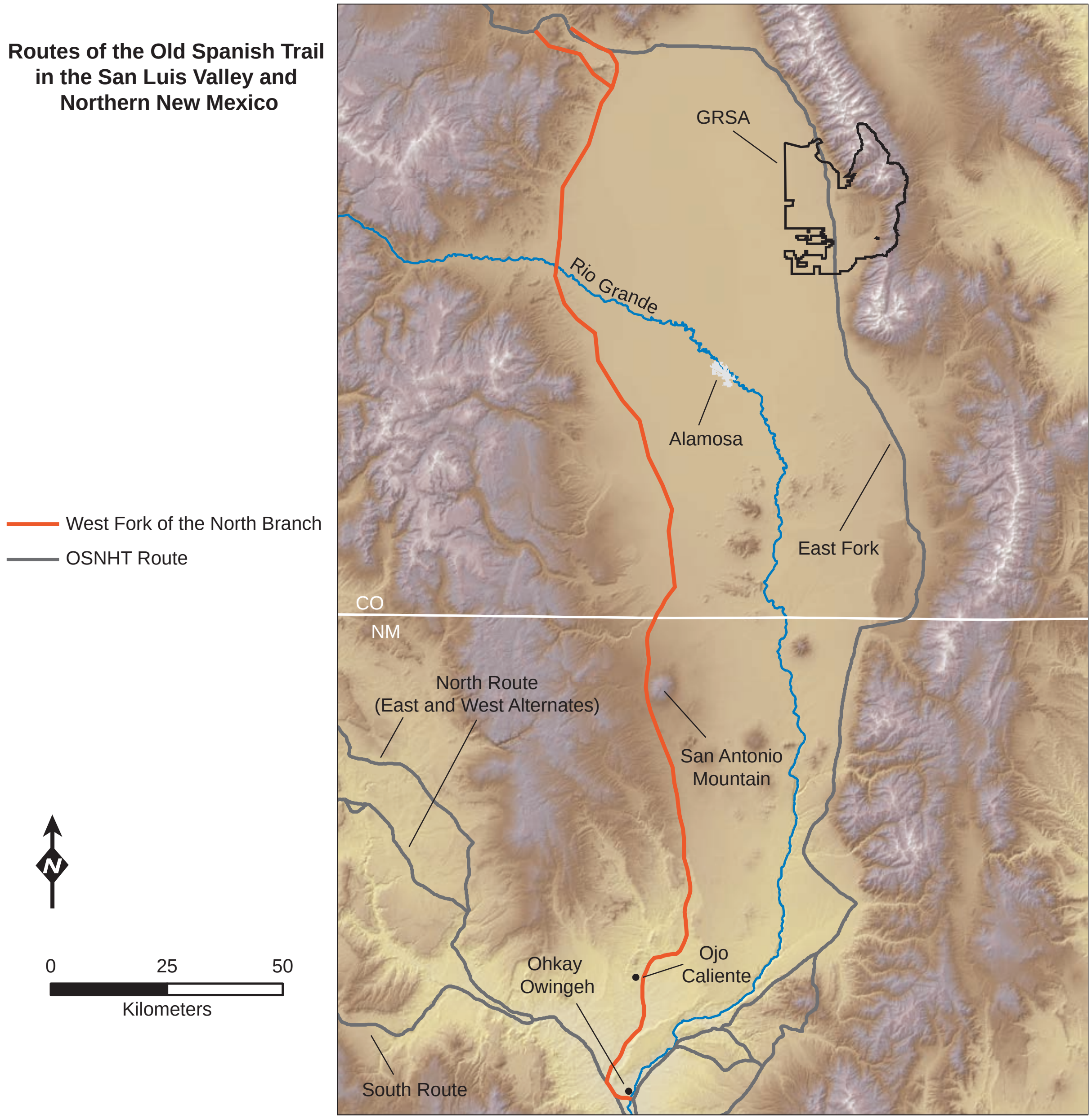

Figure 1.2. Map showing the different routes of the Old Spanish Trail leaving from near Ohkay Owingeh (San Juan Pueblo), highlighting the East and West Forks of the North Branch.

following the original track of the OST or by those of the earliest settlers along its course. The locations of explorers' camps and early settlements can also provide important clues.

Another element of the Hafens' description that has implications for the archaeology of the OST is its arduousness and crookedness. OST travelers navigated a rugged and inhospitable landscape that included mountain passes, major rivers, and waterless deserts. Seasonal variations in river flow, snowpack, and water availability dictated the use of alternate routes. Changing political economic relationships among traders and the many American Indian groups who lived astride the trail also influenced route selection. Moreover, the trail shifted course over time, as traders sought simpler or safer shortcuts. As a result, the OST eventually included multiple primary travel corridors as well as numerous variant routes spanning roughly 4,300 km (2,700 miles).

The first of the annual caravans, led by Antonio

Armijo in 1829, followed what is known today as the Armijo or South Route that ran west from Abiquiu, New Mexico, picking its way across the canyon country of northern Arizona, then angled southwest across the Mojave to Los Angeles. Sections of what would become the more commonly used North or Main Route of the OST were pioneered by Franciscan missionaries Francisco Atanasio Domínguez and Silvestre Vélez de Escalante. The Main Route drifted northwest from Abiquiu, arced through south-central Utah, then paralleled the Armijo Route across the Mojave. The longest and least well-traveled route is known as the North Branch—including both the East and West Forks through the San Luis Valley—which ran northeast from Santa Cruz through Taos and into the San Luis Valley, then west-northwest through the Southern Rockies to a junction with the Main Route near the Green River crossing.

Many segments of the OST either connected to other trails or were used for purposes other than the Santa Fe-Los Angeles caravan trade. For example, the southern sections of the North Branch were also known as the Trappers Trail or Taos Trail, which connected the Arkansas and Platte river basins of eastern Colorado with the Rio Grande basin. The western end of the North Branch connected to trails that ran northward into the Uinta Basin and beyond. The western half of the Main Route would become the Mormon Road and eventually the Los Angeles-Salt Lake Road. In addition, many sections of the OST also carried local traffic, both during and after the caravan period.

Thus, locating physical evidence of the OST today is a complex, iterative task. The first steps primarily involved historical research, including analyses of trapper's journals and trader's itineraries. Descriptions contained in the detailed reports produced in the 1850s by U.S. government expeditions were especially important for initial route identification. More recent work has involved the use of geographic information systems (GIS) to analyze terrain features along the identified routes and to compare them with historical descriptions. GIS analyses also incorporate early maps, such as General Land Office (GLO) plats, as well as recently acquired remote sensing data, such as surface models derived from lidar data.

However, positive identification of the trail route ultimately requires on-the-ground pedestrian inventories to identify swales or other landscape features as well as artifacts discarded by trail travelers or the explorers and settlers who followed them.

The Old Spanish National Historic Trail

National historic trails "follow as closely as possible and practicable the original route or routes of travel of national historical significance" (NPS 2001:1). The goal of a national historic trail designation is to identify and protect for public use and enjoyment remnants of a historic route. The United States Congress in 1996 authorized a study to evaluate the eligibility of the Old Spanish Trail for a national historic trail designation and the feasibility of doing so. To be eligible, trail routes must meet three criteria: they must have been established by historic use; they must be nationally significant; and they must have potential for public recreational use or historical interpretation. The route need not currently exist as a discernable landscape feature, but its location must be sufficiently well documented to permit public recreation and interpretation.

The National Park Service (NPS) completed its OST feasibility study in 2001 and Congress added the Old Spanish National Historic Trail (OSNHT) to the National Trails System in 2002 (Public Law No. 107-325; 16 USC 1244). The law set limits on the acquisition of new property for the trail, directed the Secretary of the Interior to consult with federal, state, and local agencies on trail-related planning and development, and provided a mechanism for designating additional OST segments.

The Secretary of the Interior designated the NPS and the Bureau of Land Management (BLM) as co-administrators of the OSNHT and the two agencies subsequently developed an administrative plan for its entire length, including segments managed by a wide variety of agencies (BLM and NPS 2017). The administrative plan identifies cooperative partners, interpretive and education themes, key sites and resources, and processes for ongoing consultation. Although the national historic trail designation and the administrative plan recognize the complex history of the OST, the defined period of significance only spans the years between 1829, when Armijo pioneered the southern caravan route, and 1848, when both New Mexico and California were ceded the United States under the terms of the Treaty of Guadalupe Hidalgo.

The West Fork of the North Branch was recognized in the NPS OST feasibility study finalized in 2001; however, it was not included in the final National Historic Trail designation (Merlan *et al.* 2011:74). The primary reason was that evidence of its use for trade and commerce between the period of significance for the trail (1829-1848) could not be found. According to Public Law No. 107-325, Section 2, Subsection F, the Secretary of the Interior can add additional routes if: "(i) the additional routes were included in the Old Spanish Trail National Historic Trail Feasibility Study, but were not recommended for designation as a national historic trail; and (ii) the Secretary determines that the additional routes were used for trade and commerce between 1829 and 1848." Thus, since the West Fork was recognized in the feasibility study, evidence would need to be found that can link trade and commerce activity on this section of the trail during the period of significance. The most obvious ways to do this would be to uncover journal entries of travelers on the trail that make explicit references to sections of the West Fork, or to find artifacts that can be conclusively linked to the period of significance and that represent a link to trade and commerce. This is no small task, and perhaps a seemingly impossible one to accomplish. However, the first step in any of this is finding evidence of the West Fork trail itself.

Superimposed Trail Traces

Especially in areas where terrain constricts travel, the route of the OST often overlaid earlier tracks and, in turn, was overlain by more recent tracks. This palimpsest of transportation traces is evident along many portions of the OST, such as the Miranda Valley tracks of the North Branch in northern New Mexico (Blumenschein 1968; Hawk 2005-2011, 2009; Johnston 2019; Merlan *et al.* 2011). Even before the arrival of European colonists in the Americas the Miranda Valley was an important travel corridor connecting the Northern Tiwa communities of Taos Pueblo and Picuris Pueblo. Habitation sites, toolstone quarries, and artifact scatters attest to earlier occupancy by American Indians. More recently, the valley was an important travel corridor for Spanish colonists, possibly beginning as early as 1598. Don Diego de Vargas certainly used the road in the 1690s, during his reconquest of the Rio Grande valley following the 1680 Revolt. Throughout the eighteenth century, the Miranda Valley was one of the main routes between Santa Fe and Taos, an extension of the Camino Real that linked New Mexico with the colonial capital. Thus, when OST caravan traffic began in 1830s, the Miranda Valley was already a well-worn route.

Before the caravan traffic ceased, the road had been improved to permit the passage of wagons; U.S. Army Colonel Sterling Price hauled wagon-mounted artillery through the Miranda Valley during the Taos Revolt in 1847. The importance of the Miranda Valley Road diminished after the U.S. Army built a route closer to the Rio Grande in 1875. However, the valley was still used for local traffic and for resource procurement, including timber harvesting.

Superimposed trail traces have also been documented along sections of the OST North Branch in the San Luis Valley and further west along the trail. For instance, Zachman and Pfertsh (2011) note multiple instances of the OST being modified, disturbed, or completely covered by later historical and modern uses along sections of 5SH3832, the presumed OST North Branch route in Saguache County. A particularly striking example of this was also found during the same project in the Fools Hill Analysis Unit west of Delta, Colorado. Here, Horn and others (2011:36) found where the pack trail went up and over an obstruction that the later Salt Lake Wagon Road went around. As they note, the "pack trail leaves and rejoins the later wagon road, confirming that the wagon road was built on top of the earlier pack trail except where wagon travel was impractical" (Horn *et al.* 2011:36). This was likely not an isolated instance, including on sections of the West Fork where major wagon roads and later roads and highways are likely to have impacted many sections of the trail.

Project Overview

In the summer of 2017, PCRG conducted a reconnaissance inventory to identify trail segments, features, or artifacts associated with the West Fork in Saguache and Rio Grande counties for the Bureau of Land Management San Luis Valley Field Office (BLM-SLVFO) under Section 110 of the National Historic Preservation Act (NHPA; 16 U.S.C. 470). Major funding for the work was provided under agreement number L15AC00240-0004.

PCRG Research Director Mark Mitchell was the project's principal investigator. PCRG Project Archaeologist Amy Nelson served as field director and was assisted by crew chief Britni Rockwell. Volunteer crew members included Jeff Brown, Jake Dupre, Alex Wesson, and Greg Wolff. Project staff and volunteers devoted a total of 23-person days to the field project, 56.5 percent of which were donated. Neslon and Rockwell coordinated the initial review and summary of the field data. PCRG Operations Director and Project Archaeologist Chris Johnston, along with Project Archaeologist Chris Davis, took over the project after Nelson's retirement from the organization and finalized the field data and completed the final report, with additional contributions by Mitchell.

The project had two primary goals. The first was to use pedestrian survey to determine if any potential historical trail traces were visible in the project area. While the goal was to link potential trail segments to the West Fork, this phase of the project was intended to be a test case to show whether finding trail traces in this area was even feasible. As discussed earlier in this chapter, and as will be shown in this report, making a definitive link to the West Fork specifically, and the OST more broadly, requires direct evidence that can be difficult to obtain. Results of the fieldwork are presented in chapter 2.

The second phase of this research project was to use a variety of geospatial data to identify potential trail segments and areas for future survey to further the goal of finding segments of the West Fork. These data included General Land Office (GLO) plat maps, 1:24,000 USGS quadrangle maps depicting modern or recent roads and trails, previous archaeological site recordings, and lidar data. Fortunately, lidar data are available for the entire area around the proposed route of the West Fork and allow for a detailed look at microtopographic features of the landscape and can often reveal trail traces that are not visible on the ground surface. Previous research by PCRG on the OST in New Mexico (Johnston 2019) has shown that lidar data are an invaluable tool for uncovering previously unknown trail segments. Chapter 3 provides a more thorough synthesis of this phase of the project. The project findings are summarized in chapter 4, including National Register of Historic Places (NRHP) recommendations and directions for future research.

History of Research and Existing Data

Prior to undertaking fieldwork, PCRG obtained a GIS shapefile from Doug Simon, GIS Specialist for the BLM SLVFO, showing a proposed route of the West Fork. According to Simon (personal communication, July 15, 2020), the proposed route was compiled approximately 15 years ago and was based upon research conducted by Ron Kessler, a local historian and member of the Old Spanish Trail Association. Simon accompanied Kessler on a tour of known or hypothesized sites where the West Fork may have been. Simon then used the data he collected on this tour, coupled with old plat maps, to build this proposed route that was then discussed with other members of the Old Spanish Trail Association and ultimately refined into the GIS layer he supplied to PCRG. As Simon noted, all parties agreed that these are possible, or even probable, locations for the West Fork but not to the "level of peer-reviewed empirical data". Even so, the proposed route does represent a starting point that ground-truthing and additional research can build from.

PCRG conducted a file search with the Office of Archaeology and Historic Preservation (OAHP). As a Section 110 project, there was no defined area of potential effect (APE) that define boundaries for Section 106 projects. Thus, as shown in figure 1.3, a 4-km buffer was used around the BLM proposed route as the limits of the file search, an area that covers 1,361 km^2 (336,449 acres). One previously recorded site was within parcels planned for inventory (see chapter 2 for more information on the survey methodology). 5RN230 is a single rock cairn recorded in 1980 by the San Luis Archaeological Project. At the time of its original documentation, the site was recommended as needs data. As discussed in chapter 2, 5RN230 was revisited during the 2017 fieldwork.

According to the file search data, about 17,930 acres, or roughly five percent of the file search area, have been surveyed. Surveys were conducted for, and by, numerous organizations and agencies, including the BLM, Forest Service, U.S. Fish and Wildlife, Natural Resources Conservation Service (NRCS), and multiple cultural resource management firms.

Over one thousand previously identified resources occur within the file search area, including 501 sites and 532 isolated finds (table 1.1). Just over 40 percent of the sites are associated with either American Indian or Settler occupations of the area, while about 10 percent have both American Indian and Settler components. About 65 percent of the isolated finds are American Indian, while only about 25 percent are Settler. A variety of American Indian site types were

Table 1.1. Distribution of resources by affiliation within the file search area.

Resource Affiliation	Sites	Isolated Finds	Total
American Indian	206	347	553
Settler	212	130	342
Multicomponent	54	37	91
Unknown/Not Listed	29	18	47
Total	501	532	1,033

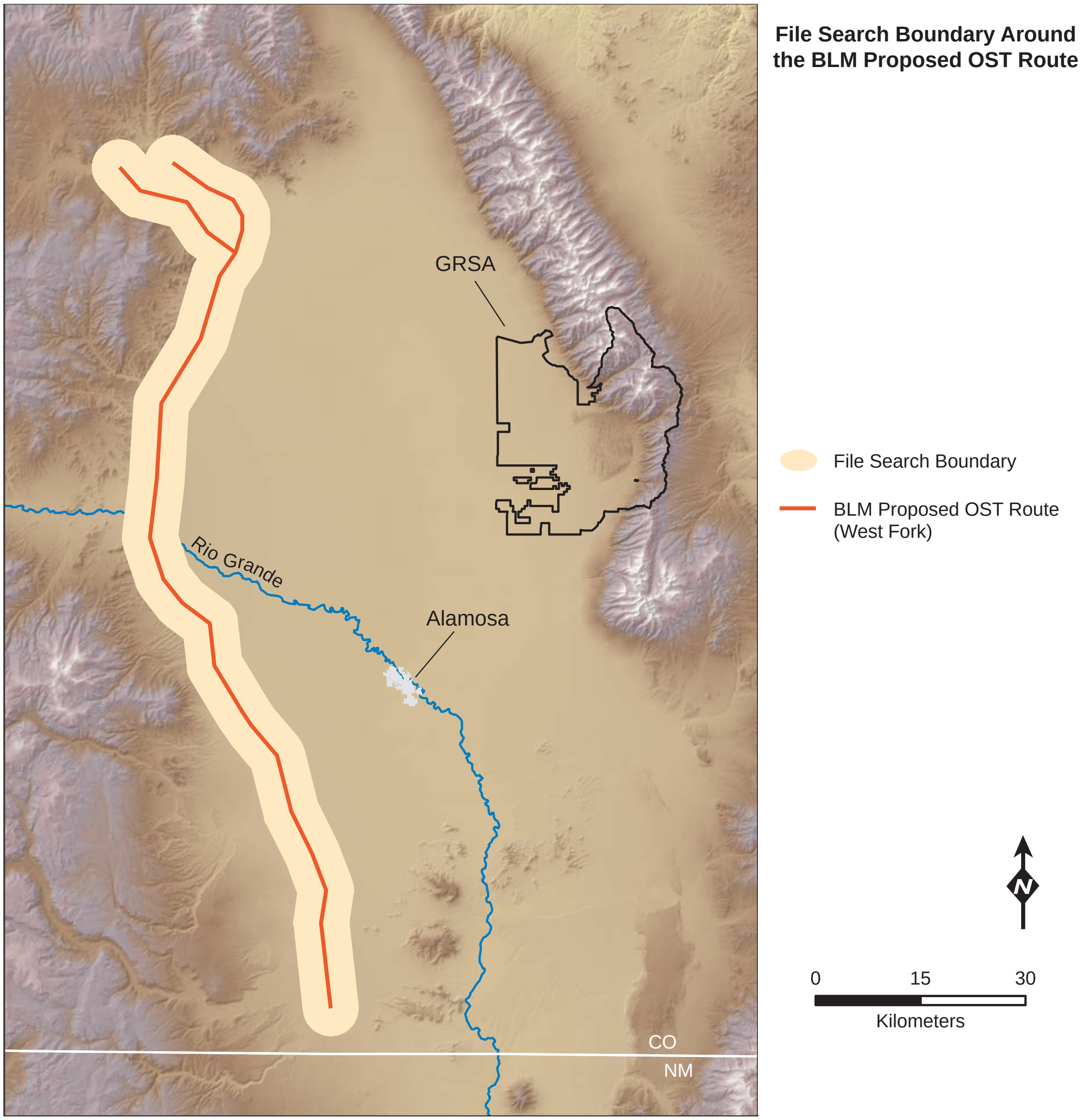

Figure 1.3. Map showing the file search boundary and the proposed route of the West Fork, along with relevant administrative boundaries noted in the text.

noted, including open and sheltered lithic scatters, open and sheltered camps, rock art sites, and stone enclosures. Settler sites included an even broader array of site types, including artifact (trash) scatters, roads and bridges, structures of various types, ranches and homesteads, ditches and canals, various camps, a stock driveway, and wagon ruts.

Table 1.2 summarizes the NRHP eligibility data on the 501 sites in the file search area. The isolated finds are all considered not eligible. Eligibility data ranges from officially eligible or not eligible, to field recommendations without a documented official designation, to needs data (both officially and field recommended). Data on NRHP eligibility were not available for 16 percent of the sites. Ninety-nine resources are officially eligible, which includes fifteen settler sites and one multicomponent site already listed on either the State or National Register. A further 36 more are recommended as eligible without an official determination. Eligible site types are quite variable,

Table 1.2. Summary of NRHP eligibility data on sites in the file search area.

	Resource Affiliation				
Eligibility	American Indian	Settler	Multicomponent	Unknown/Not Listed	Total
Officially Eligible	35	42*	19*	3	99
Field Eligible	18	14	4	-	36
Officially Needs Data	11	7	1	-	19
Field Needs Data	57	16	3	2	78
Officially Not Eligible	63	70	26	3	162
Field Not Eligible	6	17	-	3	26
No Assessment Given	16	46	1	18	81

*Includes 15 Settler sites and one multicomponent site listed on the National or State Registers.

including American Indian open and sheltered camps, rock art sites, and open and sheltered architectural sites. Eligible Settler site types are also quite variable, including ranches and homesteads, camps and trash dumps, ditches and canals, and various other feature types.

In addition to previous fieldwork undertaken in the project area, PCRG acquired maps from BLM Realty Specialist Jeff Brown depicting the location of cairns in the project area. Brown believed that a series of cairns in the vicinity of the proposed trail corridor represented OST route markers. Brown has visited cairn locations but has not documented them on Colorado Cultural Resource Survey forms. PCRG georeferenced the maps supplied by Brown to plot out cairn locations near proposed survey parcels and visited some. A variety of features have been shown to possibly mark the various routes of the OST, including cairns and blazes (Hawk 2005; Johnston 2019). However, it can be almost impossible to link cairns to a specific event or function, particularly in the San Luis Valley where cairns are ubiquitous features across the landscape. PCRG visited some of the cairns Brown had noted but as shown in chapter 2, none could be linked to the West Fork. A more systematic approach to surveying and documenting stone cairns is needed before they can be linked to any possible association with the OST.

Research on the West Fork

Little archaeological work has been done on finding and documenting the West Fork, in many ways likely due to it not being included in the National Historic Trail designation. Kessler (1998) summarizes some historical research on the West Fork. Merlan and others (2011:76-77) summarize the limited fieldwork done on the West Fork in northern New Mexico, including work on the Tres Piedras District of the Carson National Forest by Michael Kyte (2009). A brief discussion of a Passport in Time (PIT) project led by Kyte in 2010 is also noted. Unfortunately, attempts to gain access to these reports from the Carson National Forest were unsuccessful and the New Mexico Cultural Resources Information System (NMCRIS) staff reported they had record of the 2009 project but do not have reports for the projects on file. Future work on the West Fork should attempt to obtain copies of these reports from the Carson National Forest Heritage staff.

In Colorado, a few documented sites report a possible association with the West Fork, but none are definitively linked to the trail. Site 5SH4143.1 is a linear segment likely associated with the old Del Norte to Saguache road depicted on the 1873 GLO map (Landt *et al.* 2012:20-22). This road is thought to have been preceded by a trail used during the Beale Expedition, which came through the area in 1853 and where Heap (1854) clearly describes prominent landscape features on the western edge of the San Luis Valley in his journal entries. In 1858, Colonel Loring's Expedition also travelled through the area and followed an existing trail, likely the same one used by the Beale expedition five years earlier (Hafen 1946), which would indicate the trail was fairly well established and could be the West Fork.

Two other previously recorded linear segments in Saguache County, the Elephant Rocks Wagon Tracks (5SH4374.1 and 5SH4374.2), may also be associated with the West Fork. Both sites were recorded in 2011 by BLM archaeologists conducting Section 110 fieldwork with the aim of refining data on the West Fork (Brown 2014; Frye and Beats 2011a, 2011b). Both segments have wagon ruts incised into the bedrock roughly 20-25 cm deep. On the site form, Frye and Beats (2011a, 2011b) note the segments are possibly associated with the West Fork, and later the Conejos Wagon Road. They also highlight the Del Norte to Saguache Road on the GLO map as "in the area". When compared to a georeferenced GLO map, the Del Norte to Saguache Road goes directly through the boundary of 5SH4374.1 and is only about 30 m west of the center of the 5SH4374.2 boundary, indicating both are likely associated with the same road as 5SH4143.1 (which is plotted roughly 230 m west of the georeferenced GLO route). As noted earlier, and as Brown (2014:20) indicates, wagons were not a feature of the OST but ruts often overlay earlier pack routes.

In Rio Grande County, one site is also listed as possibly associated with the West Fork. The Limekiln Wagon Tracks Site (5RN539.1) was first documented in the 1990s by the BLM and contains two sets of wagon ruts incised into the bedrock, similar to the Elephant Rocks Wagon Tracks site. The site also contains an interpretive sign indicating an association with the Old Spanish Trail. Again, wagon ruts argue against an association with the OST except that it is documented elsewhere that the routes were reused by later travelers. An additional segment of 5RN539 was documented during the 2017 PCRG survey and is discussed more in chapter 2.

All four of the linear segments described here were noted in the lidar data presented in chapter 3. As discussed more in chapter 3, all previous site recordings and GLO road layers were deliberately turned off during the initial examination of the lidar data. The segments were such prominent features in the lidar data they were documented without additional assistance, highlighting how future work on the West Fork and other historical trails research will benefit from thorough examination of lidar data.

Environmental Context

The San Luis Valley is the largest of the basins making up the Rio Grande Rift, a tectonic depression extending from southern Wyoming, through central Colorado, into the state of Chihuahua, Mexico (Chapin 1979; Kellogg *et al*. 2017). At broad structural scale, the San Luis Valley is a tilted half-graben, bracketed on the east by major faults along the foot of the Sangre de Cristo Mountains and on the west by a broad hinge east of the San Juan Mountains (McCalpin 1996).

Geologists commonly partition the San Luis Valley into four or five physiographic subregions (McCalpin 1996; Upson 1971). The largest is the Alamosa Basin, which encompasses the internally drained (closed basin) northern portion of the valley as well as the broad alluvial fan of the Rio Grande. The southern portion of the valley is partitioned into the Culebra Reentrant, the Costilla Plains, and the Taos Plateau. Some authors also isolate the San Luis Hills, a series of mesas and buttes located between the Alamosa Basin and the three southern subregions (Upson 1971).

Archaeologists partition the valley floor into just two subareas: the closed basin north of the Rio Grande and the open basin south of the Rio Grande (Hoefer 1999a). In the closed basin, which has no natural hydrologic connection to the Rio Grande, the extent of surface water in the form of lakes, wetlands, and streams varies seasonally, annually, and at longer time intervals. In the open basin, a series of permanent tributary streams flow cross the valley floor, including the Alamosa, Conejos, and San Antonio rivers on the west and Culebra and Trinchera creeks on the east. Archaeologists further partition the uplands surrounding the valley into the Sangre de Cristo subarea on the east side of the valley and the San Juan subarea on the west (Hoefer 1999a).

Miocene- and Pliocene-age deposits composed of interbedded gravels and fine-grained sediments (the Santa Fe and Alamosa formations) fill the San Luis Valley. The dramatic topographic relief between the valley floor and the crest of the Sangre de Cristo Mountains is a product of faulting that likely began after 15 million years ago (Madole *et al*. 2008). Quaternary fault scarps visible in the bajada on the western toe of the Sangre de Cristos point to ongoing uplift; the most recent displacements date to between 10,000 and 13,000 B.P. and to 7600 B.P. (McCalpin 1983).

Climate

The climate of the San Luis Valley is semi-arid (table 1.3). Mean annual precipitation on the valley floor varies from about 18.5 to 24 cm. Much of this precipitation occurs during the summer monsoon, principally in July and August. Precipitation is much higher in the adjacent mountains: at Platoro in the eastern San Juans (at an elevation of about 3430 m), mean annual precipitation is 106.7 cm (27.1 in) (Western Regional Climate Center 2020).

Temperature in the San Luis Valley varies seasonally, but the mean annual high temperature is only about 60 degrees F (16 degrees C). Mean annual lows are about 25 degrees F (-3 degrees C). As a result,

Table 1.3. Climate data for three weather stations on the floor of the San Luis Valley (Western Regional Climate Center 2020).

	Weather Station		
Variable	Manassa (055322)	San Luis 1E (057430)	Blanca 4NW (050776)
Period of Record	1893-2016	1980-2006	1909-2010
Elevation (m)	2344	2432	2364
Mean Annual Maximum Temperature (°F/°C)	59.6/15.3	58.7/14.8	59.0/15.0
Mean Annual Minimum Temperature (°F/°C)	25.6/-3.6	26.0/-3.3	25.4/-3.6
Mean Annual Total Precipitation (in/cm)	7.27/18.47	9.58/24.33	8.56/21.74
Mean Annual Total Snowfall (in/cm)	24.8/63.0	20.0/50.8	24.3/61.72

the growing season is just 120 days long (Hoefer 1999a). The temperature gradient between the valley floor and the foothills and higher peaks is weak; the valley commonly is cooler in winter and warmer in summer than are the surrounding uplands, but not dramatically so (Hoefer 1999a).

Paleoclimate

Both high- and low-resolution data are available for reconstructing the ancient climate of the San Luis Valley (Grissino-Mayer *et al.* 1998; Jodry 1999b; Machette and Puseman 2007; Madole *et al.* 2008; Martorano 1999b). Low-resolution data consist of sediment cores from both high- and low-elevation lakes, as well as stratified terrestrial deposits. High-resolution data consist primarily of tree-ring sequences. High-elevation lake cores primarily preserve sediment dating to the Pleistocene-Holocene transition and the early Holocene. Low-elevation lake cores and terrestrial strata primarily preserve a late Holocene record. The tree-ring record spans the last millennia. Thus, a significant mid-Holocene gap exists in the paleoenvironmental record.

Pinedale (Wisconsinin) glaciers began retreating in the San Juan Mountains about 16,000 B.P. and had disappeared entirely by about 10,500 B.P. (Carrara 2011). Following a glacial advance during the Younger Dryas stadial, timberline in the Sangre de Cristo Mountains advanced upslope between 10,000 and 9000 years ago, signaling the onset of warmer temperatures and summer-dominant precipitation (Jodry 1999b). Piñon pine pollen first appears in sediment dating to about 9,500 B.P. from Como Lake, located south of Great Sand Dunes National Park and Preserve (GRSA) at about 3,700 m, possibly indicating the first appearance of that species in the San Luis Valley. However, Emslie and others (2014) cast doubt on this interpretation and conclude that the timing of piñon migration into the Rio Grande basin is currently unknown.

The climate of the San Juan Mountains was warmer and wetter that at present from about 8000 B.P. to 4000 B.P. (Adams and Peterson 1999; Carrara 2011). From about 9200 B.P. until 5800 B.P., upper treeline and timberline in the San Juans was at least 80 m, and possibly as much as 140 m, higher than at present (Carrara 2011). Treeline likely was near its present position between 5400 B.P. and 3500 B.P. The elevation of treeline may have decreased below its modern location after 3500 B.P. Data from Como Lake in the Sangre de Cristo Range point to relatively dry conditions between 7000 and 5500 B.P. (Martorano 1999b). The pool elevation of Head Lake, located on the valley floor at 2,300 m, declined significantly about 5200 B.P. (Jodry 1999b).

Low-elevation lake cores and stratified valley-floor terrestrial deposits record alternating mesic and xeric periods during the late Holocene. Madole and others (2008) infer fluctuations in the water-table along Big Spring Creek and in the hydrologic sump west of GRSA. The water-table was 1 to 1.5 m higher than at present between 3,000 and 2,000 years ago. Jones's (1977) data from 5AL80/81 suggests a much higher water-table in the Dry Lakes, south of GRSA, about 1700 B.P. Conversely, the water-table at San Luis Lake was 1 to 2 m lower than at present between 900 and 1000 B.P. (Madole *et al.* 2008). As Madole and others (2008) note, because topographic relief is low on the valley floor, small fluctuations in the water-table in the hydrologic sump can produce dramatic changes the extent of surface water and marshes.

Machette and Puseman (2007) identify a sequence of buried paleosols capping aeolian sand units on the northern edge of the open basin. The paleosols indicate periods of surface stability and higher effective precipitation at about 4800 B.P., 3600 B.P., and 2700 B.P.

The GRSA tree-ring record extends from A.D. 1035 to the present. Grissino-Mayer and others (1998) put the mean annual precipitation over that period at 32.8 cm (12.92 in.), slightly higher than the 28.2 cm value calculated from modern weather station data. The most intense drought recorded in the tree-ring data occurred between A.D. 1570 and 1600, the period corresponding to the sixteenth-century continental megadrought (Stahle *et al.* 2007). The major drought in the Southwest between A.D. 1273 and 1299 is not recorded in the GRSA data. Grissino-Mayer and others (1998) also note temporal trends in the amplitude of climatic variation over the period of record. Between A.D. 1400 and 1570, precipitation was relatively stable but after 1600 inter-decadal variability may have increased. Overall, precipitation variability declined over the last millennium, reaching a low in the late nineteenth century.

Several trends characterize climatic conditions during the last century. One is an increase in inter-decadal variation in precipitation (Grissino-Mayer *et al.* 1998). Another is increasing temperature and decreasing precipitation (De Lanois 1993). Increasing occurrence of dung fungus (Sporomiella) in recent sediment at San Luis Lake records the introduction of livestock (De Lanois 1993). In the Saguache Creek valley, rephotography of scenes originally shot in 1913-1914 shows significant expansion of forest cover in the last 100 years.

Ecology

Owing to a combination of low but altitude-dependent precipitation and cold temperatures, the San Luis Valley is ringed by a series of distinct dryland plant communities (Dixon 1971; Bevilacqua and Dominguez 2011; Hoefer 1999a). The valley floor supports a shrubland dominated by greasewood (*Sarcobatus vermiculatus*) and other salt-tolerant species, along with grasses. Rabbitbrush (*Chrysothamnus* sp.) replaces greasewood in areas with better drainage. Patches of semi-desert grassland steppe occur within the shrubland community. A piñon-juniper (*Pinus edulis-Juniperus* sp.) woodland dominates the valley margin above about 2,450 m. A mixed conifer zone dominated by ponderosa pine (*Pinus ponderosa*) overlaps the upper end of the piñon-juniper woodland and continues upslope to about 3,200 m. The highest peaks support spruce-fir (*Picea* sp.-*Abies* sp.) and alpine grassland communities. Riparian corridors featuring aspen, cottonwood, and fruit-bearing shrubs traverse these altitude-dependent ecozones.

Vegetation around the BLM proposed OST route is dominated by two primary ecoregions: "the San Luis Alluvial Flats and Wetlands (approximately 55 percent), and "San Luis Shrublands and Hills" (approximately 40 percent) (Chapman *et al.* 2006; U.S. Environmental Protection Agency 2012). Vegetation communities in the alluvial flats have largely been removed for agricultural purposes, but was once dominated by shadscale, saltbrush, and greasewood, which continue to dominate non-agricultural lands in the region. The shrublands and hills ecoregion largely contain sagebrush, rabbitbrush, and winterfat, along with grasslands consisting of western wheatgrass, green needlegrass, blue grama, and needle-and-thread. The proposed route also briefly crosses two other ecological zones (accounting for the remaining 5 percent): the "Southern Rockies Foothill Shrublands", which contain a variety of low shrubs, trees, and grasses, and the "Arizona-New Mexico Plateau Salt Flats" where vegetation is sparse but dominated by low growing greasewood and shadscale (Chapman *et al.* 2006). In all of these communities, with the exception of the foothill shrublands, the vegetation communities are low growing and largely drought tolerant. This combination allows for the effective use of lidar imagery to capture micro topographic features such as trail traces.

Comprehensive data on the occurrence of edible plant species in the San Luis Valley come from the GRSA, roughly 50 km east of the project area (table 1.4). Most of these species are not represented by charred macrofloral remains recovered from archaeological contexts although the current roster of studied botanical samples is small and derives from a limited number of sites and a limited range of feature types. The mostly commonly recovered plant food is goosefoot (*Chenopodium* spp.) seeds.

The potentially important mammal species that currently occur near the project area are listed in table 1.5. (Bison, now extirpated but historically present, is added to the list.) Only limited faunal data from archaeological contexts are available for the region. Fariello and Dominguez (2005) and Dominguez (2008) report data on 2,066 specimens from the GRSA. The represented skeletal element and broad taxonomic or body-size group can be determined for 1,321 specimens, including 747 bones pieces representing mammals larger than 5 kg, 522 representing mammals smaller than 5 kg, 32

Table 1.4. Edible plants available in the vicinity of Great Sand Dunes National Park and Preserve (GRSA) (adapted from Beuthel [2005], Bevilacqua and Dominguez [2011], Cummings *et al.* [2009], and Machette and Puseman [2007]).

Taxon	Common Name	Presence[a]
Asteraceae	Sunflower Family	X
Helianthus sp	Sunflower	
Brassicaceae	Mustard Family	X
Descurainia sp.	Tansy Mustard	
Cactaceae	Cactus Family	X
Echinocereus sp.	Hedgehog Cactus	X
Opuntia sp.	Prickly Pear	
Cheno-Ams	-	X
Amaranthus sp.	Pigweed	X
Atriplex sp.	Saltbush	X
Chenopodium sp.	Goosefoot	X
Monolepis sp.	Poverty Weed	
Sarcobatus sp.	Greasewood	
Cyperaceae	Sedge Family	
Scirpus sp.	Bulrush	X
Poaceae	Grass Family	X
Achnatherum hymenoides	Indian Rice Grass	X
Elymus sp.	Wild Rye	
Hordeum sp.	Barley	
Sporobolus sp.	Dropseed	X
Allium sp.	Onion	
Amelanchier sp.	Serviceberry	
Arctostaphylos sp.	Kinnickinnick	
Artemisia sp.	Sagebrush	X
Asclepias sp.	Milkweed	
Calochortus sp.	Mariposa Lily	
Campanula sp.	Harebell	
Chamerion sp.	Fireweed	X
Cirsium sp.	Thistle	
Claytonia sp.	Springbeauty	
Cleome sp.	Beeplant	
Crataegus sp.	Hawthorn	
Cymopterus sp.	Stemless Cymopterus	
Epilobium sp.	Willowherb	
Eriogonum sp.	Buckwheat	
Fragaria sp.	Strawberry	
Juniperus sp.	Juniper	X
Lactuca sp.	Lettuce	
Lappula sp.	Stickseed	
Linum sp.	Flax	
Mahonia sp.	Oregon Grape	
Oxyria sp.	Sorrel	X
Pinus edulis	Piñon Pine	X
Piptatherum sp.	Littleseed Ricegrass	

Table 1.4. Edible plants *continued.*

Taxon	Common Name	Presence[a]
Plantago sp.	Plantain	
Polygonum amphibium	Knotweed	
Polygonum bistortoides	American Bistort	
Portulaca sp.	Purslane	X
Prunus sp.	Chokecherry	
Psoralidium sp.	Scurf Pea	
Rhus sp.	Skunkbush	X
Ribes sp.	Currant	
Rosa sp.	Rose	
Rubus sp.	Raspberry	
Rumex sp.	Golden Dock	
Schoenoplectus sp.	Tule	
Maianthemum racemosum	False Solomon's Seal	
Sphaeralcea sp.	Globemallow	
Typha sp.	Cattail	
Vaccinium sp.	Bilberry	
Yucca glauca	Soapweed Yucca	

[a] Occurrence of charred macrofloral remains recovered from archaeological contexts (Beuthel [2005]; Cummings *et al.* [2009]; Machette and Puseman [2007]).

representing birds, and 20 representing fish. Jones (1977) reports a diverse archaeofauna from site 5AL80/81, located in the Blanca Wildlife Habitat Area south of GRSA, that includes birds, small mammals, Rio Grande chub (*Gila nigriscens*) and buffalofish (Ictiobinae). Mitchell (2012a) describe a small faunal assemblage from the Upper Crossing site that includes 5 micromammal specimens, 13 small mammal specimens (Sciuridae, likely black-tailed prairie dog [*Cynomys ludovicianus*]), 19 small artidactyl specimens (mule deer [*Odocoileus hemionus*], pronghorn [*Antilocapra americana*] or bighorn sheep [*Ovis canadensis*]), and 1 large artitiodactyl specimen (bison [*Bison bison*] or elk [*Cervas elephas*]).

Archaeological Context

Data on the indigenous occupation of the San Luis Valley and vicinity have accumulated rapidly in the last twenty years. However, the archaeology of the Rio Grande basin in Colorado remains poorly understood. This is particularly true of the Archaic and Late Prehistoric stages. Accordingly, this brief overview integrates data from adjacent regions, including the Northern Colorado River basin to the northwest and the Arkansas River basin to the east. Table 1.6 summarizes the ages of the broad chronological

Table 1.5. Selected mammal species currently present in the vicinity of the project area (Natural Diversity Information Source 2011).

Common Species Name	Taxon	Abundance
Abert's Squirrel	*Sciurus aberti*	Fairly Common
American Badger	*Taxidea taxus*	Common
American Beaver	*Castor canadensis*	Fairly Common
American Elk	*Cervus elaphus*	Abundant
American Marten	*Martes americana*	Fairly Common
American Pika	*Ochotona princeps*	Common
Bighorn Sheep	*Ovis canadensis*	Common
Bison	*Bison bison*	Extirpated
Black Bear	*Ursus americanus*	Common
Black-tailed Jackrabbit	*Lepus californicus*	Uncommon
Bobcat	*Lynx rufus*	Common
Bushy-tailed Woodrat	*Neotoma cinerea*	Fairly Common
Colorado Chipmunk	*Tamias quadrivittatus*	Fairly Common
Common Muskrat	*Ondatra zibethicus*	Common
Common Porcupine	*Erethizon dorsatum*	Uncommon
Coyote	*Canis latrans*	Common
Deer Mouse	*Peromyscus maniculatus*	Abundant
Desert Cottontail	*Sylvilagus audubonii*	Abundant
Golden-mantled Ground Squirrel	Spermophilus lateralis	Fairly Common
Gray Fox	*Urocyon cinereoargenteus*	Rare
Gunnison's Prairie Dog	*Cynomys gunnisoni*	Fairly Common
House Mouse	*Mus musculus*	Abundant
Least Chipmunk	*Tamias minimus*	Common
Long-tailed Vole	*Microtus longicaudus*	Fairly Common
Long-tailed Weasel	*Mustela frenata*	Fairly Common
Masked Shrew	*Sorex cinereus*	Fairly Common
Meadow Vole	*Microtus pennsylvanicus*	Common
Mink	*Mustela vison*	Uncommon
Montane Shrew	*Sorex monticolus*	Common
Montane Vole	*Microtus montanus*	Common
Moose	*Alces alces*	Uncommon
Mountain Cottontail	*Sylvilagus nuttallii*	Fairly Common
Mountain Goat	*Oreamnos americanus*	Casual/Accidental
Mountain Lion	*Felis concolor*	Common
Mule Deer	*Odocoileus hemionus*	Common
Northern Grasshopper Mouse	*Onychomys leucogaster*	Fairly Common
Northern Pocket Gopher	*Thomomys talpoides*	Common
Ord's Kangaroo Rat	*Dipodomys ordii*	Abundant
Pine Squirrel	*Tamiasciurus hudsonicus*	Fairly Common
Plains Pocket Mouse	*Perognathus flavescens*	Fairly Common
Pronghorn	*Antilocapra americana*	Abundant
Raccoon	*Procyon lotor*	Fairly Common
Red Fox	*Vulpes vulpes*	Common
Silky Pocket Mouse	*Perognathus flavus*	Fairly Common
Snowshoe Hare	*Lepus americanus*	Common
Southern Red-backed Vole	*Clethrionomys gapperi*	Fairly Common
Striped Skunk	*Mephitis mephitis*	Common
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	Common
Water Shrew	*Sorex palustris*	Uncommon

Table 1.5. Selected mammal species *continued*.

Common Species Name	Taxon	Abundance
Western Harvest Mouse	*Reithrodontomys megalotis*	Fairly Common
Western Jumping Mouse	*Zapus princeps*	Fairly Common
Western Spotted Skunk	*Spilogale gracilis*	Rare
White-tailed Jackrabbit	*Lepus townsendii*	Common
Wyoming Ground Squirrel	*Spermophilus elegans*	Common
Yellow-bellied Marmot	*Marmota flaviventris*	Common

divisions used to systematize archaeological data from these regions.

There is also a long history of anthropological and archaeological research in north-central New Mexico, the results of which are important for understanding both the indigenous and settler history of the San Luis Valley. Research in the Taos Valley has been especially important. Early work focused primarily on the most conspicuous Pueblo sites and settlements, while mid- and late-twentieth century projects investigated a wide variety of Pueblo and earlier sites. The Archaic archaeology of the Northern Rio Grande has been an important focus of research during the last 20 years.

Because this project focuses primarily on the Old Spanish Trail, the following overview briefly covers American Indian archaeology in the San Luis Valley and surrounding areas. Additional background on the region's archaeology can be found in Athern (1992); Bevilacqua and others (2008); Cordell (1979); Eiselt (2012); Martorano and others (1999); Martorano and others (2005); Mitchell and Krall (2020); Riley (1995); Stanford (1999); Vierra (*ed*. 2013); and Wells (2008). Earlier sections of this chapter also provide additional information on the Old Spanish Trail.

Paleoindian Stage

Like the Southern Rockies and northern Southwest, relatively little is known about the Paleoindian archaeology of the Northern Rio Grande (Vierra *et al*. 2012). However, Folsom period use of the San Luis Valley and adjacent mountains is relatively well attested: 43 localities are known, and excavation data are available from four sites (Jodry 1999a). Folsom sites are also the most common Paleoindian sites in Judge's (1973) Central Rio Grande Valley sample.

In the San Luis Valley, Folsom camps occur in a wide variety of ecological settings, from the valley floor to timberline in the eastern San Juan Mountains. Camps on the valley floor are associated with bison kill and butchery localities; bison population density likely peaked in the San Luis Valley during Folsom times (Jodry 1999b).

The most important Folsom sites in the mountains surrounding the San Luis Valley are the Black Mountain site in the eastern San Juan Mountains and the Mountaineer site in the Gunnison River basin. At 3,097 m, the Black Mountain site is the highest excavated Folsom campsite (Jodry 1999a). Located in a forest-edge setting adjacent to an upper tributary of the Rio Grande, the site consists of two concentrations of flaking debris and stone tools indicative of a multi-function camp, where hunters refurbished equipment for the next kill. At the Mountaineer site, located at 2,630 m on an isolated mesa overlooking the Gunnison River, a Folsom band built a roughly circular structure made of daub-covered poles (Stiger 2006). Both Black Mountain and Mountaineer are indicative of a generalized, rather than focal, use of high-country settings by Folsom people.

Table 1.6. Chronology of major culture-historical divisions in three Colorado river basins. To simplify comparison, all ages are reported in uncalibrated radiocarbon years before 1950 (^{14}C yr B.P.).

Era, Stage, or Period	Northern Colorado River Basin (Reed and Metcalf 1999)	Rio Grande Basin (Martorano *et al*. 1999)	Arkansas River Basin (Zier and Kalasz 1999)
Paleoindian	~11,500 – 8350	11,200 – 7450	11,500 – 7800
Archaic	8350 – 1950	7450 – 1450	7800 – 1850
Formative/Late Prehistoric/Ceramic	2350 – 650	1450 – 350	1850 –500
Protohistoric	650 – 69	350 – 69	500 – 225

Paleoindian technocomplexes other than Folsom are less well represented in the region. Isolated surface finds of Clovis points are reported from a variety of settings (Cordell 1979; Jodry 1999a; Judge 1973). A few Agate Basin and Hell Gap style projectile points have been reported, but no sites associated with these types are currently known in the Northern Rio Grande or San Luis Valley. More common are Middle to Late Paleoindian Cody and Plainview/Belen sites (Holliday *et al*. 2017; Jodry 1999a; Vierra *et al*. 2012).

In the Southern Rockies, Late Paleoindian lanceolate points exhibiting parallel-oblique flaking, a slightly- to strongly-concave base, and ground lateral margins are more common than are earlier Paleoindian types (Jodry 1999a; Pitblado 1998; Reed and Metcalf 1999). Points exhibiting these attributes generally are assigned to the Angostura, James Allen, or Frederick types date to between 9000 and 8000 B.P. A variety of approximately contemporaneous types that are assigned to the Foothills-Mountain complex include weakly stemmed forms and some that exhibit parallel-transverse to collateral flaking patterns (Frison 1992; Kornfeld *et al*. 2010). Many Late Paleoindian flintknappers preferred quartzites or other brittle materials for making projectile points (Bradley 2010; Pitblado 2003; Reed and Metcalf 1999). Late Paleoindian groups living in the mountains pursued a broad-spectrum subsistence strategy, in contrast to their bison-focused contemporaries in the Plains (Frison 1992).

Archaic Stage

During the Early Holocene, the climate of western North America was much warmer and dryer than at present and those conditions spurred significant and enduring changes in American Indian lifeways (Geib and Jolie 2018; Huckell 1996). Mobility decreased and use of local resources increased. Diets changed as harvesting and processing of seeds, roots, and other plant resources intensified. Hunting weaponry shifted from lanceolate styles to a variety of stemmed and notched styles. Taken together these changes mark the beginning of the Archaic stage.

In the Rio Grande basin, few Archaic stage sites have been investigated intensively. However, a context for the San Luis Valley Archaic can be built using data and interpretations from adjacent regions. The record for the Northern Colorado River basin, including the Gunnison River basin immediately northwest of the San Luis Valley, is the most comprehensive. In the Arkansas River basin, Early Archaic sites are uncommon but data from Middle and Late Archaic sites are relatively abundant. Data also are available for Archaic occupations in northern New Mexico.

Many researchers working in the Southern Rockies accept the view that Archaic hunter-gatherers living there practiced a local, year-round, mountain-focused settlement and subsistence system distinct from that of groups living in adjacent regions (Black 1991). Most researchers also recognize long-term adaptive continuity in the region, beginning as early as the Late Paleoindian period (Metcalf 2011). Whether this also reflects cultural continuity remains a subject of debate (Stiger 2001), as do the specific attributes that define a mountain adaptation (Reed and Metcalf 1999).

Reed and Metcalf (1999) partition the Archaic era in the Northern Colorado River basin into four periods. The earliest, dubbed the Pioneer period (8350-6450 B.P.), marked the initial settlement of the region by full-time residents practicing a seasonal settlement system. During the subsequent Settled period (6450-4450 B.P.), local bands practiced a central-place subsistence strategy that featured a combination of logistical moves around strategic habitation areas in the winter and residential mobility in the summer. This basic pattern continued into the Transitional period (4450-2950 B.P.), but was accompanied by increasing material culture variation, more restricted use of higher-elevation life zones, and possibly decreased sedentism. The final Archaic period, the Terminal (2950-1950 B.P.), was a period of subsistence stress that prompted various forms of economic intensification as well as technological change. (Metcalf [2011] revises the bracketing dates and durations of the Reed and Metcalf [1999] periods and argues for the use of neutral period names, including the Paleo-Archaic, Early Archaic, Middle Archaic, and Late Archaic.)

Stiger (2001) offers a model of settlement and subsistence change for the Gunnison basin. In Stiger's scenario, people took up full-time residence in the basin after 8000 B.P. Their central-place foraging system featured large and small mammal hunting combined with bulk processing and storage of plant resources. This basic pattern continued, apart from a brief interruption between 5000 and 4500 B.P., until about 3000 B.P., when central-place residences were replaced by seasonal, special-use sites occupied by groups wintering outside the basin. This shift coincided with local extirpation of piñon pines (Emslie *et al*. 2014).

Exploitation of the tundra ecosystem in the San Juan Mountains, above roughly 3,400 m, occurred primarily during the Archaic (Mitchell 2012b). Intensive use began at least by 5000 B.P. and declined after about 2000 B.P. The frequent occurrence on San Juan alpine sites of obsidian from source locations in northern New Mexico indicates that native groups using the high country maintained strong connections to the northern Southwest. However, the marked diversity of the stone tool raw materials present on many high-elevation sites, including a variety of cherts, orthoquartzites, rhyolites, and basalts, suggests either that a broad trade network linked groups living around the perimeter of the San Juans or that groups from different regions came together in the high country. Most San Juan high country sites are small, suggesting that they represent brief occupations. Assemblage diversity data indicate that high country land-use strategies were generalized, rather than focal.

In the Arkansas River basin, Middle Archaic sites, dating between 5000 and 3000 B.P., are located in a wide variety of ecological settings, from mid-elevation mountain valleys, to the Plains-foothills ecotone, to canyons and open steppe in the Plains (Zier 1999). Especially significant are Middle Archaic occupations in rockshelters, including Draper Cave (5CR1), Recon John Shelter (5PE648), Gooseberry Shelter (5PE910), and Wolf Spider Shelter (5LA6197) (Hagar 1976; Hand and Jepson 1996; Zier 1999; Zier and Kalasz 1991). The Dead of Winter site (5LK159) is the most thoroughly investigated Middle Archaic occupation in the mountains (Buckles 1978).

Middle Archaic sites in the Arkansas basin are primarily located near reliable water sources (Zier 1999). Both open and sheltered sites exhibit evidence of regular reoccupation. The diversity of tool types present, along with the frequent occurrence of hearth features, suggests that these sites represent multi-activity residential camps. Floral and faunal inventories point to a broad-spectrum subsistence strategy. Together, assemblage diversity and evidence for reoccupation may reflect a small-group foraging economy; however, the potential for preservation differences between sheltered and open sites complicates interpretations of mobility patterns.

Late Archaic (3000 B.P-1850 B.P.) sites also occur throughout the Arkansas River basin, including in the open steppe, in shallow and deep canyons, in the Plains-foothills ecotone, and in high-elevation valleys. Important Late Archaic rockshelter sites include several that also contain Middle Archaic deposits (Recon John, Gooseberry, and Wolf Spider), as well as Two Deer (5PE8), Carrizo (5LA1053), and Medina (5LA22) (Campbell 1969; Zier 1999). Open sites in steppe and shallow-canyon settings are widespread and common, but few have been intensively investigated. Excavated sites in the mountains include the Runberg site on Cottonwood Pass (Black 1986), the Venado Enojado site east of Buena Vista (Mitchell 2019), and site 5LK1999 and the Campion Hotel site southwest of Leadville (Zier 1999).

The co-occurrence of both Middle and Late Archaic cultural deposits at many Arkansas basin sites indicates long-term continuity in subsistence practices and mobility patterns (Zier 1999). Late Archaic radiocarbon dates are more numerous than Middle Archaic dates, but this likely is due to preservation and research biases rather than to an increase in population. Late Archaic deposits in stratified rockshelters generally are thicker and richer than Middle Archaic deposits, suggesting an increase in site-use intensity over time. The broad-spectrum subsistence strategy that began in the Middle Archaic continued into the Late Archaic. Late Archaic faunal and macrofloral assemblages are somewhat more diverse than Middle Archaic assemblages, but it is unclear whether this reflects increased diet breadth or sampling biases. Maize remains definitely occur in three Late Archaic assemblages, the earliest of which, from Gooseberry Shelter, dates to 2600 B.P. However, maize was certainly a minor element of Late Archaic diets and its occurrence did not lead to a real shift in subsistence practices (Zier 1999).

In the Rio Grande basin, data on Archaic stage archaeology frequently are organized around the periods of the Oshara tradition, a cultural taxonomy that Irwin-Williams (1973) developed to trace the antecedents of Pueblo culture in the northern Southwest. Based primarily on data from the Arroyo Cuervo region, located about 50 km northwest of Albuquerque, New Mexico, the Oshara tradition divides pre-Puebloan archaeology in to five phases spanning the period from about 7500 B.P. to 1550 B.P. These phases include the Jay (7500-6750 B.P.), the Bajada (6750-5150 B.P.), the San Jose (5150-3750 B.P.), the Armijo (3750-2750 B.P.), and the En Medio (2750-1550 B.P.).

In Irwin-Williams's scenario, components of the Jay and Bajada phases represent small-group, short-term residential camps. Jay and Bajada microbands practiced a local, year-round, "mixed spectrum" subsistence strategy (Irwin-Williams 1973:5). Climate, and therefore resource patch productivity, improved during the subsequent San Jose phase, permitting an increase in site-use intensity. Diet breadth increased, especially through the incorporation of more small seeds and other floral resources.

Important subsistence and settlement changes took place during the Armijo phase. Paralleling a similar development in the Arkansas basin, limited quantities of maize appear in Armijo phase macrofloral assemblages. Fall or fall-winter seasonal aggregation sites first appeared during this time, as did special-function sites. The final Archaic phase of the Oshara tradition, the En Medio, witnessed an amplification of trends begun during the Armijo. Storage features first appeared during the En Medio phase and ground stone tools became more common and morphologically diverse. Irwin-Williams argues that increases in the number of sites and in the size and intensity of site use reflect population growth during the En Medio phase. Bands began exploiting seasonally productive, but previously untapped, resource patches. This shift may point to either an increasing reliance on logistical organization or to periodic small-group residential mobility punctuated by annual macroband aggregation.

Although Irwin-Williams identifies material similarities between the phases of the Oshara tradition and Renaud's (1942, 1944, 1946) Rio Grande complex, which he defines using San Luis Valley data, the dearth of excavated Archaic-stage sites in the Rio Grande basin has nevertheless limited the development of region-specific chronologies or settlement models (Hoefer 1999b). All of the published radiocarbon dates come from sites within or immediately adjacent to the GRSA in the east-central portion of the valley, and most of these derive from individual features rather than from stratigraphic sequences.

Bevilacqua (2011a) reports 57 radiocarbon dates from GRSA contexts. Five are too recent to calibrate and a single date from a site immediately outside the park can be added to the list (Jones 1977). Among the 53 interpretable dates, 32 come from Archaic contexts, between 7450 and 1450 B.P. The median date is 2380 B.P. and arithmetic mean date is about 2800 B.P. Thus, the latest Archaic contexts—which could be assigned to the Late Archaic period, the En Medio phase, or the Terminal period—are much more abundantly represented in the radiocarbon record than are all other Archaic contexts.

Among the most interesting dated Archaic contexts is site 5AL80/81, a multi-function camp located on the valley floor just west of GRSA that produced flaked stone tools, ground stone tools, and a diverse archaeofauna composed of fish, bird, and mammal remains (Farmer 1978; Jones 1977). However, most Archaic sites located on the west flank of the Sangre de Cristo Mountains consist of concentrations of burned rock and ground stone tools, indicative of intensive processing of plant resources, possibly including Indian ricegrass (*Achnatherum hymenoides*) and piñon nuts (*Pinus edulis*) (Bevilacqua *et al.* 2008; Bevilacqua *et al.* 2011; Martorano *et al.* 2005; Wunderlich and Martorano 2015). The attributes of these sites and their associated assemblages point to seasonal, logistical use of this portion of the valley (Andrews *et al.* 2004). The fact that logistical use of the eastern valley margin dates primarily to the mid- to late En Medio lends some support to Irwin-Williams's proposed developmental sequence for the Oshara tradition.

Architectural features are important elements of the Archaic stage record in the Southern Rockies (Pool and Reed 2020). Winter-occupied habitation structures appeared in the Northern Colorado River basin as early as the Pioneer period and are well attested through the Transitional period (Pool and Moore 2011; Reed and Metcalf 1999; Rood 1998; Shields 1998; Stiger 2001). Most were semi-subterranean with shallow, saucer-shaped floors. Superstructures varied significantly, incorporating upright poles or cribbed logs along with lighter materials in a variety of configurations. Many incorporated adobe plaster. Other Archaic-period structure types include wickiups (timbered lodges) and masonry surface structures (Black 1991).

Just one Middle Archaic basin house is known from the Arkansas River context area (Zier 1999). However, a cluster of such features has been documented immediately north of the Arkansas-South Platte divide in Douglas County, Colorado (Gantt 2007). Habitation structures dating the Late Archaic also are uncommon in the Arkansas basin, but include basin houses at the McEndree Ranch site in Baca County (Shields 1980) and at the Veltri site in the upper Purgatoire River valley (Rood 1990).

Documented Archaic-stage architectural features in the San Luis Valley include four basin houses at two sites located in the GRSA and one probable basin house at the Upper Crossing site in the middle Saguache Creek valley (Bevilacqua 2011a; Mitchell 2012a). Two of the GRSA basin houses have been excavated, yielding a Middle Archaic date for one structure at the Big Spring site (5SH181) and a Late Archaic date for another at the Little Spring site (5AL10) (Jodry 2002). The probable basin house at Upper Crossing likely dates to the Late Archaic. Hoefer (1999b) assigns some of the Rio Grande basin's stone enclosures to the Archaic, but no radiocarbon dates are available to confirm this. However, rock art panels that may date to the Archaic occur on four sites that also include stone enclosures (Hoefer 1999b:123).

One hallmark of Archaic assemblages from the Southern Rockies is the diversity of associated projectile point styles (Mullen 2009; Reed and Metcalf 1999). Many Archaic point styles were produced over long periods of time and many well-dated components incorporate multiple styles. As Reed and Metcalf (1999:86) observe, "broad series show some patterning, but the rule is for diversity within sites and temporal periods." For the San Luis Valley and adjacent mountains, this problem is compounded by the routine use of style names linked to sequences originally developed for sites in other regions, including the northern Southwest, the Great Basin, and the Plains. In view of the chaotic diversity of Archaic point types in the Southern Rockies, it is likely that projectile point morphology there provides little or no information on interregional cultural connections (Stiger 2001). More importantly, this diversity means that the morphologies of projectile points recovered from surface contexts cannot be used to assign sites to particular periods within the Archaic.

Late Prehistoric or Formative Stage

Diversity characterizes the post-Archaic record of the Southern Rockies and adjacent areas. Reed and Metcalf (1999) partition the Formative era in the Northern Colorado River basin into a series of separate cultural traditions, including the Fremont, Gateway, Anasazi, and Aspen traditions. All share use of the bow and arrow. With the exception of the Aspen tradition, all of the Northern Colorado River basin's Formative societies relied to some extent on maize cultivation, though it was less important to them than it was to the ancestral Puebloan farmers who lived south of the San Juan Mountains. Northern Colorado's Formative-era architectural features varied in design and construction technology, both within and between traditions. Manufacture and use of pottery also varied: some groups relied heavily on high-quality vessels while others used pottery only to a limited extent. Settlement systems also varied. In some locations, Formative-era people maintained Archaic-era settlement and subsistence patterns but in others they were tethered to long-term habitation sites near maize fields. Formative-era projectile point styles are less diverse than are those of the Archaic.

In the Arkansas River basin, Late Prehistoric stage archaeology is partitioned into two periods (Kalasz *et al.* 1999). (Kalasz and others [1999:250-263] also include the Protohistoric period in the Late Prehistoric stage; however, the post-500 B.P. archaeology of the Rio Grande basin is considered separately in the next section.) The beginning of the Developmental period (1850-900 B.P.) was marked by the first appearance of the bow and arrow and, perhaps asynchronously, ceramic containers. Small corner-notched arrow points occur at Recon John Shelter as early as 1900 B.P. Pottery may be present on several roughly contemporaneous sites and definitely occurs on sites dating to between 1500 and 1700 B.P. However, apart from these undoubtedly important technological changes, Developmental period lithic technology is markedly similar to that of the preceding Late Archaic period, a pattern indicative of local cultural development.

Goosefoot (*Chenopodium* sp.) seeds dominate Developmental period macrofloral assemblages. Other wild plant foods include a variety of cacti and weedy annuals. Remains of maize are consistently, though not ubiquitously, present. However, maize likely was not significant a component of Developmental period diets (Kalasz *et al.* 1999). Developmental period archaeofauna are very diverse and include numerous small mammals in addition to small and large artiodactyls.

In the Plains, Developmental period architectural features are uncommon and varied. The best-known include two basin houses at the Belwood site, one with a low encircling rock foundation; an enigmatic basin house at the Running Pithouse site; and two stone enclosures at the Forgotten site (Kalasz *et al.* 1999). By contrast, circular to oval basin houses with rock foundations are relatively common in the southern Park Plateau, in the Plains-foothills ecotone.

The succeeding Diversification period (900-500 B.P.) in the Arkansas basin is characterized by increased investment in domestic architecture and by the widespread use of triangular, side-notched arrow points (Kalasz *et al.* 1999). The Diversification period is further partitioned into the Sopris phase and the

Apishapa phase. Sopris phase sites are confined to the Park Plateau, both north and south of the New Mexico-Colorado border, while Apishapa phase sites occur throughout a broad arc south the Arkansas River. Sopris phase houses are heterogeneous and include both single- and multiple-room structures built from stone masonry, adobe, and jacal. Apishapa phase houses include single- and multiple-room structures built nearly exclusively from vertical slabs. Stone barrier walls or fences also are common, as are walled or partitioned rockshelters.

Although wild resources continued to be the backbone of Diversification period diets, the consumption of maize clearly increased. Small mammals appear to dominate rockshelter archaeofauna while bison dominate open-site archaeofauna (Kalasz *et al.* 1999:218). Interregional interaction increased during the Diversification period, particularly for Sopris phase communities who maintained routine connections with ancestral Puebloans in the Rio Grande basin.

Comparatively little is known about the archaeology of the Late Prehistoric or Ceramic stage in the San Luis Valley (Martorano 1999a). The early Late Prehistoric encompasses Irwin-Williams's (1973) Trujillo phase. Trujillo phase groups adopted bow-and-arrow technology and used a modest number of ceramic containers. However, Irwin-Williams detects no change from earlier En Medio phase economic practices. Economic intensification that began in Armijo phase times continued through the En Medio and into the Trujillo. Both En Medio and Trujillo phase sites represent a "strongly seasonal annual economic cycle" (Irwin-Williams 1973:14).

Maize horticulture likely was not possible north of the New Mexico-Colorado border. The data available suggest that the San Luis Valley and adjacent foothills and mountains were used both by indigenous hunter-gatherers and by groups who resided for much of the year either farther south along the Rio Grande or to the east in the Arkansas River basin. Late Prehistoric sites occur primarily on the floor of the San Luis Valley, especially along San Luis and Saguache creeks and in the hydrologic sump west of GRSA (Martorano 1999a:133). Many are large and exhibit diverse tool assemblages suggestive of central-place foraging camps. A number exhibit evidence of repeated re-occupation.

Use of the San Luis Valley by ancestral Pueblo groups, particularly during the Pueblo II and Pueblo III periods, is attested by data from several sites, including the Mill Creek site (5SH354) and Saguache Shelter (5SH1458) on the northern end of the valley. Cord-marked pottery found sporadically throughout the valley suggests visits by Plains groups (Bevilacqua 2011c; Martorano 1999a).

The number of people living in the San Luis Valley and adjacent regions peaked during the Late Prehistoric, but the timing of local peaks likely varied. In the Northern Colorado basin, population peaked at about 950 B.P then began declining slowly. South of the San Juan Mountains, ancestral Puebloan population waxed and waned locally, but likely reached a regional peak between 800 and 700 B.P., immediately prior to a sharp decline just prior to 650 B.P. (Lipe and Varien 1999). Radiocarbon data from the San Luis Valley suggest a population peak early in the first millennium, followed by a significant decline. However, all of the available radiocarbon data come from sites located within or adjacent to GRSA and so may not be representative of valley-wide trends. In northern New Mexico, population likely peaked during the early centuries of the first millennium (Irwin-Williams 1973:12). Population in the Arkansas basin likely rose during the Developmental period and peaked about 750 B.P. in the west and 600 B.P. in the east.

Archaeologists working in the Northern Rio Grande in New Mexico have long recognized that maize horticulture and Ancestral Pueblo occupation came late to the region compared to other parts of the northern Southwest (Vierra and McBrinn 2016). Vierra and others (2018) argue that this late persistence of a hunting-and-gathering economy was due to the comparative abundance of higher-ranked plant and animal resources, including pinon nuts and deer. Regardless of the reason, Ancestral Pueblo people appear to have first come to the Taos Valley about A.D. 1100 or perhaps a litter earlier (Boyer *et al.* 1994). The late persistence of hunter-gatherers, combined with the immigration of Pueblo people from the south, encouraged intimate social interactions between foragers and farmers in the Northern Rio Grande, interactions that had long-term consequences (Boyer 2008; Fowles 2005; Vierra *et al.* 2018).

The earliest Puebloan occupation of the Taos Valley is known as the Valdez phase (A.D. 1100 – 1225 [Boyer *et al.* 1994]). Crown (1990) argues for a slightly earlier beginning for the Valdez phase at A.D. 1050. Valdez phase sites mostly consist of scattered homesteads or hamlets represented by one or a few pithouses. In some cases, the pithouses are associated with jacal surface structures. A few larger surface structures have also been attributed to the Valdez phase. Both round and square or rectangular pithouses occur, with round structures more common on the south end of the Taos Valley, including in the Rio Grande de Ranchos, and square more common on the north. Ceramic assemblages consist of Taos Gray utility wares and Taos Black-on-White decorated wares.

The succeeding Pot Creek phase (A.D. 1225 – 1260 or 1270 [Crown 1990]) was a period of population aggregation out of Valdez phase farmsteads and into small pueblos. Pot Creek phase sites occur throughout the Taos Valley. The first appearance of kivas in the area may date to the Pot Creek phase. Production of Taos Gray utility wares continued, although frequencies of the incised and neck-banded varieties declined while the frequency of the corrugated variety increased. Taos Black-on-White was partially replaced by the carbon-painted Santa Fe Black-on-White.

Aggregation continued during the Talpa phase (A.D. 1260 or 1270 – 1320s [Crown 1990]). Smaller Pot Creek phase pueblos were abandoned, and Pot Creek Pueblo grew to about 300 ground-floor rooms. Talpa Black-on-White and Taos Gray pottery was produced during the Talpa phase.

The abandonment of Pot Creek Pueblo marks the end of the Talpa phase. However, Ancestral Pueblo occupation of the Taos Valley continued at Cornfield Taos and in the Rio Pueblo Valley at Picuris (Dick 1965; Ellis and Brody 1964). Vadito Black-on-White, a successor to Talpa Black-on-White, was produced between about A.D. 1325 and 1600 (Wilson 2007). Taos Gray may have continued as the local utility ware until the early eighteenth century (Levine 1994).

Post-500 B.P. Indigenous Archaeology

Ceramic and rock art evidence indicates that numerous groups visited the San Luis Valley and surrounding mountains after 500 B.P., including ancestral Puebloans, multiple Apache bands, Utes, Comanches, Navajos, and possibly other groups (Bevilacqua 2011c; Cole 2008; Crosser *et al.* 2008; Eiselt and Darling 2012; Martorano 1999c; Mitchell 2012a; White 2005). However, by about 250 B.P. the Utes were the dominant cultural group occupying the region. Utes, or related Numic-speaking peoples, first appeared in the Southern Rockies around 850 B.P. (Reed 1994), though debate continues both on the timing of their arrival and on their relationships, if any, to Formative or Late Prehistoric groups (Reed and Metcalf 1999).

Post-500 B.P. projectile point styles include triangular side-notched and unnotched arrowpoints. Documented architectural features include conical timber lodges, brush wickiups, forked-stick hogans, and possibly circular spaced-rock features (Martorano 1999c; Reed and Metcalf 1999; Wilshusen and Towner 1999).

Perhaps the most common and visible type of archaeological resource dating the last several centuries is culturally modified or peeled trees (Martorano 2011). American Indians harvested tree bark for comestible and medicinal purposes, for building materials, and to obtain raw materials for manufacturing a wide variety of tools, containers, and other objects. Scars left by harvesting are readily observable on both living and dead trees in many parts of the western United States and Canada

Spanish Period (1540 – 1821)

Although Spain had sent both military and civilian expeditions to the Rio Grande Valley in the sixteenth century, it was not until 1598 that Don Juan de Oñate established the first colony in New Mexico (Spicer 1962). In July 1598, Oñate visited Picuris and Taos pueblos but did not enter the San Luis Valley in Colorado. That first Spanish colony at Ohkey Owingeh (San Juan) was moved in 1610 to what is now Santa Fe. Spain's influence on the Rio Grande Valley slowly expanded through the seventeenth century, as missions and land grants were established. In the 1620s, the Franciscan Alonso de Benevides visited and later wrote about missions that had been established at the Northern Tiwa pueblos.

The Pueblo Revolt of 1680—in which Taos Pueblo played a leading role—brought Spanish colonization of New Mexico to a temporary halt. The Revolt also greatly affected the indigenous political economy of the Northern Rio Grande and San Luis Valley. Taos Pueblo had long maintained connections with mobile groups living in the Plains and Southern Rockies (e.g. Spielmann 1991), but when the Spanish returned in the 1690s they found that relationships among native groups had changed substantially. By the early eighteenth century, Apaches had become permanent residents of the region (Eiselt 2009) and Comanches and Utes were regular visitors (Fowles *et al.* 2017).

The Spanish return to the Northern Rio Grande in

1692 was led by Don Diego de Vargas. In 1694, Vargas again attempted to subjugate the northern Pueblos. However, his return trip to Santa Fe involved a long detour to the north, following trails into the San Luis Valley that more than a century later would become the Trapper's Trail and the North Branch of the Old Spanish Trail (OST) (Colville 1996).

Although the OST would not be established until after Mexican Independence, Spain recognized as early as the 1760s the need for a commercial link between New Mexico and missions of California (Hafen and Hafen 1993). The search for a viable route began both from the east in Santa Fe and from the west in Los Angeles. The most important exploration conducted by Spain occurred in 1776, when Francisco Garcés explored eastward from Los Angeles and Francisco Atanasio Dominguez and Silvestre Vélez de Escalante explored westward from Santa Fe.

Mexican Period (1821 – 1848)

Mexican Independence dramatically shifted trade relationships in the Northern Rio Grande and San Luis Valley. Independence severed Mexico's connection to Europe. The peripheries of what had been New Spain were especially hard-hit. In response, the Mexican government welcomed commercial ventures with U.S. businesses. The most immediate response was the opening of the Santa Fe Trail between Franklin, Missouri, and Santa Fe. In addition, French Canadian, British, and American fur trappers and traders were afforded greater access to the Southern Rockies and the Southwest. Taos quickly became a base of operations for the trappers, who helped expand the routes into the Southern Rockies and Great Basin that had first been pioneered by Spain in the late eighteenth century (Hafen and Hafen 1993). Those routes eventually became what later was known as the OST.

Jedediah Smith is commonly credited as the first man to traverse the entire trail, although not in a single trip. The first dedicated commercial expedition was made in 1829 by Antonio Armijo and a party of 60 men, who took 86 days to cross the OST's South Route from Abiquiu through southern Utah and northern Arizona (Merlan *et al*. 2011). Most of the caravan traffic subsequently used the Main or North Route that ran northwest from Abiquiu through central Utah and finally across the Mojave to Los Angeles. The North Branch through Taos and into the San Luis Valley was used by some Los Angeles-bound travelers, but primarily remained a fur-trappers trail. The North Branch also connected to the Trapper's or Taos Trail that crossed the Sangre de Cristo Mountains into the Arkansas River basin and skirted the Front Range into the South Platte basin (LeCompte 1978). Caravan traffic on the OST ended in 1848 with the Mexican Cession following Mexico's defeat in the Mexican-American War.

The early nineteenth-century archaeology of Jicarilla Apaches, Utes, and other mobile groups has become an important focus of regional archaeological research (e.g. Eiselt 2012). American Indian sites of the period exhibit a complex material culture signature that includes items of indigenous manufacture as well as items of European or American manufacture. Key features of late-eighteenth and nineteenth-century indigenous sites is in the Southern Rockies are peeled ponderosa pines and brush shelters known as wickiups. American Indians harvested the inner bark of ponderosa pines and other trees for comestible and medicinal purposes. They also used wood and bark for building materials and for manufacturing a wide variety of tools, containers, and other objects. Scars left by harvesting are readily observable, although unevenly distributed, on both living and dead trees in many parts of the Northern Rio Grande (Corral 1996; Martorano 2011). The largest documented clusters in the San Luis Valley occur in the GRSA and at the Upper Crossing site (Martorano 2011; Mitchell 2012a).

Early American Period (1848 – 1912)

The Treaty of Guadalupe Hidalgo that ended the Mexican-American War also ended the caravan traffic on the OST. Both Santa Fe and Los Angeles became parts of the United States after the war, lessening the economic importance of the OST trade. The nearly simultaneous discovery of gold at Sutter's Mill in California, as well as the arrival of Mormon colonists in the Salt Lake Valley, further altered the economic structure of the West.

However, several important expeditions traversed the North Branch through the San Luis Valley in the early 1850s. Those expeditions were primarily prompted by a search for a practical trans-continental rail route. Descriptions penned by participants in those U.S.-government sponsored projects provide important information about the nineteenth-century environment and cultural landscape of the San Luis Valley.

The Treaty of Guadalupe Hidalgo also guaranteed the property rights of former Mexican citizens living the in ceded lands. In northern New Mexico and southern Colorado, those rights included ownership of lands granted to individuals and groups by the Spanish crown and later by the Mexican government to encourage settlement. Prior to the war, six Spanish or Mexican land grants extended into what later would become the state of Colorado (Hafen 1927). Several were adjudicated in whole or part; however, other claims, like those to the Conejos Grant in the San Luis Valley, were rejected by U.S. courts even though settlement along the Conejos River and the Rio San Antonio occurred sporadically beginning in 1833 (McCourt 1975).

The arrival of the Denver and Rio Grande Railway in 1878 dramatically re-shaped human occupation of the San Luis Valley. It allowed for efficient connections to major city centers such as Denver and Santa Fe and also for goods and commerce, along with people, to travel more freely between the Valley and elsewhere. A principal component of this from an economic standpoint is farming and ranching, which continues to be a major economic driver in the San Luis Valley today.

2

Fieldwork Results

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Fieldwork was conducted between August 18-23, 2017. The survey area was divided between two parts of the valley, one set of northern parcels in Rio Grande County and one southern set in Saguache County. Doug Simon, GIS Specialist for the BLM San Luis Valley Field Office (SLVFO), supplied PCRG with a GIS shapefile showing a proposed route for the West Fork of the North Branch of the Old Spanish Trail (OST) prior to fieldwork. The proposed route begins in Conejos County near the intersection of US Highway 285 and the Colorado-New Mexico border and extends north to northwest traveling through Rio Grande and Saguache Counties before ending in the Saguache Creek valley near Cochetopa Pass (figure 2.1). In addition to the proposed route, Jeff Brown, Realty Specialist for the BLM SLVFO, supplied PCRG with a map of cairn locations which he believed were placed along the West Fork route. These maps were georeferenced in GIS using features such as section corners, road intersections, and hill tops. A discussion on the genesis of this proposed route and Brown's cairn data is presented in chapter 1.

These two datasets formed the framework that guided planning of the field investigation. Five parcels on BLM land along the proposed route were selected for possible inventory to assess whether linear resources that could potentially be associated with travel during the period of significance for the OST (1829-1848) are present. These inventory parcels were 400 m wide corridors using the proposed trail route as a centerline. Four linear corridors with buffers of 400 m centered on a line that connected cairns identified by Brown were also selected for possible inventory. These nine parcels ranged in size from 277 to 1976 acres for a combined total of 9365 acres.

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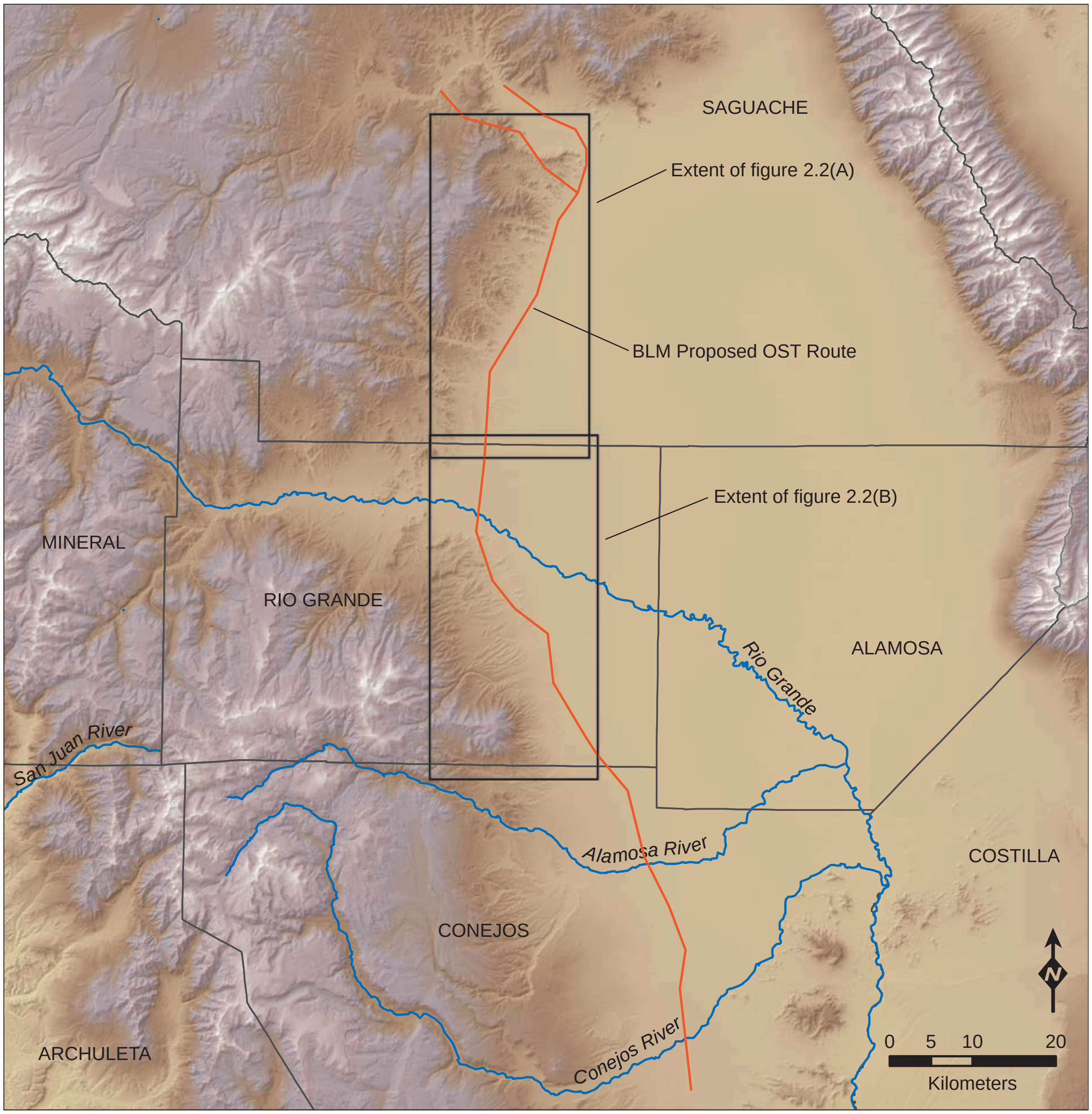

Figure 2.1. Overview map showing the locations of major rivers, county boundaries, the BLM proposed Old Spanish Trail route, and the extents of figure 2.2.

The parcels initially outlined for possible inventory were far more than the total acreage anticipated to be inventoried during fieldwork but were chosen to provide flexibility once fieldwork began. Ultimately, a total of 493 acres (244 acres in Rio Grande County and 249 in Saguache County) spread across 10 linear and small block parcels were surveyed over the five days of fieldwork (figure 2.2). The fieldwork effort documented 36 cultural resources, including 6 sites, 19 isolated finds, and 11 site leads (a site that was noted but not recorded during the project). All but one of the resources are newly documented, the one exception being a site that was originally recorded in the 1980s and was relocated for this project. One of the sites is a newly recorded segment of a previously identified linear resource. No artifacts were collected during this project, and all original field data is housed at the PCRG laboratory in Broomfield, Colorado.

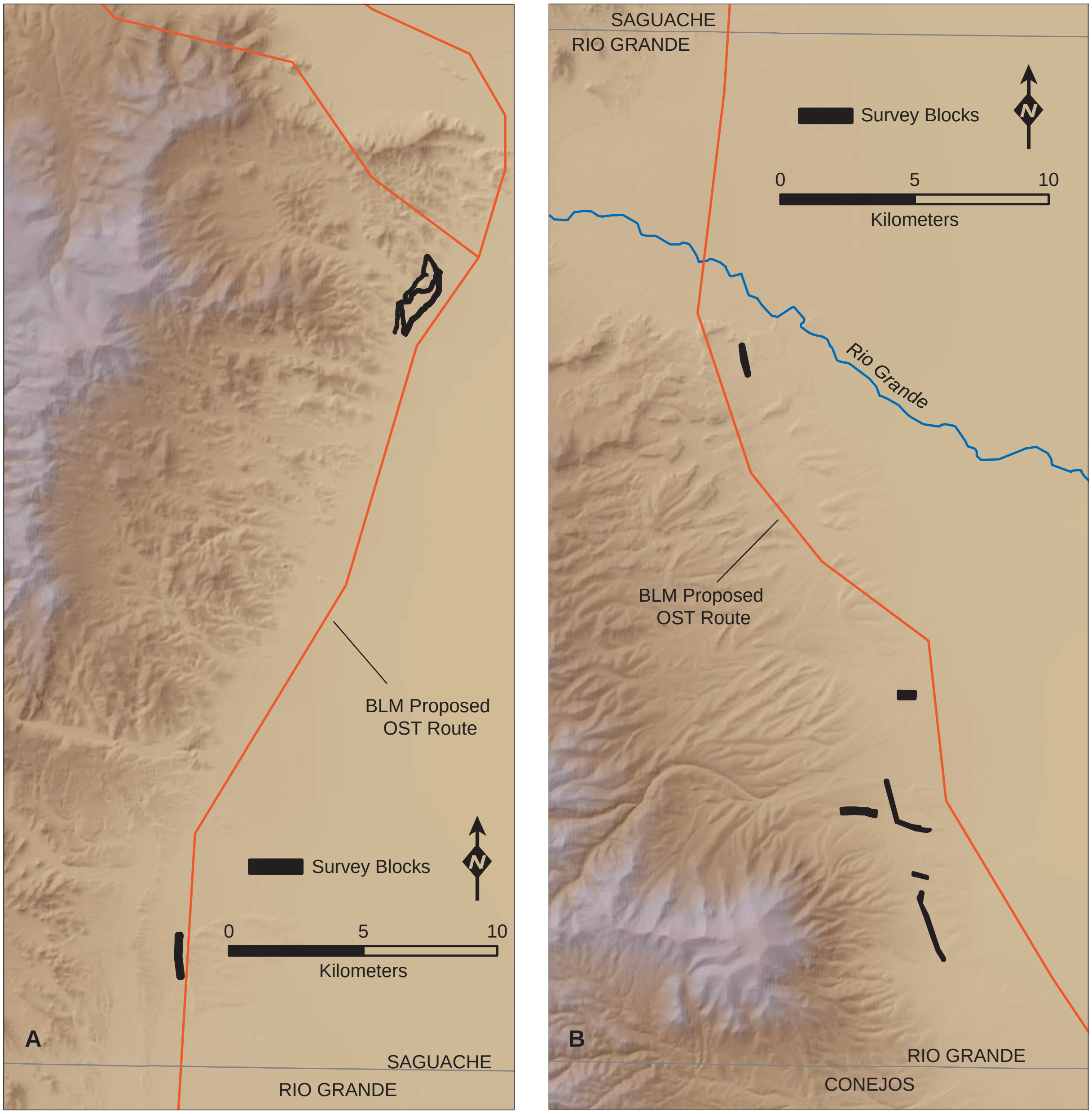

Figure 2.2. Survey blocks in Saguache (A) and Rio Grande (B) counties in relation to the BLM proposed Old Spanish Trail route.

Field and Laboratory Methods

Cultural materials encountered in the field were first assessed to determine whether they met the definition of an isolated find or a site according to the standards of the BLM and OAHP. Sites were defined as a locus of patterned or repeated activity that is at least 50 years old. Isolates were defined as evidence of single activities that do not meet the definition of a site.

Field crews utilized standard PCRG field recording forms, which mimic various sections of the Colorado OAHP site forms. Sub-meter GPS units (corrected in the lab) were used for all spatial documentation of resources using the NAD83 datum. Total survey transect width varied by the crew, as well as terrain and field conditions, but transects were never spaced more than 10-15 m apart. Photo documentation consisted of site overviews, feature or other necessary overviews, and details (close-ups) of various aspects of features.

The focus of the fieldwork was on potential historical trail and road segments, cairns, or artifacts that could potentially be associated with historical trails. When rock features or trail or road segments were identified, they were fully recorded. Linear resources included roads that appear on General Land Office plats or swales visible at the ground surface that were not naturally occurring and do not conform to the local drainage pattern. Documented trail and road segments were also classified according to the system outlined in the Mapping Emigrant Trails Manual (MET), outlined in table 2.1, published by the Office of National Historic Trails Preservation (Buck *et al.* 1993). Isolated finds were also fully recorded. After consultation with the BLM SLVFO archaeologist, three or fewer cairns or rock piles found together with no other associated features or artifacts were documented as isolated finds.

Cairns are ubiquitous in the San Luis Valley and often it can be difficult to determine their age and affiliation. For this project, Specific criteria were developed to identify cairns as American Indian, Settler, or Unknown components. Cairns that are directly associated with American Indian artifacts (chipped or ground stone tools), or which have no artifacts but display clear evidence of considerable time-depth (extensive lichen development, lichen bridging, and sediment accumulation), were considered American Indian resources.

Conversely, association with presumed Settler artifacts (metal, cans, glass, or wire) were a primary indicator of Settler-era cairns. A lack of substantial lichen growth or sediment accumulation that might suggest a more recent placement was also used to classify some cairns as Settler features. Large, pyramid-shaped cairns, which are often associated with sheepherders (perhaps erroneously in some instances), were also presumed to date to the Settler era. Finally, cairns of unknown cultural and temporal affiliation are those for which some time-depth is suggested by moderate lichen development and sediment accumulation, but no artifacts or other features are associated that can help to clarify the age of the resource.

Based on guidance from the BLM to preserve the limited field time for the focus of this project, cultural resources not clearly associated with potential historical trails were, in most instances, documented as site leads. Site leads include water containment features, American Indian open lithic and open camps, and settler-era trash scatters that would post-date any association with the OST. Sites with features not related to historical trails but which were small enough to efficiently and quickly document were fully recorded. Locational data and limited descriptive data were collected for each site lead for recording in the future. Site leads are summarized later in this chapter and appendix B includes locational information.

At the conclusion of fieldwork, lidar and other spatial data (including georeferenced GLO maps and aerial imagery) were examined in the vicinity of the linear features identified during the survey to assess the likelihood that they are associated with historical transportation routes. During this process, multiple linear features documented in the field were determined to result from natural processes (such as erosional features) or to have been more recently constructed or utilized (such as likely unauthorized roads). These were eliminated from the site recordings but are discussed in chapter 3 to illuminate the necessary steps of using multiple lines of evidence to assess the plausibility of historical trail segments being present. Chapter 3 also discusses more of the research done with lidar and other spatial datasets to assess potential historical trail segments.

Site Descriptions

Six sites—including one previously recorded site—were recorded during the project (table 2.2). Two of the sites have only American Indian components, three have only Settler components, and one is multicomponent.

5RN230

No. of Components:	1
Site Type:	Cairn
Cultural Affiliation:	Settler
Temporal Period:	Unknown; likely 20th century
Previously Recorded:	1981
Prior NRHP Status:	Needs data
NRHP Recommendation:	Not eligible
Artifacts Collected:	No
Topographic Location:	Eastern edge of a north-flowing drainage
Vegetation:	Rabbitbrush, sagebrush, grasses, and forbs.
Elevation:	2392 m (7850 ft)
Depositional Context:	Alluvial
Dimension and Area:	10 m x 10 m; 78.5 m^2
Ground Visibility:	Good; 80%

5RN230 sits on the eastern edge of a north-flowing drainage approximately 6.5 km east of the town of Del Norte and 0.8 km west of U.S. Highway 160. Two-track roads are located 250 m to the south and 330 m to the west. The site was previously recorded as part of the San Luis Archaeological Project (Haas *et al.* 1981) and was relocated for the current project. It was originally recommended as needs data, but no official determination has been made.

The site consists of one cairn constructed of two angular tuff boulders leaning against a third more rounded basalt boulder, with no other associated features or artifacts (figure 2.3). The rocks were intentionally placed and may have been intended to mark the drop off the eastern edge of the drainage. 5RN1360, another low stone cairn, is located

Figure 2.3. Overview of the cairn at 5RN230.

Table 2.1. Mapping Emigrant Trails (MET) categories (Buck *et al.* 1993) used to classify suspected trail or road segments documented during the 2017 fieldwork.

MET Class	Description
1	**Unaltered Trail**: Trail segment retains the essence of its original character and shows no evidence of substantial alteration by motor vehicles or modern road improvement. There is visible evidence of the original trail in the form of depressions, ruts, swales, tracks, scarring, vegetative differences, rock alignments along the trailside, and eroded trail features.
2	**Used Trail**: The trail retains the essence of its original character but shows past or present use by motor vehicles, typically as a two-track road overlaying the original wagon trail. There is little or no evidence of having been altered permanently by modern road improvements.
3	**Verified Trail:** The trail route is accurately located and verified from written, cartographic, artifact, geomorphic, and/or wagon wheel impact evidence. But because of weathering, vegetative succession, rodent surface digging or logging, trail traces will not be visible on the surface. What remains is a verified trail corridor that has not been directly altered by modern intrusion or development.
4	**Altered Trail:** The trail location is verified but elements of its original condition have been permanently altered, primarily by road construction, underground cables, pipelines, events, or modern developments leaving no evidence of its original appearance.
5	**Approximate Trail:** The trail is either so obliterated or unverifiable that its location is known only approximately. In many cases, trail segments have been destroyed entirely by development. In other cases, natural causes have removed any remains of a trail. In both cases, there is not enough documentary or geomorphic evidence to locate the trail accurately. Only the approximate route is known.
6	**Reconstructed Trail**: A segment of Class 1, 2, or 3 trail no longer exists in its previous form due to alteration or destruction but the trail segment was replicated by design and construction in its previous verified location to appear as the trail class it was before the alteration or destruction occurred.

Table 2.2. Summary of sites recorded during the 2017 fieldwork.

Site No.	Component Type	Site Type	Description	NRHP Recommendation
5RN230	Settler	Open architectural	Cairn	Not eligible
5RN539.2	Settler	Linear	Road or trail segment	Needs data
5RN1355	American Indian	Open architectural	Stone enclosure	Not eligible
5RN1356	Multicomponent	Open architectural	Cairns; stone enclosure	Needs data
5SH4959	American Indian	Open architectural	Stone enclosure	Needs data
5SH4969.1	Settler	Linear	Road or trail segments	Needs data

approximately 35 m to the northwest and may serve a similar function on the western side of the drainage. There is minimal sediment accumulation around the base of 5RN230 and very little lichen development, suggesting that placement of the rocks is relatively recent although they have been in place since at least 1980. The cairn exhibits no potential to provide additional data regarding its function or any possible association with the OST.

5RN539.2

No. of Components:	1
Site Type:	Linear (road or trail segment)
Cultural Affiliation:	Settler
Temporal Period:	Unknown
NRHP Recommendation:	Needs data
Artifacts Collected:	No
Topographic Location:	Base of a ridge
Vegetation:	Sagebrush and bunch grasses
Elevation:	2396 m (7860 ft)
Depositional Context:	Alluvial
Dimension and Area:	93 m x 20 m; 1792 m^2
Ground Visibility:	Good; 75%

5RN539.2 is a linear resource located approximately 100 m east of 5RN230 (figure 2.4). The site consists of a road or trail segment identified as a shallow swale that extends for approximately 75 m along the east side of a drainage, generally trending in a north-south direction. It is classified as an MET 1(unaltered trail). No artifacts or features were found in the vicinity of 5RN539.2. This segment is approximately 1 km east of the BLM proposed route, which in this area crosses terrain that appears to be rather unsuitable for a trail. Conversely, the general area where 5RN539.2 is located would be more than adequate terrain for a pack mule trail. This is most likely just a scalar issue related to how the proposed route of the West Fork was created, which is discussed more in chapter 4.

Examination of lidar shows that linear features extend beyond both sides of 5RN539.2, particularly to the south where it aligns directly with the Limekiln Wagon Tracks (5RN539.1 [Gantt *et al.* 2011; Zier 2010]) several kilometers to the south. Traces of this extension can be seen in aerial imagery, but it does not appear to be a modern or even semi-recent road. It does cross multiple modern roads that generally go in an east-west direction. The extensions, and recorded segments of 5RN539, are clearly visible in the lidar data. For these reasons, the newly recorded segment (5RN539.2) was determined to be associated with 5RN539.1.

Earlier recordings of 5RN539.1 indicate it may be associated with the "Northern Branch of the OST" (Zier 2010), but there is little to no archaeological evidence presented to support this in any prior recordings of the site. Additionally, as discussed more in chapter 1, the OST was primarily a pack mule route—wagons and other wheeled vehicles were seldom used on the OST. The presence of wagon ruts could argue against a firm association with the OST; however, we also know that many later routes used by wagons did follow (or closely followed) the routes used by travelers on the OST. Additional data will be needed to support any firm link with the OST, but it is clear both recorded segments of 5RN539 are related to historical trails in this area of the San Luis Valley. Chapter 3 provides more detailed information on lidar investigations of this site and others.

5RN1355

No. of Components:	1
Site Type:	Open Architectural-Stone Enclosure
Cultural Affiliation:	American Indian
Temporal Period:	Pre-A.D. 1800s
NRHP Recommendation:	Not eligible
Artifacts Collected:	No
Topographic Location:	Alluvial fan
Vegetation:	Rabbitbrush, sagebrush, grasses, and forbs.
Elevation:	2407 m (7897 ft)
Depositional Context:	Alluvial fan deposits with outcropping decomposing bedrock.
Dimension and Area:	10 m x 10 m; 78.5 m^2
Ground Visibility:	Good; 80%

5RN1355 is an open architectural site located on the edge of an alluvial fan overlooking Spring Gulch. The site consists of a single stone enclosure constructed from six basalt boulders placed along a single course to form a semi-circle (figure 2.5). Smaller rocks have been used to fill in some of the gaps between the boulders. The open end of the enclosure faces northwest, while the closed end faces southeast overlooking the drainage. The enclosure measures approximately 1.5 m long by 0.3 m wide.

Lichen growth observed on some of the larger boulders indicates that 5RN1355 is likely related to

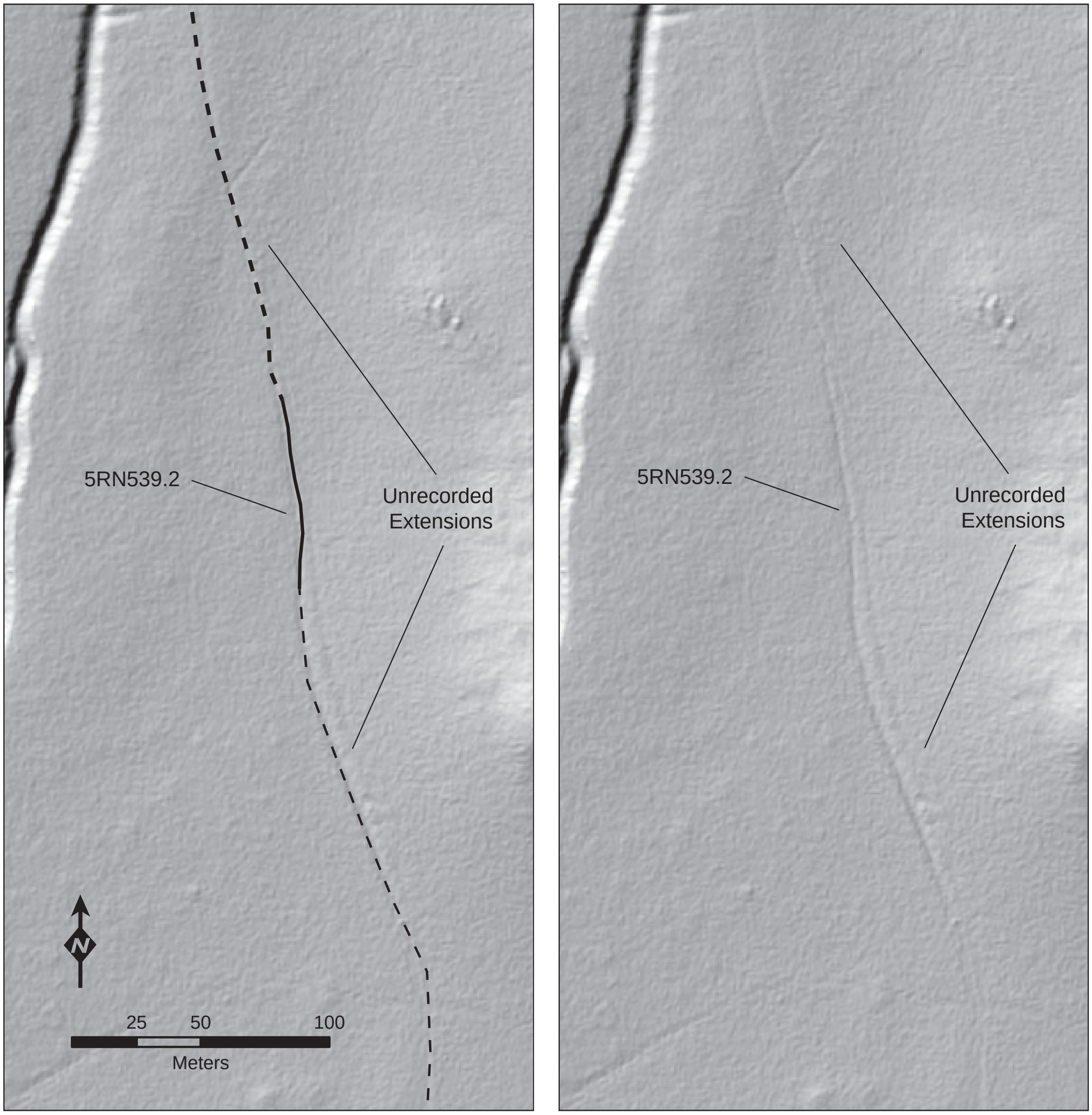

Figure 2.4. Hillsahded bare-earth surface models from lidar map of 5RN539.2. Left panel shows the recorded segment and the unrecorded extensions traced in the lab. The right panel shows the same basemap but without the traced segments.

American Indian use of the area. Similar features have been documented across the San Luis Valley (Mitchell 2012, 2015; Mitchell and Falk 2017), many of which are considered seasonal residential structures, further supporting the American Indian affiliation. However, no artifacts were found in association with the feature so there is currently no additional evidence to support this conclusion. The site is also heavily eroded and deflated, with no potential for intact, buried cultural levels or datable features within or around the enclosure. As such, there is little chance that further investigation at 5RN1355 would help to clarify the age and affiliation of the enclosure or provide additional information about past human activity in this part of the San Luis Valley.

Figure 2.5. Overview of stone enclosure feature at 5RN1355 (top); close-up of wall construction and lichen growth (bottom).

5RN1356

No. of Components:	2
Site Type:	Cairns; artifact scatter
Cultural Affiliation:	American Indian; Settler
Temporal Period:	Unknown
NRHP Recommendation:	Needs data
Artifacts Collected:	No
Topographic Location:	Knoll
Vegetation:	Rabbitbrush, sagebrush, and grasses.
Elevation:	2400 m (7874 ft)
Depositional Context:	Shallow residuum and dense gravels overlying bedrock.
Dimension and Area:	100 m x 140 m; 11,223 m^2
Ground Visibility:	Good; 80%

5RN1356 is a multicomponent open architectural site spread across the top of a small knoll approximately 15 km south of the town of Monte Vista (figure 2.6). The knoll is bounded to the north and south by two-track roads, and the broader area is dissected by numerous east-flowing drainages that originate on the slopes of Greenie Mountain, which is 2 km to the west.

Features 2 and 3, located approximately 25 m apart, were recorded as American Indian components. Feature 2 is a cairn that includes 20 to 30 small basalt boulders and measures 1.8 m in length, 1.2 m in width, and is 0.4 m high (figure 2.7[A]). Much of the cairn is covered with heavy lichen growth, and some lichen bridging between the rocks was observed. No artifacts were found in association with the cairn.

Feature 3 is a partial stone enclosure made from basalt boulders that measures 2.0 m in diameter (figure 2.7[B]). The enclosure is discontinuous and some boulders scattered in the immediate area may have originally been part of the structure. The west wall makes use of naturally fractured outcrops of bedrock; the east wall has one course of intentionally stacked rocks. Some of the boulders have a crust of calcium carbonate on the top side indicating that they have been displaced, likely in the recent past. Most of the rocks have considerable lichen growth and one flake was found about three meters south of the enclosure. Similar features have been documented in the San Luis Valley (Mitchell 2012, 2015; Mitchell and Falk 2017), many of which have been shown to be seasonal residential structures. Additional data

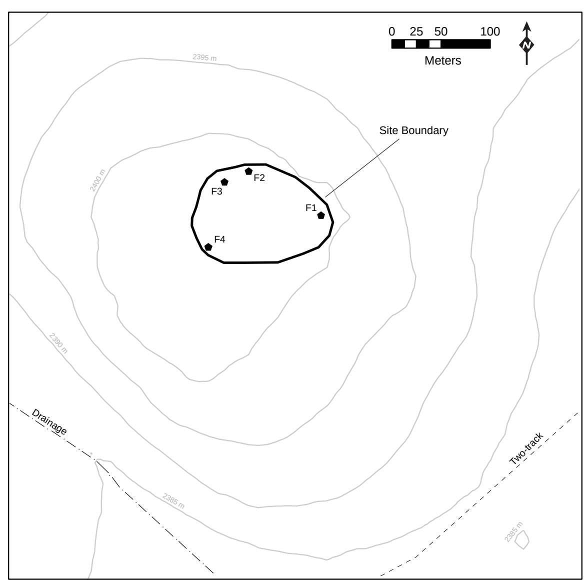

Figure 2.6. Sketch map of 5RN1356.

Figure 2.7. Overviews of the four features documented at 5RN1356. (A: Feature 2, American Indian cairn; B: Feature 3, American Indian stone enclosure; C: Feature 1, pyramid shaped Settler cairn; D: Feature 4, small Settler cairn, note the sun-bleached mammal tibia in the middle of the feature.)

are needed for Feature 3 to fully evaluate the NRHP eligibility.

Features 1 and 4 were identified as likely Settler components of 5RN1356. Feature 1 is a tall stacked stone cairn located on the eastern edge of the knoll (figure 2.7[C]). The cairn, which is 2.0 m in diameter and 1.5 m tall, is visible from a considerable distance and may have served as a locational marker. No lichen growth is present on any of the rocks, and one key-opened can lid was found nearby.

Feature 4 is a smaller cairn near the western boundary of the site, which consists of around 20 angular basalt boulders and measures 1.8 m long, by 1.7 m wide, by 0.5 m high (figure 2.7[D]). A small amount of lichen growth is present on the sides and undersides of the rocks, and a large mammal tibia is wedged into the middle of the cairn. Calcium carbonate crust on the exposed sides of rocks in both Features 1 and 4 indicate that they have been displaced and were intentionally moved to their current locations. Features 1 and 4 are considered not to be contributing to an eligible or needs data recommendation.

5SH4959

No. of Components:	1
Site Type:	Stone enclosure
Cultural Affiliation:	American Indian
Temporal Period:	Unknown
NRHP Recommendation:	Needs data
Artifacts Collected:	No
Topographic Location:	Bench

Vegetation:	Rabbitbrush, low sagebrush, yucca cactus, sparse pinion pine, and mountain mahogany.
Elevation:	2396 m (7860 ft)
Depositional Context:	Mixed residuum and colluvium
Dimension and Area:	10 m x 10 m; 78 m^2
Ground Visibility:	Good; 80%

5SH4959 is an open architectural site located at the mouth of Tracy Canyon approximately 9.5 km south of the town of Saguache. The site consists of a single stone enclosure constructed of stacked basalt boulders that make use of naturally occurring bedrock that outcrops along the southern and northern walls (figure 2.8). The enclosure is approximately 2.5 m in diameter and has a circular shape with a possible opening that faces to the west. Several stones scattered around the perimeter and downslope to the south appear to be displaced and may have originally been part of the stone enclosure. Heavy lichen growth is present on many of the rocks, but no associated artifacts, features, or cultural staining were observed in or around the enclosure.

The site is most likely associated with American Indian occupation of the area. The feature is similar to others documented in the San Luis Valley (Mitchell 2012, 2015; Mitchell and Falk 2017), many of which have been shown to be seasonal residential structures. The considerable amount of lichen development on the rocks also suggests substantial time has passed since their placement and further supports this designation. Additional investigation is necessary to fully evaluate the site, namely more complete mapping of the enclosure and limited testing in the shallow, rocky sediment within, which may provide additional data about the age and function of 5SH4959.

5SH4969.1

No. of Components:	1
Site Type:	Linear (road segments and swales)
Cultural Affiliation:	Settler
Temporal Period:	Prior to 1875
NRHP Recommendation:	Need data
Artifacts Collected:	No
Topographic Location:	Narrow valley
Vegetation:	Rabbitbrush, sagebrush, and grasses.
Elevation:	2401 m (7880 ft)
Depositional Context:	Alluvial
Dimension and Area:	960 m x 30 m; 32,209 m^2
Ground Visibility:	Good; 60 to 80%

5SH4969.1 is a linear resource located in a narrow valley formed by two low ridges 13 km northeast of Del Norte and 15 km west of the town of Center. As show in figure 2.9, the site encompasses two road segments (LN1 and LN2) and one swale (LN 3). Each segment is summarized in table 2.3.

LN1 is a segment of two-track that measures just

Figure 2.8. Overview of stone enclosure at 5SH4959. Tape measure at 1 m for scale.

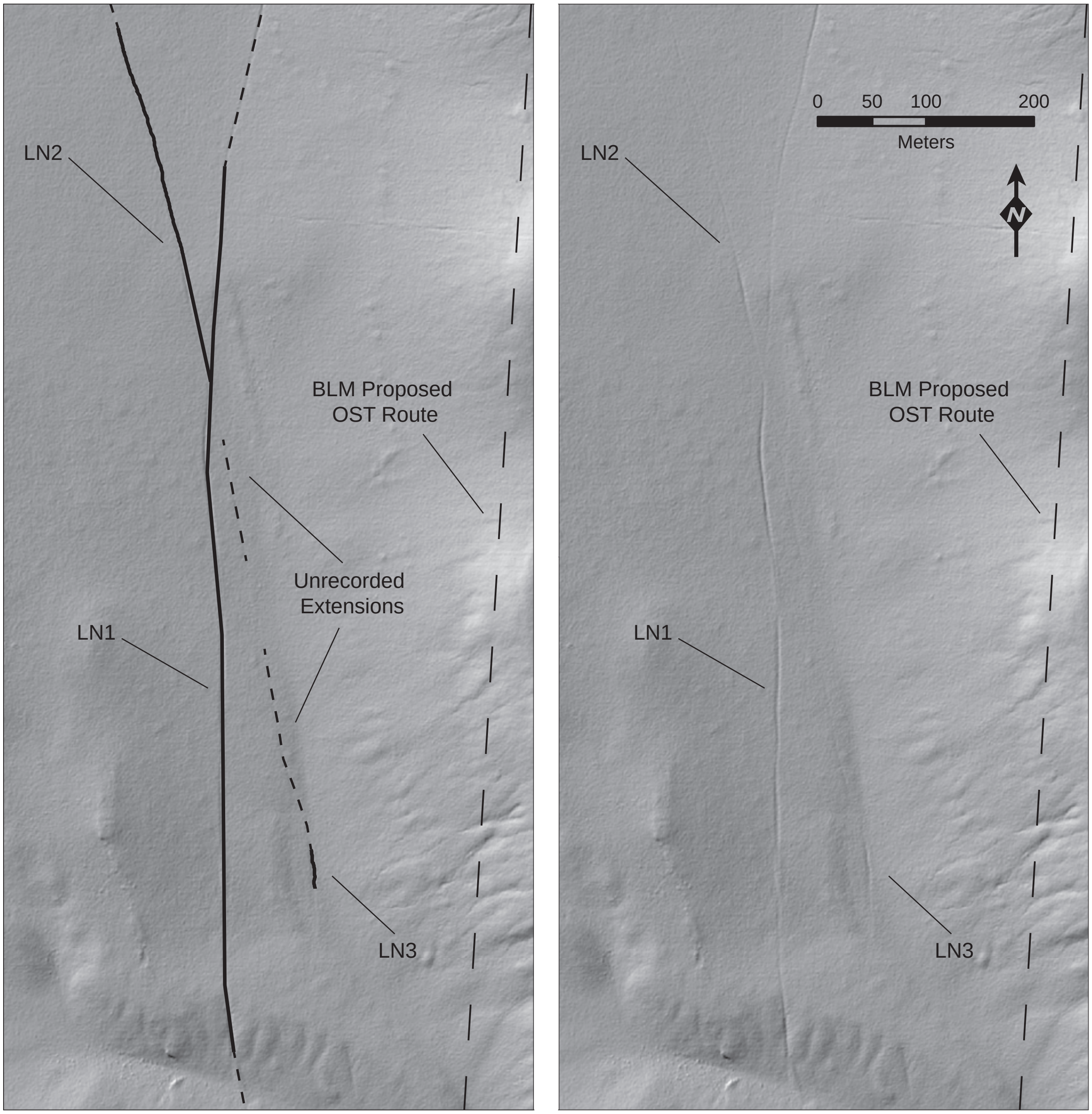

Figure 2.9. Hillsahded bare-earth surface models from lidar map of 5SH4969.1. Left panel shows the recorded segments and the unrecorded extensions traced in the lab. The right panel shows the same basemap but without the traced segments.

over 820 m in length and is part of a longer BLM road that is currently closed to vehicle use (figure 2.10). The northern half of LN1 is 1.5 m wide and flat, with little depth to the tracks. The southern half is 2.5 m wide and cut more deeply into the accumulated sand. Modern vehicles using the track have created a third rut down the center of the road in some areas.

LN2 is a 340 m long segment of an ephemeral two-track that veers to the northwest near the northern end of LN1. This segment is approximately 2 m in width and has a very shallow swale. LN3 is a subtle, grass-covered swale that parallels LN1 approximately 80-100 m to the east. The recorded segment is relatively short and narrow, and perhaps the most likely to be an intact remnant of a historical trail at the site.

No artifacts or other features relating the site to the OST were found in association with the linear features. LN1 and LN2 are less than 100 m west of a

Figure 2.10. Overview LN1 at 5SH4969.1. Evidence for recent use is clearly seen via the two-track, but LN1 also closely aligns with a GLO road dated to at least A.D. 1875.

Table 2.3. Summary of linear segments at 5SH4969.1.

Line Number	MET Classification	Length (m)	Width (m)	Depth (cm)
LN1	2 (Used Trail)	820	1.5-2.5	8-30
LN2	2 (Used Trail)	340	2	8
LN3	1 (Unaltered Trail)	37	1.5	10

road depicted on the GLO map (labeled "Old Road") and the proposed OST route from the BLM is about 150 m east of the recorded swale and roads. Inspection of lidar data and historical maps indicate the recorded segments may extend for several hundred meters on either side, including the more ephemeral LN3. This suggests the site, while not definitively linked to the OST, is likely part of a larger transportation network that ran along the western edge of the San Luis Valley. LN1 generally follows the route of the "Old Road" depicted on the GLO map (as well as on the 1967 quadrangle), and while they do not align precisely, it is likely LN1 is the same or a modern incarnation of this GLO road. Thus, this segment dates to at least 1875 when the GLO map was drafted and it is possible this road was created roughly around the route of the OST or other historical trail networks in the area. Additional data will be needed to support any link with the OST, but it is clear the three recorded segments of 5SH4969.1 are related to historical trails in this area of the San Luis Valley.

Isolated Finds

Isolated artifacts and features recorded during the project are summarized in table 2.4. These include five American Indian resources, eleven Settler resources, and three isolates of unknown age and affiliation. None can be attributed to anything other than a relatively broadly defined temporal period (*e.g.,* the late 1800s or early 1900s) or cultural group (American Indian or Settler). There is no potential for further investigation to provide additional data that would help clarify the age, affiliation, or function of any of these resources and thus all isolated finds are recommended as not eligible for the NRHP.

Two of the American Indian isolates are small open lithic scatters, while the other three are complete or fragmented bifaces in various stages of production. The larger of the two lithic scatters contains four white chert flakes. None of the artifacts retain cortex on the outer surface, suggesting that they result from later stage flaking. The other lithic scatter consists

Table 2.4. Summary of isolated finds recorded during the 2017 fieldwork.

Isolate Number	Component Affiliation	Description	Raw Material
5RN1357	Settler	Cairns (2)	Basalt boulders/cobbles
5RN1358	Unknown	Cairns (2)	Basalt boulders/cobbles
5RN1359	Settler	Cairn	Basalt boulders/cobbles
5RN1360	Settler	Cairn	Basalt and rhyolite boulders
5RN1361	American Indian	Complete basalt biface	Basalt
5RN1362	Settler	Cairn	Basalt boulders/cobbles
5RN1363	Settler	Cairn	Basalt boulders/cobbles
5RN1364	Settler	Cairn	Basalt boulders/cobbles
5RN1365	Settler	Cairn	Basalt boulders/cobbles
5RN1366	American Indian	Basalt biface fragment	Basalt
5SH4960	Settler	Prospect pit	-
5SH4961	American Indian	Flakes (4)	White chert
5SH4962	American Indian	Flakes (2)	Rhyolite
5SH4963	American Indian	Basalt biface fragment	Basalt
5SH4964	Unknown	Cairn	Basalt boulders/cobbles
5SH4965	Unknown	Cairn	Basalt boulders/cobbles
5SH4966	Settler	Prospect pit	-
5SH4967	Settler	Cairn	Basalt boulders/cobbles
5SH4968	Settler	Cairn	Basalt boulders/cobbles

of two rhyolite flakes, one of which retains cortex and has use-wear along a lateral margin. Possible evidence of heat-treatment was also observed on the primary flake. The remaining American Indian isolates include a complete biface, a late-stage biface midsection fragment, and a non-identified fragment of a mid-stage biface. All three artifacts are made of (presumably local) basalt.

Nine of the Settler isolates are cairns; most are constructed of basalt boulders or cobbles while one has several tuff and rhyolite boulders used in addition to the basalt rocks. The cairns range in size and shape, from large pyramid-shaped structures composed of roughly 20-25 boulders and cobbles (figure 2.11[A and D]), to smaller and more haphazardly stacked piles of 5-10 rocks (figure 2.11[B and C]). The isolated cairns are often located on knolls or along the edge of drainages and many of them may have been intended to serve as highly visible markers of places or features on the landscape (figure 2.11[E]). Many of the cairns have calcium carbonate on their exposed surfaces (figure 2.11[B]), attesting to intentional displacement and stacking of the rocks. Additionally, two prospect pits were also identified as Settler component isolated finds. Both prospect pits are located near the mouth of Tracy Canyon, one atop a small knoll and the other along a low ridge approximately 215 m to the southeast.

The three isolated finds of unknown age and affiliation are also cairn features (figure 2.12). One of the cairns is situated in between the two prospect pits (and a little to the west) near the mouth of Tracy Canyon, while another is located along a ridge 780 m to the southwest. The last unknown isolate, which consists of two small cairns a few meters apart, is located near a two-track road just north of Spring Gulch in southern Rio Grande county. Moderate lichen growth and sediment accumulation were observed for most of the cairns, which suggests at least some time-depth for these features. Likewise, that only small patches of calcium carbonate remain on many of the rocks may indicate that they have been in place long enough for carbonates to have dissolved much of the rind. Unfortunately, no associated artifacts were found nearby that could help verify the antiquity or affiliation of any of the cairns, hence their temporal and cultural attribution as unknown components.

Site Leads

The 11 site leads recorded for this project are summarized in table 2.5. A summary table with locational information is also provided in appendix B. As discussed in chapter 1, this project was primarily focused on documenting historical roads, trails, and other features that might provide evidence to support

Figure 2.11. Selected examples of Settler-era cairns documented as isolated finds. (A: Pyramid-shaped cairn from 5RN1365; B and C: smaller, haphazardly stacked cairns from 5RN1364 5RN1362, respectively, tape measure is 1 m in C; D: tall, pyramid-shaped cairn from 5SH4967; E: view from afar of the cairn depicted in D showing how visible such cairns can be.

the existence of the proposed West Fork of the North Branch of OST in the western San Luis Valley. Thus, at the direction of the BLM, resources encountered during inventory that met the criteria for sites—but which were determined not to be related to this main research theme—were documented as site leads to preserve the limited field time for the focus of the project. Site leads were noted but not fully recorded in the field, and all of them warrant further investigation in the future.

Figure 2.12. Two examples of isolated find cairns determined to be of unknown age. Top is from 5SH4964, bottom from 5SH4965. Tape measure pulled to 1 m in both images.

There are four American Indian site leads, including two open architectural and two open lithic sites. The two architectural sites are a stone enclosure and a possible fire ring, both of which were determined to likely be of considerable age based in part on the amount of lichen development on the rocks. No artifacts or other features (such as cultural staining or fire-cracked rock) were found in association with either structure, although it is possible that more in-depth investigation of these site leads could result in the recovery of additional cultural material. The other two American Indian site leads are rhyolite outcrops that likely served as lithic procurement sites. Tested cobbles were observed at both sites, and one them also contained several chipped stone flakes and a mid-stage biface fragment.

The six Settler component site leads include a water containment feature, four artifact scatters, and a cairn site. The water containment feature is an earthen dam at the base of a large knoll in the foothills of the La Garita Mountains and extends for approximately 160 m to the east from its base. The cairn site is an area approximately 4 km northwest of Greenie Mountain that contains of 20 or more small-to-medium-sized cairns. Visible impressions from recently displaced rocks around the area suggest that at least some of the cairns are likely quite recent. All the Settler era artifact scatters consist of domestic debris, including various combinations of metal cans (including sanitary, solder-dot, and tobacco tins), glass, porcelain, earthen ware, ceramics, wood, and metal wire. One site lead is a multicomponent site and includes a biface along with a Settler-era domestic debris scatter.

Table 2.5. Summary of site leads documented during the 2017 fieldwork. Appendix B provides additional locational information for each site lead.

Site Lead No.	Component Type	Site Type	Description
SL01	Settler	Water containment	Earthen dam
SL02	Multicomponent	Open lithic; Artifact scatter	Biface; domestic debris scatter
SL03	American Indian	Open architectural	Stone enclosure and one flake
SL04	Settler	Artifact scatter	Domestic debris scatter
SL05	Settler	Artifact scatter	Domestic debris scatter
SL06	American Indian	Open lithic, quarry	Rhyolite outcrop, tested cobbles
SL07	Settler	Artifact scatter	Domestic debris scatter
SL08	American Indian	Open lithic, quarry	Rhyolite outcrop, tested cobbles, flakes, and a biface
SL09	Settler	Artifact scatter	Domestic debris scatter
SL10	American Indian	Open architectural	Rock alignment and possible fire ring
SL11	Settler	Unknown	Cairns (20+; some likely modern)

3 Geospatial Analysis

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Christopher A. Davis

Prior research on the Old Spanish Trail has shown that lidar data is imperative to understanding and finding historical trail segments (Johnston 2019). Often, these trail traces are so faint they are not visible on the ground surface or in aerial imagery. Lidar, which stands for Light Detection and Ranging, uses light energy in the form of lasers to measure the distance from an origin point to a reflection point and the measured range between these two points creates a surface or terrain model. These digital terrain models can have a vertical accuracy as good as 10 cm, creating highly detailed surface models that can illuminate microtopographic features like historical trails.

One of the primary reasons the West Fork was not included in the National Historic Trail designation was the lack of evidence for its use during the period of significance. Thus, in addition to doing survey in selected areas where the trail might have passed, the other primary goal of this project was to use a variety of methods to build datasets to guide future research on the West Fork. These datasets relied primarily on lidar data to examine the landscape around the proposed West Fork route in search of potential historical trail segments.

Analysis Methods

Original GLO survey plats, mapped between 1858 and 1881, and USGS 1:24,000 quadrangle maps, created between 1964 and 1968, were used to identify the location of historical roads and trails documented in the western part of the San Luis Valley from the decades following the OST period of significance (1829-1848) up through the mid-twentieth century. Additional information on modern roads, trails, possible swales, and other linear features

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in the project area were derived from lidar data and recent aerial imagery.

Aerial imagery was examined using a standard base map layer in ArcMap 10.8 and Google Earth. Lidar data and digital raster graphic (DRG) topographic maps (1:24,000 scale) were downloaded from the USDA Geospatial Data Gateway (https://datagateway.nrcs.usda.gov). When necessary, bare earth digital elevation models of the lidar datasets were manually converted to hillshades in ArcMap. Original GLO survey plats were obtained as PDF files from the General Land Office Records Automation website (https://glorecords.blm.gov). Survey plats were georeferenced using a shapefile of Public Land Survey System sections in southern Colorado and all road and trail segments depicted on them were digitized in ArcMap.

Once pre-processing was complete, lidar hillshades, GLO plats, and DRG maps were loaded into ArcMap, and overlain by shapefiles of the resources documented by PCRG and file search data (see chapters 1 and 2) and the proposed route of the West Fork of the OST. Finally, a set of polygons was created to divide the western side of the valley into nine separate analytic units, or Sections, for the purposes of analysis (figure 3.1). The polygons were generally centered on the proposed West Fork route and extend roughly 6-8 km east and west of the route.

The initial step in the analytical process involved further investigation of the linear sites recorded by PCRG. First, the location of the linear sites was compared to historical roads and trails from the GLO plats and DRG maps and the proposed route of the West Fork to assess possible associations between them. Next, hillshade rasters were examined to determine if the linear sites continued as swales that were not observed (and therefore not recorded) by the PCRG field crew, but which are nonetheless visible in the lidar data. Swale continuations identified in the lidar data were also checked against aerial imagery to ensure they were not modern roads or other natural features that are unlikely to represent road or trail segments. These data were then used to draw conclusions about the full extent of the sites documented in 2017 and whether or not they are likely to represent segments of the West Fork or other historical routes documented on the western side of the San Luis Valley. The results of this phase are briefly discussed here but are also shown in chapter 2 with each linear site description.

The second analytical step focused largely on BLM lands within the nine project sections and was aimed at identifying swales that may be associated with historical routes, including the West Fork, and therefore warrant additional investigation. This was also meant to explore the potential value of using lidar data, in particular, to identify possible linear features and help direct the pre-fieldwork planning stages of future research projects involving documentation of historical roads and trails in the San Luis Valley.

Lidar data were examined closely for linear features that could plausibly represent historical routes, and aerial imagery was inspected for well-kept roads or other features in the same location as the identified swales. Swales that did not match obviously modern or natural features were then compared to the location of roads depicted on the GLO and DRG maps, as well as the proposed West Fork route, to determine if they were a potential match for any of the historical roads and trails in these datasets. Finally, swales deemed to warrant further investigation were given a priority rank based on several factors, including whether they occur on BLM land and their proximity and similarity to documented historic roads and trails in the area. While the focus was primarily on BLM lands, other parcels, including private lands, were inspected to ensure no obvious traces were missed. However, examining the lidar data at the scale needed to identify these features—about 1:4000—is an arduous process. Future research on the West Fork or other historical trails research would be well-served by accessing the latest lidar datasets prior to conducting the fieldwork and inspecting potential survey blocks for any features this analysis may have missed.

Misinterpreted Linear Features

Fourteen linear features were originally recorded in the field but upon further examination during this analysis were deemed not to meet the criteria for inclusion as cultural resources for various reasons. Seven of the misinterpreted linear features occur as a parallel series of shallow and narrow depressions spaced 20-30 m apart on an alluvial fan at the base of the La Garita foothills just north of Tracy Canyon. Plotting the GPS data for these depressions onto a lidar hillshade map of the area clearly demonstrates that all seven features are segments of contour furrows created to control erosion and runoff from the foothills of the La Garita Mountains into the valley below.

All but one of the other possible swales were

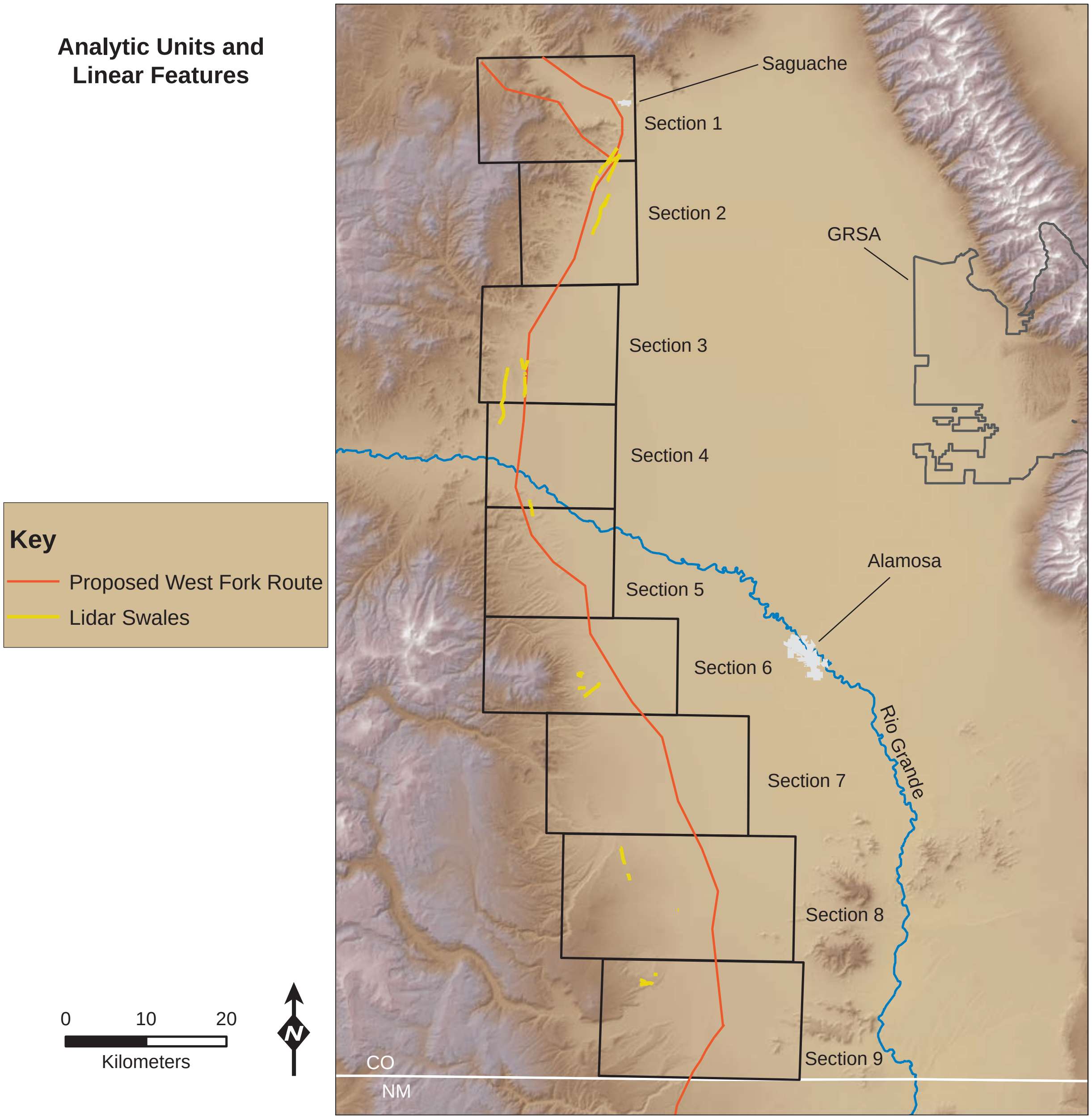

Figure 3.1. Shaded relief map of the San Luis Valley showing the nine sections used to classify the lidar data and the locations of each lidar feature noted with each section.

found to be natural erosional features. This includes three short, narrow, and shallow depressions that were originally interpreted as part of 5SH4969.1 but are actually rills eroded into the bank of the drainage at the southern terminus of the site. The remaining feature, recorded as a subtle swale that converged with a trail providing access to a drainage in the northern part of Tracy Canyon, is part of a modern two-track road. The two-track is visible in recent Google Earth images, but not in lidar data, indicating that it likely results from recent, and probably unauthorized, vehicle use in the area. This highlights the importance of combining lidar data with in-field analysis while in search of historical trails.

Lidar Features

This analysis identified 30 linear features that could plausibly be related to the West Fork. This section describes each of the nine analytic units and the swales identified in each; one of these, Section 7, contained no swale features. This is followed by a short summary of where resources should be dedicated in future phases of research on the West Fork using the data compiled here. Figure 3.1 depicts the nine analytic units described in this section in relation to the larger landscape, with additional figures providing closer views of the sections. Not every feature observed is depicted in close-range images of the lidar data; however, examples are provided that depict relevant features and landforms. Shapefiles of all the data discussed below are on-file with the BLM SLVFO as well as with PCRG and are available upon request.

Section 1

Section 1 is the northern-most parcel examined and includes the junction of a possible split in the proposed West Fork route as well as where it likely joined the East Fork of the North Branch, near Saguache (figure 3.2). BLM land accounts for about 40 percent of the area of Section 1, which also includes land used for farming and ranching, as well as developed land around the town of Saguache. This development may have altered or destroyed sections of the West Fork. Several GLO roads traverse the area, as does Highway 285 and numerous modern dirt roads. Some of these modern roads align with GLO roads, which may also have been portions of the OST. No new resources were documented during the 2017 fieldwork, and only a limited amount of survey in 2017 was done in this section, all on the southern end.

There are three swales noted in the lidar data, all continue south into Section 2 (table 3.1). Swale 1a is about 400 m west of the "Road to Los Conejos" depicted on the GLO maps, and roughly follows the same course. This segment is visible in aerial imagery and it joins with and continues as a modern dirt road, which was not included in the segment noted here. Swale 1a continues south into Section 2, noted as Swale 2a.

Swale 1b is also adjacent to the "Road to los Conejos", but the trending direction is more horizontal (east-west) whereas the GLO road is more north-south in this area. Swale 1b intersects Swale 1a, and it also intersects a modern dirt road. The swale terminates at a modern ditch on the edge of an agricultural field. It is partly visible in aerial imagery, but some sections are only barely visible, if at all, suggesting it may be somewhat old. Swale 1b continues south as Swale 2b.

Swale 1c is the longest in Section 1 and is the only one to even partially cross BLM land. It is at least 480 m west of the "Road to los Conejos" and is unlikely to be that road, although it does trend in a similar direction. It also trends in roughly the same direction as the proposed West Fork route, and on a similar trajectory to Swale 1a. Its northern end terminates in an open area along a stream bed and it continues south as Swale 2c. It is also not visible in aerial imagery except in short sections, suggesting it is likely older than some of the other swales. Because of its likely age, proximity to the proposed route, trending direction, and that is crosses BLM land, Swale 1c is a good candidate for further investigations.

Section 2

Section 2 contains six different swale segments, summarized in table 3.2. Three of these are continuations of swales in Section 1. BLM land accounts for about 25 percent of the total area of Section 2 and is mostly concentrated in the northwestern quarter; only a small portion of the proposed West Fork route crosses BLM land in this section. PCRG documented multiple isolated finds and site leads during 2017 in this section, including some cairns and possible cairns, along with one site. None were thought to be related to the West Fork.

Swales 2a-2c are continuations from Section 1 and largely follow the same descriptions. Swale 2a is faintly visible in aerial imagery and terminates abruptly in an open area about 2 km southeast of the mouth of Tracy Canyon. Swale 2b terminates on the western end just east of the intersection with Swale 2c. Like Swale 1b, it is likely trending too east-west to plausibly be the West Fork but should still be examined during future

Table 3.1. Summary of lidar features documented in Section 1.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 1a	1010	Northeast-Southwest	No	Continues as 2a
Swale 1b	1400	Northeast-Southwest	No	Continues as 2b
Swale 1c	2030	Northeast-Southwest	Yes	Continues as 2c

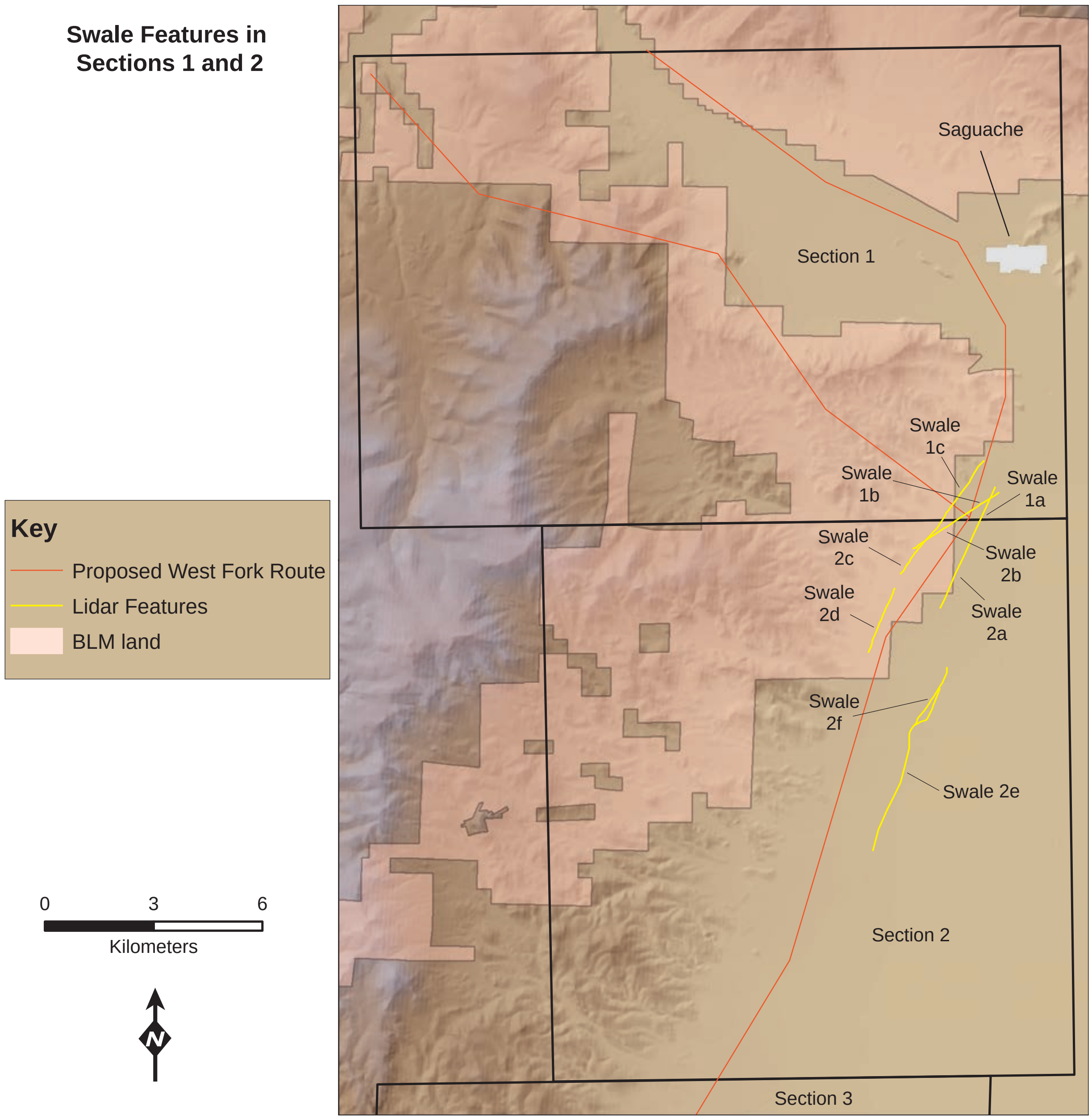

Figure 3.2. Shaded relief map of Sections 1 and 2, showing identified lidar features in relation to the BLM proposed route and BLM land.

Table 3.2. Summary of lidar features documented in Section 2.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 2a	2700	Northeast-Southwest	Yes	Continues as 1a
Swale 2b	1445	Northeast-Southwest	Yes	Continues as 2b
Swale 2c	1895	Northeast-Southwest	Yes	Continues as 2c
Swale 2d	1955	Northeast-Southwest	Yes	Possibly related to 2c
Swale 2e	5020	Northeast-Southwest	No	5SH.4143.1 on this segment
Swale 2f	1890	Northeast-Southwest	No	Fork of 2e

phases of work on the West Fork. Over half of the swale is on BLM land and interestingly it intersects with the PCRG survey area from 2017 in multiple places but was not documented, attesting to the subtleness of these features.

Swale 2c is all on BLM land and is a continuation of Swale 1c. It continues the same trending direction as 1c and terminates on the southern end just north of the creek that feeds out of Tracy Canyon. Figure 3.3 shows a close-up of the intersection of Swales 2b and 2c, highlighting the trending directions of both but also how faint and subtle these features are in the lidar data. It is only partially visible in aerial imagery but is quite faint where it can be seen. Like Swale 2b, the 2017 PCRG survey intersects the swale but was not noted by the field crews. The southern terminus is about 400 m north of the northern end of Swale 2d, which is trending in roughly the same direction. It is possible they are related but are separated by an arroyo or creek bed and a dirt road.

Swales 2e and 2f are not on BLM land and are roughly 1.6 km from the proposed route of the West Fork. Swale 2f forks off of 2e and continues north while 2e makes a slight turn east then north,

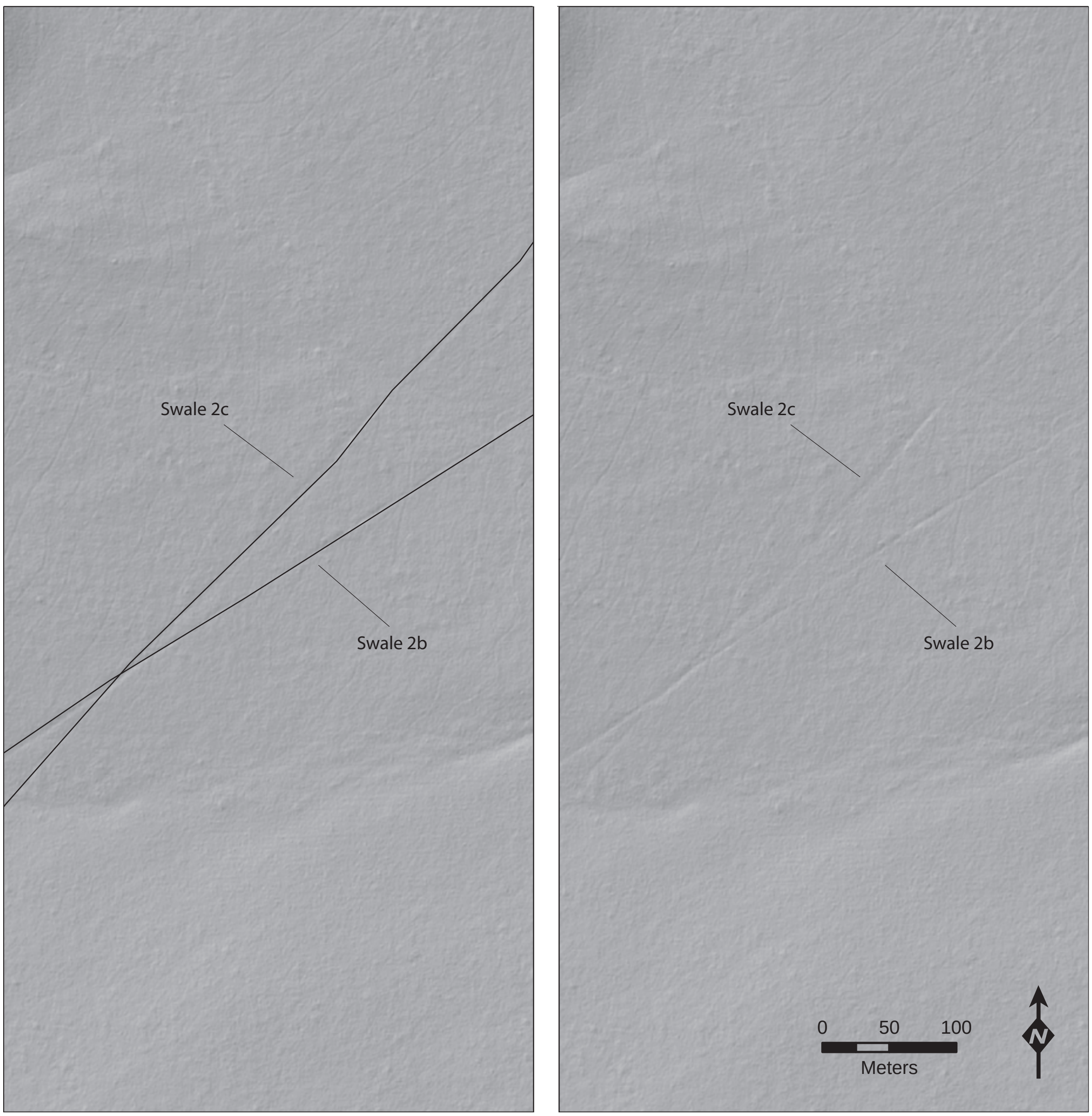

Figure 3.3. Labeled (left panel) and corresponding unlabeled (right panel) lidar maps of Swales 2b and 2c.

where it seems they may join again about 1 km north of the fork (figure 3.4). Both roughly parallel the "Saguache to Del Norte" road noted on the GLO plat. Site 5SH4143.1, discussed more in chapter 1, is a wagon rut site that sits right in the middle of Swale 2e, roughly 1.1 km south of the junction with Swale 2f. The recorders of this site believed it to be related to the Saguache to Del Norte road, and possibly the West Fork. The features roughly correspond to this road and it seems very plausible both Swales 2e and 2f are related to that road.

Section 3

Roughly 15 percent of the land is owned by the BLM in Section 3 (figure 3.5). PCRG recorded one site during the 2017 survey in this section; five of the six linear features noted are related to that site, 5SH4969.1 (table 3.3). The site contains three linear segments that were documented in the field (see chapter 2). Swale 3a is the northern continuation of the north-northeast trending LN1, while Swale 3c is the southern continuation of LN1. Portions of these features are depicted in chapter 2 in figure 2.9.

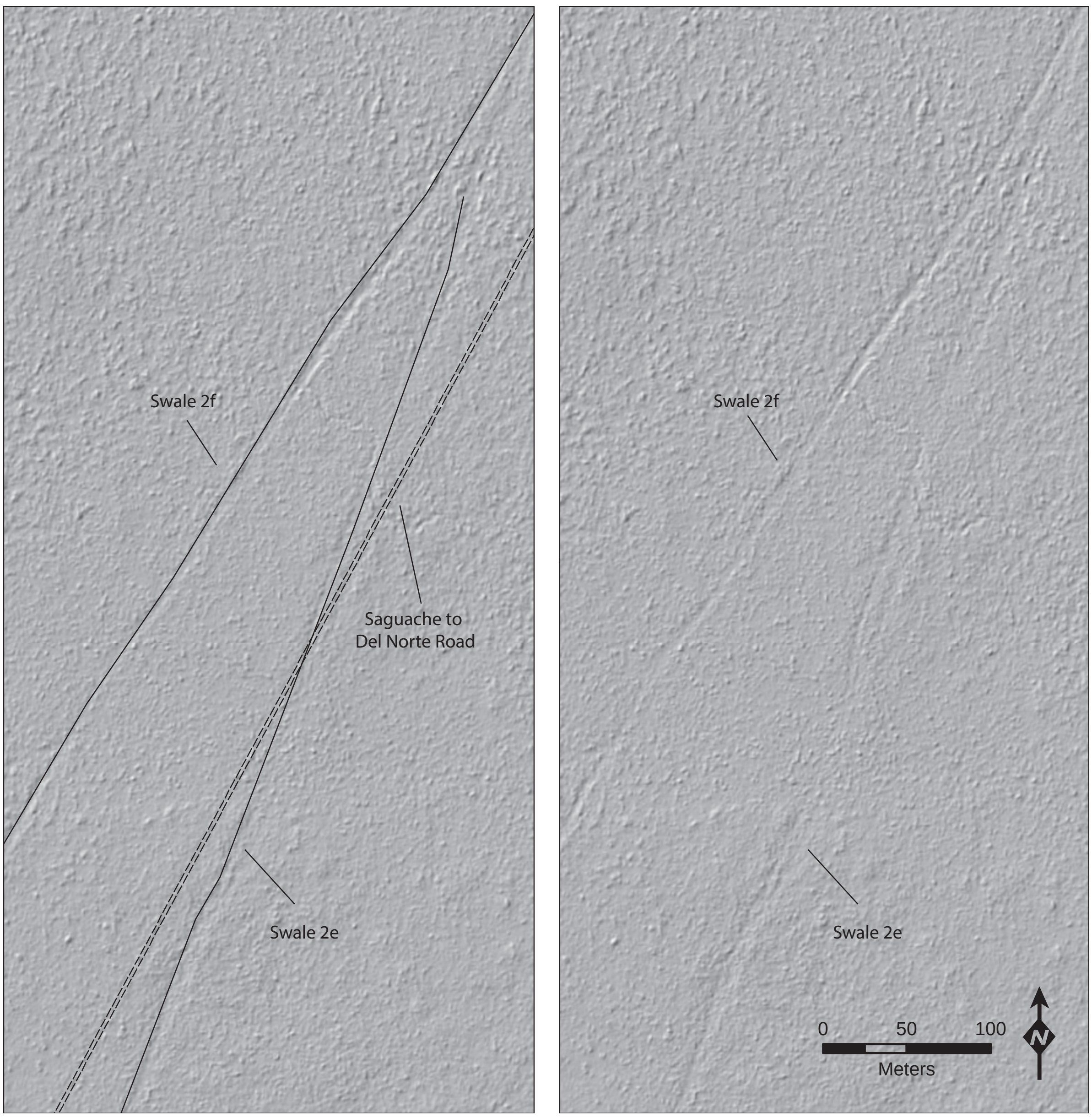

Figure 3.4. Labeled (left panel) and corresponding unlabeled (right panel) lidar maps of Swales 2e and 2f.

Table 3.3. Summary of lidar features documented in Section 3.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 3a	1285	North-South	Yes	Continuation of 5SH4969.1
Swale 3b	1345	North-South	Yes	Continuation of 5SH4969.1
Swale 3c	2545	North-South	Yes	Continuation of 5SH4969.1
Swale 3d	192	North-South	Yes	Continuation of 5SH4969.1
Swale 3e	115	North-South	No	Continuation of 5SH4969.1
Swale 3f	4480	North-South	No	Del Norte to Saguache Road

Swale 3b is the continuation of the north-northwest trending LN2. Swales 3a and 3b terminate on the northern end at a small residential development, which likely obliterated and remaining traces of this feature. Both of these segments, along with Swale 3c, are clearly visible in aerial imagery as a modern or recently used dirt road or two track.

Swales 3d and 3e are two short segments just west of LN1. Swale 3d is a continuation of LN3 while 3e is along the same trajectory to the north but is separated by about a 75 m break where no segment is visible in the lidar data. Swale 3e appears to converge, or nearly converge, with LN1. It is possible they are part of the same braided network. All five of these segments, and 5SH4969.1 itself, are likely associated with the "Old Road" noted on the GLO plat, which has an unknown relationship to the West Fork.

Swale 3f is about 2.5 km west of the other five swales in Section 3. This long feature roughly parallels the "Del Norte to Saguache Road" noted on the GLO plat, the same road likely associated with multiple swales in Section 2. It appears to maybe terminate on the southern end of Section 3 just north of Shaw Springs, but then continues into Section 4 as Swale 4f.

Two previously recorded linear segments align almost perfectly with the lidar tracing of Swale 3f. The Elephant Rocks Wagon Ruts (5SH4374.1 and .2) are discussed more in chapter 1, where an association is noted between this road and the Beale Expedition of 1853, and potentially the West Fork. Nearly the entire length of the segment seen in the lidar data sits on BLM land; even if an association to the West Fork cannot be found this is a potentially significant resource and future research should document more of this feature.

Section 4

BLM land accounts for only about 10-15 percent of the area of Section 4, concentrated in the northern and southwestern ends. Three swales were noted in the lidar data in this section (table 3.4). In 2017, PCRG had limited survey in this section, all on the south end where one linear site, 5RN539.2, was recorded, along with two isolated finds and two site leads. As discussed more in chapter 2, 5RN539.2 is a segment of the Limekiln Wagon Tracks site. Near the first recording of the site, 5RN539.1, an interpretive sign indicates an association with the OST and the West Fork, although to date no definitive archaeological evidence has been presented to support this assertion.

Swale 4a is an extension of 5RN539.2 to the north, while Swale 4b is an extension to the south and extends into Section 5 as Swale 5b. Portions of these two swales are also depicted in chapter 2 in figure 2.4. It is possible this connects to a road labeled "North Road" on the GLO plat which starts about 400 m north of Swale 4a and continues a similar trajectory. The north end of 4a terminates at a creek, which may have obliterated traces of the trail further north and any potential connection with the road listed on the GLO plat. The proposed route of the West Fork is about 1 km west of the site and swale segments.

Swale 4f is a continuation of Swale 3f, which aligns with the Del Norte and Saguache Road depicted on the GLO map. However, the GLO does not show the road extending this far south. Swale 4f also roughly parallels a modern dirt road that is about 100 m to the west (figure 3.6). The swale is partially visible in aerial imagery but is usually quite faint and not visible at all in many parts.

Section 5

Only one swale was noted in Section 5, where BLM land accounts for about 40 percent of the area (figure 3.7). Much of the BLM land is in a more topographically complex area, marked by undulating hills, downcutting, and generally more severe terrain than areas to the east. While this would potentially argue against an ideal place for trails to cross, the Limekiln Wagon Tracks are in the middle of this

Figure 3.5. Shaded relief map of Sections 3, 4, and the northern portion of 5, showing identified lidar features in relation to the BLM proposed route and BLM land.

Table 3.4. Summary of lidar features documented in Section 4.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 4a	280	North-South	Yes	Continuation of 5RN539.2
Swale 4b	685	North-South	Yes	Continuation of 5RN539.2
Swale 4f	2850	North-South	Yes	Continuation of Swale 3f

terrain indicating it was used as a historical travel route. Travelers on the OST, as noted by examples in chapter 1, generally traveled on the straightest path possible and chose to go up and over hills rather than around, like later wagon routes did. This is evident at the Limekiln site, where the tracks follow the terrain

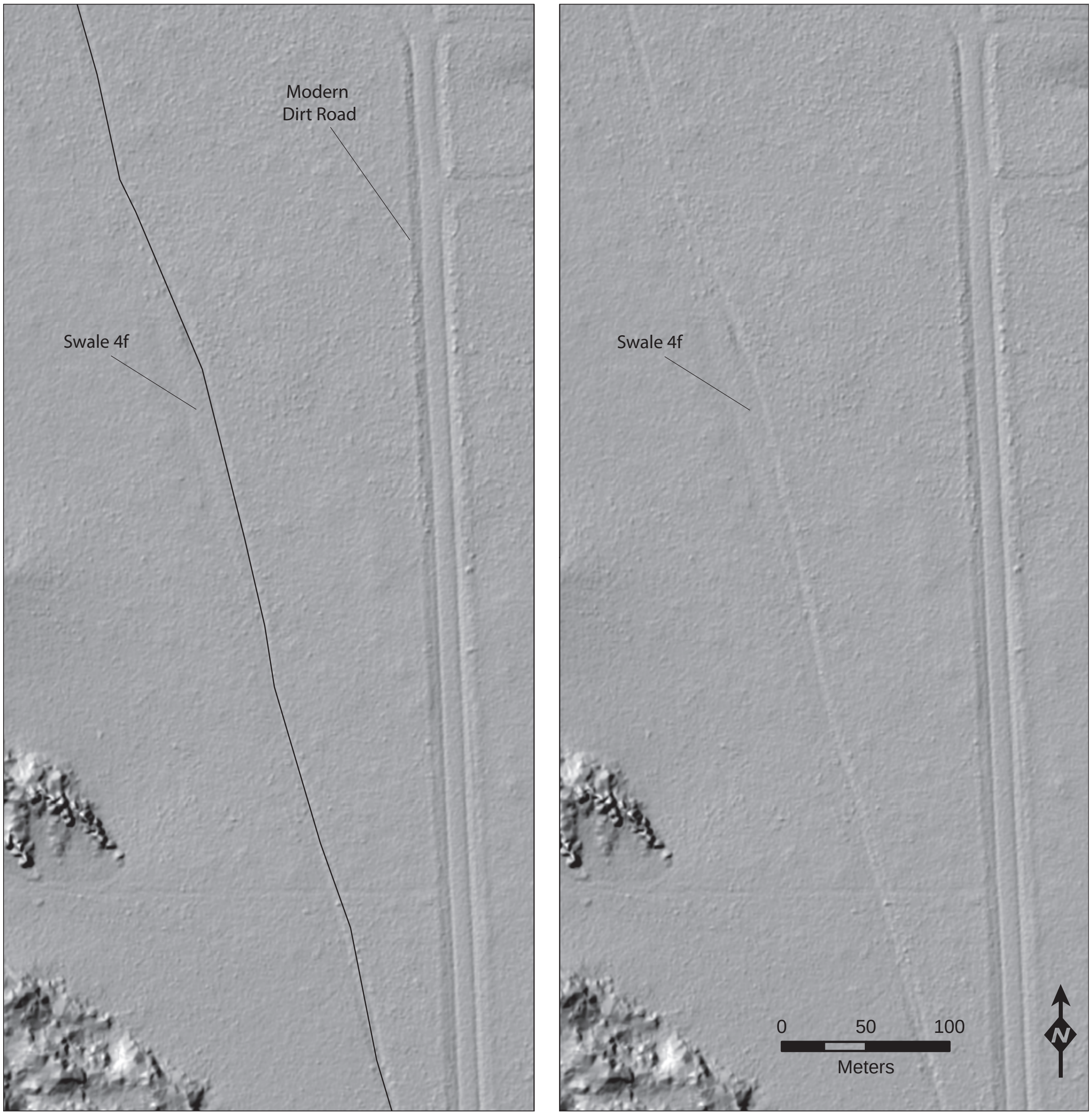

Figure 3.6. Labeled (left panel) and corresponding unlabeled (right panel) lidar maps of Swale 4f.

around the base of a moderately steep hill. No features were observed in the lidar data going up and over the same hill, but it is possible the complex topography may obscure evidence of historical trails via erosional or depositional processes.

Swale 5b was the only segment noted in Section 5. It is a continuation of Swale 4b, heading in a north-south direction for about 1080 m, all of which is on BLM land. The southern end terminates at an arroyo about 400 m north of the Limekiln site (5RN539.1). It is only slightly visible in aerial imagery. It may have once extended a bit further south after the arroyo but a modern dirt road, which is visible in the lidar and aerial imagery, likely destroyed any evidence of it. The Limekiln tracks go around this road to east, hindering any additional recordings of the site in the immediate vicinity of 5RN539.1.

Section 6

Roughly 40 percent of the area of Section 6 is BLM land, concentrated in the central and western

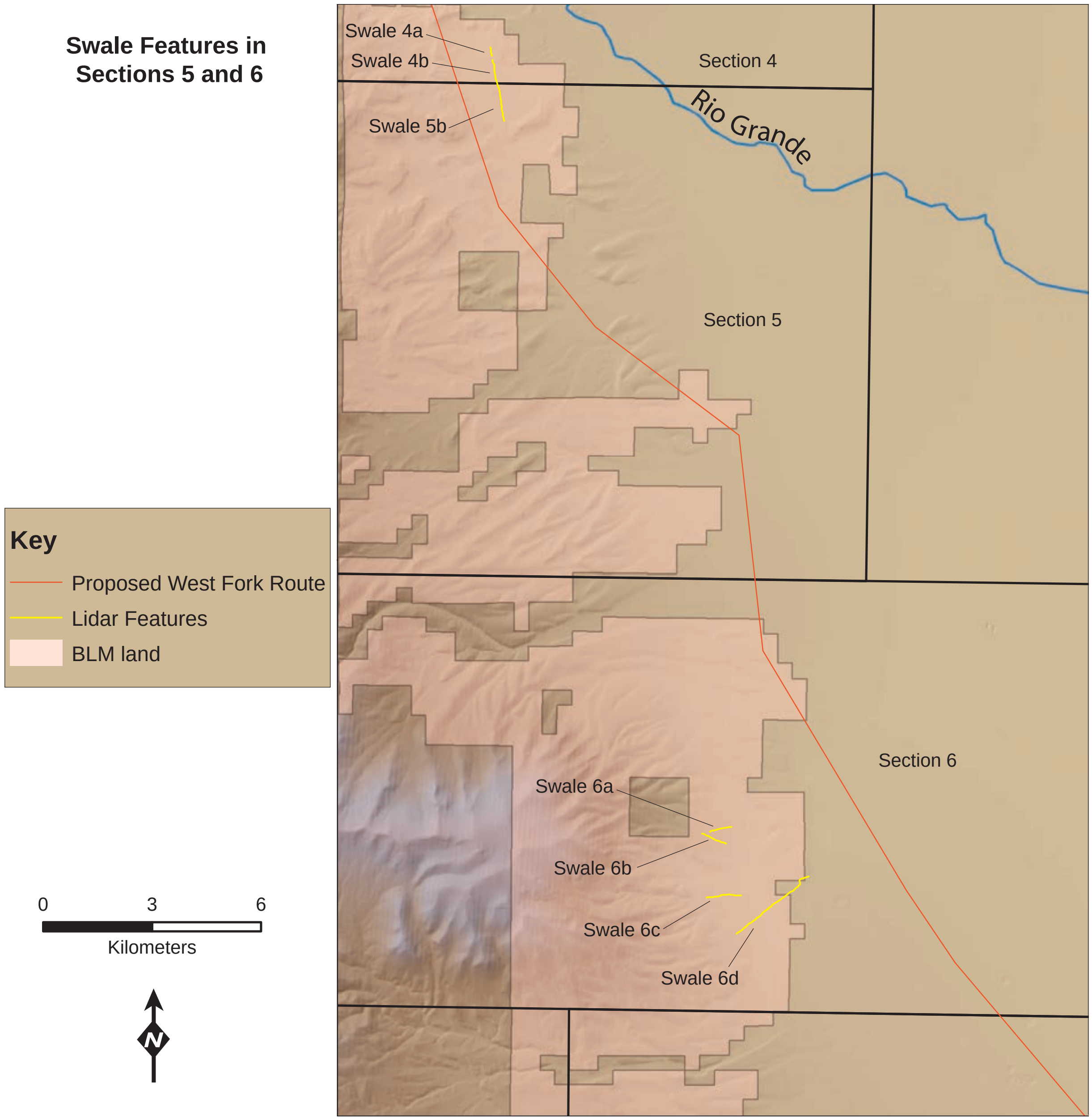

Figure 3.7. Shaded relief map of Sections 5 and 6, showing identified lidar features in relation to the BLM proposed route and BLM land.

portions of the section. Four survey areas from the 2017 PCRG survey are in this section, where two sites, six isolates, and three site leads were recorded, none thought to relate to the West Fork. Like Section 5, the topography is more complex than some of the other sections, which may preclude identification of linear features in the lidar data. Multiple roads are depicted on the GLO plat in Section 6; all are unnamed except for a possible segment of the "Conejos and Del Norte Road" in the southwest corner of the section.

Section 6 contained four swale features (table 3.5). Swales 6a and 6b are not visible at all in the aerial imagery, while 6c and 6d are both partially visible. All four of these appear to be associated with unnamed roads depicted on the GLO plat as they align almost perfectly. While not immediately disqualifying for association with the West Fork since many later roads overlay older trails, the trending direction of each of the swales suggests they are most likely not associated with the West Fork. Travelers on the trail preferred the

Table 3.5. Summary of lidar features documented in Section 6.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 6a	660	East-West	Yes	Likely unnamed GLO road
Swale 6b	760	East-West	Yes	Likely unnamed GLO road
Swale 6c	1000	East-West	Yes	Likely unnamed GLO road
Swale 6d	1000	East-West	Yes	Likely unnamed GLO road

straightest, quickest route, which in this case would be oriented more north-south. Certainly, there would have been sections that may have required some east-west travel but given the likely association with the GLO roads the swales in Section 6 seem unlikely to be associated with the West Fork.

Section 7

Section 7 has about 20 percent of the area covered by BLM land, concentrated on the western end of the section. Like Sections 5 and 6, the topography is undulating and complex. No PCRG survey was conducted in this section in 2017. No features were observed in Section 7, including the one small parcel of State Land Board land that is near the proposed route in the northern part of the section. The proposed route primarily crosses plowed fields and agricultural land which, if this is roughly the course of the trail, likely destroyed any evidence of it in this section.

Section 8

BLM land accounts for about 40 percent of the area in Section 8 (figure 3.8). The eastern half, including much of the proposed West Fork route, is plowed agricultural fields, which has likely destroyed any evidence trails the area. The western half, where the BLM land is concentrated, is comprised of gentler terrain than in Sections 5 and 6, but still marked by rolling hills and downcutting, which could potentially hinder the discovery of historical trail traces. No PCRG survey took place in this section in 2017.

Three swales were identified in the lidar data in Section 8 (table 3.6). Swales 8b and 8c are only faintly visible in aerial imagery, while 8a is hardly visible at all. All three appear to be part of the "Wood Road" as depicted on the GLO plat. Swale 8a is a short east-west trending section that aligns almost perfectly to the GLO road. Swales 8b and 8c are north-south trending traces on the northern end of the section. They are separated by a roughly 1.2 km gap, which includes an arroyo or drainage that possibly has obliterated traces of this path. Swale 8c, the northern-most segment in the section, is intersected by a jeep trail that is depicted on the USGS 1:24,000 quadrangle, and its northern end terminates at the edge of Trujillo Canyon. These are all possible segments for a potential West Fork route; however, traces in other sections seem more plausible than these, particularly given the clear association with the Wood Road. Moreover, however, they are about 10 km west of the proposed West Fork route, and in terrain that would appear to be less desirable for a pack trail than to the east. The association with the old GLO road does, however, make the features quite old and should be recorded by future surveys in the area when encountered.

Section 9

About 30 percent of the area in Section 9 is BLM land, concentrated in the northwest corner and southern half. No PCRG survey was conducted in this section in 2017. There are numerous GLO roads in this section, but only a few cross BLM lands. This is the southern-most section in this analysis, with the southern end aligning with the Colorado-New Mexico border. Much of the non-BLM land is agricultural and plowed fields, obscuring any evidence of historical trails. The Conejos river also runs roughly through the center of the section, with its floodplain also likely obscuring any potential trail crossings. The western half if marked by undulating hills like Sections 7 and 8.

Four swale segments were observed in Section 9 (table 3.7). Swale 9a is visible as a two-track in aerial imagery, while the other three are only faintly visible in certain areas and not visible at all in others. Two, Swales 9b and 9c, appear to be related to the "Wood Road" depicted on the GLO map, which seem to link to the same "Wood Road" from Section 8. Near the eastern terminus of Swale 9b, which descends into a gulch, 9d forks off and runs northwest then west along the top of a small ridge and connects to a modern two-track. Given the predominately east-

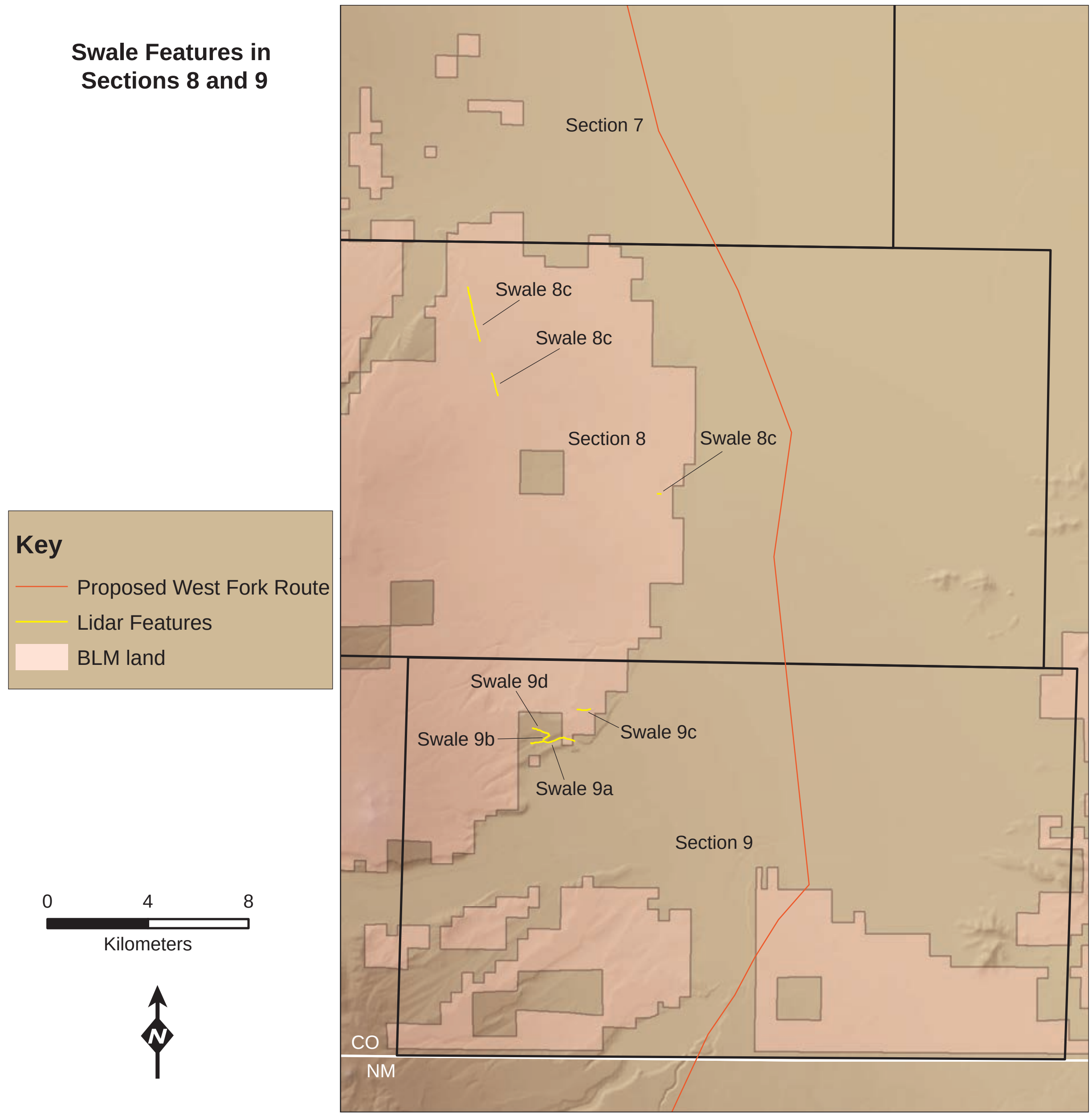

Figure 3.8. Shaded relief map of Sections 8 and 9, showing identified lidar features in relation to the BLM proposed route and BLM land.

west trending trajectories, and the associations with GLO and modern roads, none of these swales seem very plausible as candidates for the West Fork.

Discussion and Summary

The analysis of the lidar and other combined datasets reveal that additional research on the West Fork is warranted. None of the swales identified in the analysis can conclusively be linked to the West Fork without further field investigation. Such investigations should combine the data presented here with other methods, including metal detection survey along the trail traces. As noted in chapter 1, conclusive evidence of use during the period of significance for the OST needs to be found for the West Fork to be added to the National Historic Trail designation. This includes written records from journals or other sources, but also evidence from the material culture that travelers on the trail may have left behind. The next phase of

Table 3.6 Summary of lidar features documented in Section 8.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 8a	165	East-West	Yes	Possible "Wood Road" on GLO
Swale 8b	910	North-South	Yes	Possible "Wood Road" on GLO
Swale 8c	2110	North-South	Yes	Possible "Wood Road" on GLO

Table 3.7. Summary of lidar features documented in Section 9.

Feature Number	Length in Section (m)	Trending Direction	Cross BLM Land	Comments
Swale 9a	1750	East-West	Yes	Possible GLO road
Swale 9b	320	East-West	No	Possible "Wood Road" on GLO
Swale 9c	520	East-West	Yes	Possible "Wood Road" on GLO
Swale 9d	730	East-West	No	Intersects Swale 9b

research may also benefit from a focus on potential camp spots, including around or near springs or other water sources.

Although this analysis identified 30 linear features worthy of further investigations, five swale segments or combined segments across multiple sections (accounting for 14 of the 30 linear features), should be given higher priority for future research on the West Fork. This should not discount the other swales, however, as many are likely related to old roads depicted on the GLO maps. Further research may reveal significance for these features in their own right, regardless of any association with the West Fork. Some, including all the east-west trending features, seem unlikely to be related to the West Fork but again should be documented during any future fieldwork in their area.

The five most likely to be related to the West Fork are listed in table 3.8. They are all concentrated in the northern five sections. This is due, in part, to a likely trail route in the southern sections being in areas with agricultural lands and plowed fields which has destroyed any remnants of the Trail.

The five segments all trend in a north-south direction or have reasons—due to topography—to be trending northeast-southwest. Two of these, Swales 2e-2f and 3f-4f, are associated with the Saguache to Del Norte road and have previously recorded linear sites associated with them. As discussed elsewhere, this road is thought to have been the route of the 1853 Beale Expedition which some believe roughly followed the West Fork.

Two others—Swales 3a-3e and 4a-4b—are associated with linear sites documented during the 2017 PCRG fieldwork. One of these, Swales 4a-4b, is also associated with a previously recorded site (5RN539.1) which has an interpretive sign indicating an association with the OST. Based on this alone these segments should be incorporated into future West Fork research to help confirm this association and perhaps update the interpretive sign.

Swales 1c, 2c, and 2d may be the most intriguing for future phases of research. None of the segments appear to be associated with any GLO roads, which could help during a metal detector survey since there could be less chance of "contamination" from more recent metal or other artifacts. They are also nearly invisible in the aerial imagery, which could indicate they are of some antiquity. All three also closely parallel the proposed route of the West Fork created by Dan Simon and the members of the OST Association. While this route should be subjected to

Table 3.8. Summary of high priority swale features for future research on the West Fork.

Feature Number	On BLM Land	Comments
Swales 1c, 2c, 2d	Mostly	No clear association with GLO roads
Swales 2e and 2f	No	Saguache to Del Norte road
Swales 3a-3e	Mostly	Associated with 5SH4969.1
Swales 3f, 4f	Mostly	Saguache to Del Norte road
Swales 4a, 4b	Entirely	Associated with 5RN539.2

scrutiny and may not be entirely accurate (see chapter 4), the comprehensive research that went into it should not be discounted.

Lastly, it should be stressed that the data presented in this chapter is merely one part of the analysis. As noted earlier in this section, linear features identified in the field during the 2017 survey seemed very plausible as linear features. However, upon further inspection of the lidar and other datasets, it became clear they were mostly natural features that one could not observe during survey. The reverse of this is also true. Features that appear as undoubtedly linear features in lidar data may well in fact be nothing more than cattle trails, two tracks, or some other phenomenon that has no relationship to historical trails. A combination of ground-truthing and remote sensing data like lidar is the surest way to plausibly identify (or disqualify) newly identified historical trail features.

4

Summary and Recommendations

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The 2017 PCRG fieldwork and research presented in this report represents one of the few broad scale archaeological investigations on the West Fork of the North Branch of the Old Spanish Trail and the first focused in Colorado. This is primarily due to the West Fork not being included in the National Historic Trail designation assigned to the other recognized routes of the OST. Understandably, many resources dedicated to OST research since the NHT designation have focused on the recognized routes. However, as outlined in the congressional designation, the West Fork has the potential to be included in the NHT designation if certain criteria are met. The West Fork was included in the initial feasibility study conducted for the NHT designation, so it meets the first criteria. The second is showing use of the trail during the recognized period of significance (1829-1848), which is a much larger task.

Therefore, the first step to even attempt to include the West Fork as part of the Old Spanish National Historic Trail (OSNHT) is documenting its presence in the San Luis Valley. The primary focus this research was twofold: 1) to determine if pedestrian survey could uncover historical trail traces on the western side of the San Luis Valley; and 2) use geospatial data to develop a framework for future phases of historical trails research in hopes of better defining manifestations of historical trails, and in particular the West Fork, in the San Luis Valley.

This chapter first presents a summary of the results from the fieldwork and geospatial analysis. This summary also includes brief reviews of additional elements related to this research, including a summary of cairns and how they may (or may not) relate to the West Fork, and the proposed route of the

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West Fork supplied by the BLM. This is followed by a summary of the National Register of Historic Places eligibility recommendations and a brief discussion on directions for future research.

Summary of Results

The OST was not a single well-worn path but rather a braided network of trails and routes that even some travelers on the trail had difficulty identifying. Unlike wagon roads and other trails, the archaeological signature of such a system can be ephemeral and nearly impossible to see over 170 years later. This is further complicated by the stacking of later trails, wagon roads, and modern dirt or paved roads on top of this network of trails. Even many stretches of the recognized OSNHT routes are not often found but rather are assumed to be in the vicinity, due in large part to the ephemeral nature of the trail system and later development. These complicating factors should not preclude research on the OST but instead force a variety of methods and techniques to find archaeological evidence of historical trails.

One of these methods is traditional pedestrian survey in search of trail traces that may take the form of a gentle swale or a series of swales in proximity to one another. This was the focus of the 2017 fieldwork for the project and was largely successful. Two linear sites were documented, including one associated with a wagon track site (5RN539.2) and one that appears to have a series of swales or depressions (5SH4969.1). Both sites have potential for additional research to better define their association, if any, with the West Fork. None of the other cultural resources identified during the survey appear to have any relation to the West Fork or historical trails, except for perhaps cairns which are discussed later in this section.

Another method is applying geospatial analytic methods to model the terrain and examine for irregularities such as trail traces. This method, combines high-resolution terrain models with other data such as historical and more recent maps. Prior OST research (e.g. Johnston 2019) has shown this is a productive method, particularly when combined with in-field analysis of the features.

Our research found 30 features in the lidar data that could potentially be swales or trail traces on the west side of the San Luis Valley. Of these, 14 appear to be ideal candidates for ground-truthing in future phases of research. They are trending in a north-south direction, they are minimally to not visible at all in aerial imagery and thus likely old, and some are associated with prior recordings of potential West Fork segments. The other 16 should also be investigated as they likely are related to other historical trails or roads but, based on several factors seem less likely to be candidates for the West Fork. Although the 2017 fieldwork and subsequent research did not conclusively identify any traces of the West Fork, it did document historical trails and provides a framework for future phases of research.

During the course of this research, two other important aspects of work on the West Fork were identified and deserve additional attention: research on stacked rock cairns and the GIS layer for the proposed route of the West Fork supplied by the BLM.

Stacked Rock Cairns

One of the two datasets PCRG acquired prior to the fieldwork were maps of stacked rock cairns documented by BLM Realty Specialist Jeff Brown. Brown had not officially recorded any of these cairns, but had marked their locations on maps and shared these with PCRG which were subsequently georeferenced as best as possible. Brown hypothesized that these cairns were markers meant to map out the route of the West Fork.

Stacked rock cairns present numerous challenges to archaeologists. First, they are nearly impossible to date (although, as noted in chapter 2, there are methods to infer relative ages). Absent any datable organic material, which is unlikely given the nature of the feature, the only viable method for attempting to date the features would be optically stimulated luminescence (OSL) dating, which can be a time consuming and laborious process that likely would involve dismantling some of the feature.

Without an age, the function(s) of the cairns can also be difficult to ascertain. Cairns have been hypothesized to serve myriad functions, including trail markers, other alignment markers like ditches or canals, marking hazard spots, associations with sheepherding, serving as points visible on prominent landscape features for travel or navigation, hunting blinds, or simply rock piles from nearby agricultural fields. It is likely cairns served all these purposes and more but identifying which one for each specific cairn can be difficult.

Cairns are also ubiquitous across many landscapes, and the San Luis Valley in particular. For instance, during their 1100-acre survey in the south-central region of the San Luis Valley in 2017, Hurt and colleagues (2017) identified 11 sites containing 17 different cairn features. Additionally, in response specifically to claims that the cairns may be related to navigation markers, they state the cairns they documented are "in an area with prominent landmarks on the horizons, which may suggest a more local focus for the cairns, rather than orientation along a long-distance trail (Hurt *et al.* 2017:23). Elena Jimenez (2020) also discusses cairns in the San Luis Valley as ubiquitous features on the landscape and intends to provide more data and analysis in a forthcoming report about Hispano sheepherding in the San Luis Valley.

The ubiquitous nature of cairns in the San Luis Valley, their difficulty in dating, and the many functions they may have served should not disqualify them from being considered as potential components of the West Fork or other historical trails. Future surveys may want to incorporate cairn data in their methodology; however, due to the high frequency of cairns in the San Luis Valley they should supplement possible trail segments rather than function as guides. Additionally, cairn recordation must be done systematically, where all cairns on the surrounding landscape are documented and then parsed for patterns.

Proposed Route of the West Fork

The proposed route of the West Fork compiled by BLM SLVFO GIS Specialist Doug Simon, in conjunction with members of the Old Spanish Trail Association (see chapter 1), provides a foundation to start research on the West Fork. Their use of historical records such as journals, field visits to potential sites, and consultation of old maps, is the best effort to date at identifying a general path of the West Fork. The route, however, should be taken for what it is, a potential, and for all accounts plausible, path for the trail. As discussed at great length in this report, there likely was no one single route for the West Fork. Many different paths were likely used, with some potentially diverging from the main path (if there was a main path) based on any number of factors. For instance, seasonal changes may have impacted different water crossings in different ways, necessitating a different route, or even simply the route not being clearly identifiable to travelers who knew they only needed to continue in one primary direction—north or south.

The proposed route also appears to cross terrain that would seem less than desirable compared to other nearby options. For instance, in Section 5 in the lidar analysis, as depicted in figure 3.1, the proposed route makes a turn to the west and crosses over numerous hills and valleys or arroyos while the landscape slightly to the east is relatively flat. While the trail certainly could have gone this route, at least in portions is seems less plausiThis is surely no fault to Simon or his colleagues that helped create the route and instead is most likely a scalar issue of drawing a generalized shapefile to represent a linear feature over more than 100 km long. In fact, without this proposed route almost none of the research presented here would have been possible. The proposed route was likely never intended to be meticulously analyzed at a scale down to dozens or even hundreds of meters wide. The shapefile of the route is intended to be a guide and future research should recognize this and plan survey blocks or other analytic units encompassing much more than just a narrow corridor around the proposed route.

National Register Eligibility Recommendations

Cultural resources identified during the fieldwork were evaluated for their eligibility to be included in the National Register of Historic Places (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 to fully evaluate NRHP eligibility.

None of the resources recorded during the 2017 fieldwork are recommended as eligible for the NRHP. Four sites are recommended as needing additional data to better evaluate eligibility recommendations; two sites are recommended as not eligible. Isolated finds are all not eligible for the NRHP. The following section provides a brief review of each site and justifications for the NRHP recommendation. Each of the resources are discussed in more detail in chapter 2.

Needs Data Sites

5RN539.2 is a linear resource consisting of a road or trail segment identified as a shallow swale that extends for approximately 75 m along the east side of a drainage. No artifacts or features associated with OST-era travel were found in the vicinity of 5RN539.2. However, examination of lidar data shows that 5RN539.2 likely extends further on both sides—particularly to the south—of the recorded segment is likely associated with the Limekiln Wagon Tracks (5RN539.1, which is listed as Officially Eligible) several kilometers to the south. Although wheeled vehicles such as wagons were uncommon on the OST, later uses of the trail by wheeled vehicles often followed paths attributable to the OST. Despite the absence of direct evidence to associate 5RN539.2 with the OST, the recorded segment—and the associated 5RN539.1—do represent part of a local or regional transportation network that runs along the western edge of the San Luis Valley. The significance of the 5RN539.2 segment and whether it supports the overall eligibility of the linear resource is still unclear, and thus it is recommended as needs data. Additional data, such as recording of the linear feature between the two recorded segments (and the segment north of 5RN539.2) using the lidar data presented in chapter 3, and implementing a metal detection survey along the entire route (or selected portions), have the potential to provide needed information about the period when this transportation route was in use and its possible association with the West Fork.

5RN1356 is a multicomponent open architectural site consisting of two features (2 and 3) thought to be related to American Indian use of the area, and two features (1 and 4) thought to be related to Settler use of the site. The American Indian designation of Features 2 and 3 is based largely on the presence of substantial lichen growth on the rocks, the similarity of the stone enclosure to other American Indian structures in the San Luis Valley (Mitchell 2012a, 2015; Mitchell and Falk 2017), and the presence of a chipped stone flake near Feature 3. By contrast, the lack of lichen development, as well as the presence of a metal can lid, are two primary indicators that Features 1 and 4 are Settler components of 5RN1356. Unfortunately, neither of the Settler features retain attributes that could provide additional information about Settler use of the area or any potential association with historical trails. Sediments on the knoll are shallow residuum, so there is also little prospect of deeply buried intact cultural deposits related to Features 2 or 3. However, Feature 3 was only partially mapped during the survey, and it is possible that some material could be preserved in the shallow sediment layer within the enclosure. Thus, Feature 3 should be fully mapped and the interior tested for shallowly buried cultural deposits, which could provide additional data about the chronology and function of this feature. For this reason, 5RN1356 is recommended as needs data.

5SH4959 is an open architectural site located at the mouth of Tracy Canyon and consists of a single stone enclosure constructed of stacked basalt boulders that make use of naturally occurring bedrock that outcrops along the southern and northern walls. The site is most likely associated with American Indian occupation of the area. The feature is similar to others documented in the San Luis Valley (Mitchell 2012a, 2015; Mitchell and Falk 2017), many of which have been shown to be seasonal residential structures. The considerable amount of lichen development on the rocks also suggests substantial time has passed since their placement and further supports this designation. Additional investigation is necessary, however, to fully evaluate the site, namely more complete mapping of the enclosure and limited testing in the shallow, rocky sediment within, which may provide additional data about the age and function of 5SH4959. For these reasons, 5SH4959 is recommended as needs data.

5SH4969.1 is a linear resource with two road segments (LN1 and LN2) and one swale (LN 3). No artifacts or other features relating the site to the West Fork were found in association with the linear features. Inspection of lidar data and historical maps indicate several of the recorded segments may extend for several hundred meters on either side, including the more ephemeral LN3. This suggests the site, while not definitively linked to the OST, is likely part of a larger transportation network that ran along the western edge of the San Luis Valley. LN1 closely mimics the "Old Road" depicted on the GLO map, and likely dates to at least 1875 when the GLO map was drafted. LN2 may be a more modern spur or unauthorized road extending northwest from LN1. LN3 is perhaps the most promising potential trail linked to the OST as it appears to be the most intact (unmodified) segment at the site. Additional data will be needed to support any link with the West Fork, but it is clear the three recorded segments of 5SH4969.1 are related to historic trails in this area of the San Luis Valley. Metal detection along the recorded segments and swale continuations visible in lidar data, particularly associated with LN3, are needed in order to better determine the potential for the site to provide additional information relating to past use of the area and its possible association with the OST. For these reasons, the site is recommended as needs data.

Not Eligible Sites

5RN230 consists of one cairn constructed of two angular tuff boulders leaning against a third more rounded basalt boulder, with no other associated features or artifacts. The site was originally documented in 1980 and relocated during the 2017 fieldwork. There is minimal sediment accumulation around the base of 5RN230 and little lichen development, suggesting that placement of the rocks is relatively recent although has been in place since at least 1980 when it was originally documented. The cairn exhibits no potential to provide additional data regarding its age, function, or any possible association with the OST. The site is recommended as not eligible for the NRHP.

5RN1355 is an open architectural site consisting of a single stone enclosure feature constructed from six basalt boulders placed along a single course to form a semi-circle. Lichen growth observed on some of the larger boulders indicates that 5RN1355 is likely related to American Indian use of the area. The site is heavily eroded and deflated, with no potential for intact, buried cultural levels or datable features within or around the enclosure. As such, there is little chance that further investigation at 5RN1355 would help to clarify the age and affiliation of the enclosure or provide additional information about past human activity in this part of the San Luis Valley and the site is recommended as not eligible for the NRHP.

Future Research

This research project was intended to be an initial attempt at identifying the feasibility of—and next steps for—research on the West Fork specifically, and historical trails in the San Luis Valley more generally. One of the two primary goals was to establish a framework for future research on the West Fork. The data for this phase of the project are presented in chapter 3, along with a summary of the 14 potential trail traces that should receive top priority for future work. The GIS data related to that work are on file with the BLM SLVFO as well as with PCRG and is available upon request.

Research on historical trails is a multi-step process, including significant investment examining lidar and other geospatial datasets in conjunction with ground truthing those findings. The next phase of research on the West Fork should use the data from chapter 3 and focus field efforts on the 14 most plausible candidates for the trail. One of the few ways to establish that these segments are likely associated with the West Fork is to find artifacts dating to the period of significance. While a seemingly impossible task, the most efficient way to attempt this would likely be systematic metal detection survey along and around the identified swales. While this should be conducted at all potential linear sites, the most successful may be along swales not clearly or directly associated with later GLO roads, which likely will contain metal from later eras and could confound the results.

Additional effort could also be spent on scouring old journals for mentions of potential camp sites along the trail and prominent landscape features to help further refine the route. Even those that may post-date the period of significance for the trail would likely have been ideal camp spots for earlier travelers and could contain evidence of use during the early to mid-nineteenth century.

Lastly, field efforts could be directed towards the 16 linear features identified in chapter 3 that seem less likely candidates for the West Fork. Many of these are associated with GLO roads and could be significant on their own. Additionally, it could be instructive to develop a methodology that helps identify how different features manifest on the ground compared to the lidar data. This could assist future lidar analyses in ranking potential trail segments to prioritize the necessary ground truthing phase of the research.

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