GCC Energy

"Safety as a Value"

Telephone: 970.385.4528
Facsimile: 970.385.4638

GCC Energy, LLC
6473 County Road 120
Hesperus, CO 81326

November 5th, 2024

State of Colorado

Division of Reclamation, Mining & Safety
1313 Sherman St., Room 215
Denver, CO 80203

Attn: Clayton Wein, Environmental Protection Specialist

Re: GCC Energy, LLC, King II Mine
CDRMS Permit # C-1981-035
Minor Revision No. 53 (MR-53) Initial Submittal
- Add Exploration Drill Holes: GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14

Mr. Wein,

Please find attached Minor Revision MR-53, "Add Exploration Drill Holes: GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14". GCC Energy proposes to drill four (4) exploration holes which is intended to obtain data on future underground coal reserves at the King II Mine operated by GCC in La Plata County, Colorado.

Holes #GCC-22-08, #GCC-22-12, #GCC-22-13, & #GCC-22-14 are proposed on C & C Livestock Corporation surface land which is within the current CDRMS Permit C-1981-035 boundary.

The proposed boreholes will be drilled utilizing already disturbed portions of the access roads, a temporary cross-country travel route, and a very small "drill pad". The "drill pad" will be approximately 50' x 50' and, other than a small cuttings pit, will not permanently damage topsoil or undergrowth. Some oak brush and rabbit brush may need to be cleared for drilling equipment access.

As part of the Minor Revision to CDRMS Permit #C-1981-035, two new additions have been incorporated. Firstly, Appendix 3(6) will now include the Stratified Environmental and Archaeological Services Cultural Resource Inventory for GCC Energy. Secondly, a map titled King II-006B Soils & Vegetation – MR-53 Exploration Drill Sites has been added to illustrate the drill site locations

Please find enclosed:

- Minor Revision 53 Application Form
- King II PAP Cover Page
- King II Table of Contents pages ii, iii, iv & v

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GCC Energy, LLC
6473 County Road 120
Hesperus, CO 81326

- King II Section 2.03.8 page 1
- King II Section 2.04.4 page 1
- King II Section 2.04.6 page 11 & 12
- King II Section 2.04.9 page 8
- King II Section 2.04.10 page 2
- King II Section 2.04.11 page 3
- King II Section 2.05.4 page 19
- King II Section 2.05.6 page 5 & 5A
- King II Appendix 3(6) SEAS Cultural Resource Inventory for GCC Energy
- Map King II-006B Soils & Vegetation – MR-53 Exploration Drill Sites

Please contact Michael Dickson at 970.909.4022 (cell) or Jordan McCourt at 970.385.4528 x 6531 with questions or comments.

Sincerely,

Michael Dickson

Michael Dickson
Mine Engineer
michael@summitmining.co

COLORADO DIVISION OF RECLAMATION, MINING AND SAFETY
1313 Sherman Street, Room 215, Denver, Colorado 80203, (303) 866-3567

APPLICATION FORM FOR A REVISION TO A COAL MINING AND RECLAMATION PERMIT

This form must be completed and submitted with all requests for minor revisions, as defined in Rule 1.04(73), technical revisions, as defined in Rule 1.04(136), and permit revisions, as defined in Rule 1.04(90). All revisions are to address the requirements of Rule 2.08.4. Three (3) copies of the revision, including maps, must be submitted in order for it to be complete.

All revisions are to be formatted so they can be inserted into the permit to replace the revised sections, maps, tables and/or figures, with a revised table of contents, if necessary. The revision submittal date should be printed in the lower right corner of each revision page. A cover letter to the revision should explain the nature of the revision and reference the specific permit sections being revised.

For federal mines, a copy of the revision application must be submitted to all agencies on the federal mailing list (except OSM) at the same time the application is submitted to the Division, and proof of distribution must be submitted to the Division along with the application. Copies of revision pages modified during the review process must be distributed in the same manner, along with proof of distribution. Proof of distribution must be submitted prior to implementation of the revision.

Permit No.: C - 1981 - 035 Date: 11 / 04 / 2024

Permittee: GCC Energy, LLC
King Coal Mine

Street: 6473 County Road 120

City: Hesperus

State: CO Zip Code: 81326 -

Brief Description of Revision: Minor Revision 53 (MR-53): King II Mine - Exploration Drill Holes: GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14.

Public Notice Attached: Yes ☐ No ☑ *(Required for PRs and TRs)*

Bond Increase: Yes ☑ No ☐ **Federal** ☑ **Non-Federal** ☐ **Mine**

Proposed Change in:

Permit Area -

Disturbed	(+/-) 1.52	Acres
Permit	(+/-) 0.0	Acres
Affected	(+/-) 0.0	Acres

Surface Ownership -

Private Land	(+/-) 0.0	Acres
Federal Land	(+/-) 0.0	Acres
State Land	(+/-) 0.0	Acres

Mineral Ownership -

Mineral Private	(+/-) 0.0	Acres
Mineral Federal	(+/-) 0.0	Acres
Mineral State	(+/-) 0.0	Acres

GCC ENERGY, LLC
KING II MINE
PERMIT DOCUMENT
CDRMS PERMIT # C-1981-035

Minor Permit Revision MR-53

November, 2024

GCC Energy, LLC
King II Mine
6473 County Road 120
Hesperus, CO 81326

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2.03.8 - PERMIT TERM INFORMATION

The anticipated start of each phase of mining activities is discussed in Section 2.05.2 and 2.05.3 Operations Plan.

The term of the permit shall be for five (5) years from issuance, renewable under the terms of Rule 2.08.5.

The current extent of areas affected by this permit, the anticipated number of acres to be affected during the 5-year term of this permit, and the anticipated number of acres to be affected during the total life of the permit is listed in the following table:

Location	Approved Areas	5 Year Additional	Life of Operation Additional
King I Surface Facilities (Disturbed Area)	23.60 Acres	+ 0 Acres	+ 0 Acres
King II Surface Facilities (Disturbed Area)	22.89 Acres	+ 0 Acres	+ 0 Acres
TR-22 Drill Holes Disturbed Area	2.1 Acres	+ 0 Acres	+ 0 Acres
MR-49 Drill Hole Disturbed Area	0.8 Acres	+ 0 Acres	+ 0 Acres
TR-26 Monitoring Wells Disturbed Area	1.0 Acres	+ 0 Acres	+ 0 Acres
MR-53 Drill Holes Disturbed Area	1.52 Acres	+ 0 Acres	+ 0 Acres
Total Disturbed Area	**51.91 Acres**	+ 0 Acres	+ 0 Acres
King I Affected Area	1392.9 Acres	+ 0 Acres	+ 0 Acres
King II Affected Area	260.7 Acres	+ 0 Acres	+ 0 Acres
TR-22 Drill Holes Affected Area	1.1 Acres	+ 0 Acres	+ 0 Acres
Total Affected Area	**1654.7 Acres**		
Total Permit Area (prior to TR-24)	2615.8 Acres	+ 0 Acres	+ 0 Acres
Total Permit Area (including TR-24 angle-of-draw adjustments)	**2705.4 Acres**	+ 0 Acres	+ 0 Acres

In January 2009, the King I mine was permanently sealed. The final mine map revealed areas where the potentially affected areas lie outside of the permit boundary (due to potential angle-of-draw) as shown at the time. To reflect that change, the permit boundary has been revised with the submittal of TR-24 to show an increased permit area of 89.60 acres. No actual disturbance due to subsidence has ever been noted outside of the previous extent of the permit boundary. The following table provides percentages of surface and mineral ownership concerning the expanded 89.60-acre permit area.

	Surface Ownership	Mineral Ownership
Federal	0 %	63.76% (57.13 Acres)
State	0 %	0 %
Private	100 % (89.60 Acres)	36.24% (32.47 Acres)

2.04.4 - CULTURAL AND HISTORIC RESOURCE INFORMATION

Complete Archaeological Service Associates of Cortez, Colorado has prepared a cultural resource inventory documenting the results of a pedestrian survey of those areas that may be affected by surface disturbance within the permit area (see Appendix 3(2)). No cultural or historic resources eligible for listing on the National Register of Historic Places or significant archeological sites that may be affected by surface disturbance (including subsidence) were identified in the survey.

SWCA Environmental Consultants of Durango, Colorado performed a cultural resource survey of the 9 core drill sites addressed in Technical Revision TR-22 (see Appendix 3(3). No cultural or historic resources eligible for listing on the National Register of Historic Places or significant archeological sites that may be affected by surface disturbance were identified in the survey.

Stratified Environmental and Archaeological Services (SEAS) of Durango, Colorado has performed a cultural resource survey of the 5 monitoring well drill sites addressed in Technical Revision TR-26 (see Appendix 3(4). One newly recorded prehistoric site (5LP 11050) was found. The MW-4 monitoring well site was relocated over 50 feet from the prehistoric site boundary.

Stratified Environmental and Archaeological Services (SEAS) of Durango, Colorado, has performed a cultural resource survey of the exploration drill site and access path addressed in Minor Revision MR-49 (see Appendix 3(5)). The survey did not identify cultural or historic resources eligible for listing on the National Register of Historic Places or significant archeological sites that may be affected by surface disturbance. Cultural resource clearance for the project was recommended as no significant or potentially significant cultural properties will be affected.

Stratified Environmental and Archaeological Services (SEAS) of Durango, Colorado has completed a cultural resource survey within the LBA permit boundary. This encapsulates the area of the proposed exploration drill sites in Minor Revision MR-53 (see Appendix 3(6)). This survey did not identify cultural or historic resources eligible for listing on the National Register of Historic Places or significant archeological sites within proximity of the proposed exploration drill sites.

EXPLORATION HOLE DRILLING, MR-53

GCC proposes to drill four (4) exploration holes numbered GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14, as shown King II-006B. These holes will consist of drilling approximately 320 feet just below the coal seam to determine coal thickness and quality.

A small cutting pit will be constructed to capture the cuttings (see drawing in Appendix 4(4)). Cuttings pits are excavated by a back-hoe and are approximately 6 feet wide by approximately 10 feet long. The pit will be unlined and construction is the same for all drilling methods used. Locations of the proposed holes and existing access roads are shown on Maps King II-006B.

During final reclamation, the drill holes will be plugged by filling from the bottom up to the surface with cement. The plug will be covered with like material as in road base or topsoil depending on which is present. Tracks will be raked or brushed to remove obvious signs of activity.

Where topsoil is encountered within the area to be disturbed at a drill pad, the topsoil will be salvaged by scraping the suitable soil horizons to the upgradient side of the drill pad where they will be temporarily stockpiled. Topsoil will be salvaged to the depths described in Section 2.04.9 for the soil type encountered at the drill pad. As the time required for drilling is short, less than a few days per hole, stockpiled topsoil will not be seeded or otherwise actively stabilized. Topsoil will be replaced, stabilized, and reseeded after drilling, as described in the reclamation plan in Section 2.05.4.

Given the small size and temporary nature of the drill pad, GCC requests that this area be granted SAE (small area exemption) status concerning sediment control. To ensure minimal impact from water erosion, the drill pad will have straw wattle erosion “logs” installed along the downgradient side or sides of the drill pad (See drawing in Appendix 4(4)). The straw wattles will filter any surface water runoff from the temporary drill pad during operations and will be left in place until the reclamation of the drill pad is complete.

Drilling will be accomplished with a truck-mounted core rig accompanied by a water truck typically of 3,000-gallon capacity; a flat-bed service truck; and smaller pickup trucks as necessary for service and transportation to and from the drilling site. Water will be provided to the drill sites from the mine supply at the main plant.

The hole may be geophysically logged. The equipment necessary for such work is typically mounted in a full-size Suburban-type 4X4. Under this program, no roads are proposed for construction and no blasting will be performed.

The moderately rugged terrain of the proposed exploration area consists primarily of the mesas drained by Hay Gulch. The drill site elevation ranges from approximately 8,200 feet to 8,680 feet.

The exploration holes will be accessed by dirt roads and well-defined jeep trails controlled and maintained by the Ute Mountain Ute Tribe and by roads maintained by the surface owners (C&C Livestock Corporation) within the CDRMS permit area. GCC Energy maintains a "crossing permit" with the Tribe for drill site access.

Access from the existing jeep trail and the drill site will be achieved by using a "brush cutter" (a device that attaches to the front of a skid steer loader) to grind a path for the drill rig and support vehicles through the existing oak brush patches. Topsoil and ground cover will not be disturbed in the process. The drill site will not be accessed if rain or snowmelt would create ruts over 6 inches. The weather can drastically affect mobility and as such, severely limit access, especially in winter months. The drilling is anticipated to be completed, weather permitting, during the summer of 2025, and at the latest December, 2025.

Water-bearing strata is not expected to be encountered during exploration. Water has not been encountered in previous drilling projects in the area or the active workings of the King II mine. Small amounts of water were encountered occasionally at the King I mine. These were believed to be small "perched" aquifers that dried up quickly once the coal had been removed below them. Unlike the King II mine, the King I mine strata dipped below the coal outcrop. King II outcrops on practically all sides of the surrounding mesas, effectively draining any perched aquifers to the outcrop.

MR-53 Drill Site Locations

Minor Revision MR-53 to this permit document consists of drilling four (4) exploration drill holes on the C&C Livestock Corporation surface-owned land. This drill program will be completed within the C-1981-035 permit area. These exploration drill holes will further define coal reserves for future mine planning. The proposed drill sites will be accessed utilizing already disturbed portions of the access roads. "Drill pad" will be constructed within the immediate drilling location, these will be approximately 50' x 50' and, other than a small cuttings pit, will not permanently damage topsoil or undergrowth. Some oak brush and rabbit brush may need to be cleared for drilling equipment access.

The "drill pads" will be located on Zau Stony Loam soil (Refer to Map 006B). Soil salvage for disturbance within this soil series may yield depths up to 30" of topsoil and subsoil (B horizon) materials. Salvage should be terminated with the encountering of the sandstone parent material, regardless of depth.

Threatened and Endangered Plant Species

The Colorado Natural Heritage Program (CNHP) at Colorado State University was contacted to undertake a search of their database of natural heritage elements ("occurrences of significant natural communities and rare, threatened or endangered plants and animals") for the area within and 1.5 miles outside the permit area. The results of that search identified only the wolverine (presumed extirpated in Colorado since 1979) and the Townsend's big-eared bat (a species of concern for the BLM and Forest Service). No candidate or federally listed plant species were identified within or adjacent to the permit area. The CNHP report can be found in Appendix 8(3).

TR-22 Drill Site Locations

Technical Revision TR-22 to this permit document consisted of drilling exploration core drill holes on State of Colorado Lease CO-3388. This exploration drilling program involved the completion of up to 9 boreholes, all within the C-1981-035 permit area. The boreholes further defined coal reserves for future mine planning. All of the proposed boreholes were drilled utilizing already disturbed portions of the access roads.

SWCA Environmental Consultants of Durango, Colorado performed a natural resource survey of the proposed drill sites and issued a report dated April 11, 2014 (see Appendix 8(5).

TR-26 Monitoring Well Locations

Technical Revision TR-26 to this permit document consisted of drilling monitoring wells on land owned by State of Colorado Lease CO-3388, Bureau of Land Management, Travis & Theresa Oliger, Clay Rathjen, and Jack Wiltse. This drilling program involved the completion of 4 bedrock monitoring well clusters of 3 wells each (MW-1 through MW-4) and one alluvial monitoring well in Hay Gulch, upgradient from the King I mine site (MW-HGA-4).

Ecosphere Environmental Services of Durango, Colorado has completed a natural resource survey of the proposed drill sites and has issued a report included as Appendix 8(6).

MR-49 Drill Site Location

Minor Revision MR-49 to this permit document will consist of drilling an exploration borehole on land owned by the Bureau of Land Management. This drilling program will involve the completion of one exploration drill hole labeled GCC-19-06.

Ecosphere Environmental Services, Inc. of Durango, Colorado performed a natural resource survey of the proposed drill site and issued a report dated July 9, 2019 (see Appendix 8(7).

TR-26 Monitoring Well Locations

Technical Revision TR-26 to this permit document consisted of drilling monitoring wells on lands owned by State of Colorado Lease CO-3388, Bureau of Land Management, Travis & Theresa Oliger, Clay Rathjen, and Jack Wiltse. This drilling program involved the completion of 4 bedrock monitoring well clusters of 3 wells each (MW-1 through MW-4) and one alluvial monitoring well in Hay Gulch, upgradient from the King I mine site (MW-HGA-4).

Ecosphere Environmental Services of Durango, Colorado has completed a natural resource survey of the proposed drill sites (Memorandum: October 25, 2016, "Hydrologic Monitoring Well Sites Natural Resource Surveys") included as King II Appendix 8(6).

See Section 2.05.6 for a detailed discussion on water monitoring.

MR-53 Drill Site Location

Minor Revision MR-53 to this permit document will consist of drilling four (4) exploration boreholes on land owned by C&C Livestock Corporation. The proposed four (4) exploration drill holes are numbered GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14.

These drill holes are within the Colorado Natural Heritage Program (CNHP) study that was completed in June 2022. The results of that search identified only the wolverine (presumed extirpated in Colorado since 1979) and Townsend's big-eared bat (a species of concern for the BLM and Forest Service). No candidate or federally listed plant species were identified within or adjacent to the permit area. The CNHP report can be found in Appendix 8(3).

See Section 2.05.6 for a detailed discussion on water monitoring.

SEALING EXPLORATION DRILL HOLES

Any coal exploration drill holes, vent holes, and groundwater monitoring wells (not transferred to the landowner) in the permit area will be backfilled, sealed at water-bearing zones, and capped with concrete plugs to meet reclamation requirements.

GCC proposed to drill up to 9 exploration holes (TR-22), numbered CO-15-14 thru CO-15-22 (hole CO-15-22 was not drilled) as shown on Appendix 4 (4) page 1, within the existing permit area. Holes were rotary-drilled, nominally 5 to 6 inches in diameter, to predetermined core points. The total depth of each borehole was about 320 feet. This predetermined core zone was cored by PQ wireline methods. Drilling was with air, air with water injection, or water. Cutting pits were necessary at all locations drilled by conventional methods (see drawing in Appendix 4(4). Locations of holes and existing access roads are shown on Map 006B.

All 8 boreholes drilled utilized the already disturbed area of the existing roadway minimizing the footprint. Cutting pits were constructed to capture the cuttings for replacement into the completed borehole before plugging the hole. Cuttings pits were necessary at all locations drilled by conventional methods (see drawing in Appendix 4(4)). Cuttings pits were excavated by a back-hoe and are approximately 6 feet wide by approximately 10 feet long. The pits were unlined and construction was the same for all drilling methods used. Drill holes were sealed by filling them with cement or other suitable water-sealing material to within 3 feet of the ground surface. The plug was covered with like material as in road base or topsoil depending on which is present. Tracks were raked or brushed to remove obvious signs of activity.

The 9 drill sites will be reseeded (unless the disturbance is confined to areas previously disturbed such as preexisting roads, drill pads, etc.) once topsoil has been replaced to pre-disturbance depth using the seed mixes for Rangeland and, if applicable, Pinyon-Juniper as listed in Section 2.05.4, page 12 of this document. Broadcast seeding will be employed due to the very limited size of the disturbed areas. Whenever broadcast methods are employed it is critical to ensure that the seed is subsequently covered through raking, harrowing, or mulching. Seeding rates for broadcast seeding are twice those employed for drill seeding. In addition, applicable sections of the part of this document entitled “REVEGETATION” beginning in Section 2.05.4, page 9 will be adhered to.

Drill hole GCC-19-06, as proposed in Minor Revision MR-49, will be drilled and reclaimed as described above in paragraph 2 for exploration holes approved by Technical Revision TR-22.

TR-26 has been approved by the Division to further address groundwater monitoring, springs & seeps, and additional surface monitoring of the Hay Gulch Ditch. Data obtained will be used to update the Probable Hydrologic Consequences and the Cumulative Hydrologic Impact Assessment of Hay Gulch and surrounding areas.

No significant hydrologic consequences of mining are anticipated. All coal to be removed from the mine lies above the potentiometric surface of Hay Gulch, the only known aquifer in the area. Therefore, there should be no diminution of water quality or quantity to Hay Gulch from the mine workings due to subsidence related to mining.

Surface drainages from the project area from the main haul road, Small Area Exemption #1 (SME#1), report to a native channel and eventually to the Hay Gulch Ditch. Nearly all of the runoff from SME#1 reports to a filter check dam, located adjacent to the cattle guard. This filter check dam is cleaned out regularly as needed.

Surface drainages north of the Sedimentation Pond from disturbed areas of the surface facilities report to the Sedimentation Pond for evaporation and infiltration. In the event a major storm, or series of storms, exceeds the capacity of the Sedimentation Pond, discharge would report to a native channel, and eventually the Hay Gulch Ditch. This discharge point is permitted with the National Pollutant Discharge Elimination System (NPDES) through the Colorado Department of Health and Environment (CDPHE) discharge permit COG850001 as discharge number 003. See “Surface Water Monitoring” later in this section for Monitoring procedures and parameters.

No water is known to occur in any rock unit above or immediately below the coal seams being mined based on the mining at the National King Mine within or immediately adjacent to the permit boundaries. Again, there is little likelihood of a significant impact on the quantity or quality of groundwater resources resulting from the King II Mine. Should subsidence-related features appear above the mine, water would recharge into the localized groundwater system and not continue off-site, given the dissected nature of the project site topography.

The design of the portal facilities and the dip of the strata facilitate drainage of any encountered water in the workings toward the surface. While not anticipated, should water be encountered in amounts that reach the surface, monitoring and control measures will be employed.

Minor Revision MR-49 will consist of drilling one exploration borehole, labeled GCC-19-06, on land owned by BLM within the CDRMS permit boundary. Once completed, this hole will be plugged from bottom to top with concrete. No hydrologic consequences are anticipated.

Minor Revision MR-53 will consist of drilling four (4) exploration boreholes, labeled GCC-22-08, GCC-22-12, GCC-22-13, & GCC-22-14, on land owned by C&C Livestock Corporation within the CDRMS permit boundary. Once completed, these holes will be plugged from bottom to top with concrete. No hydrologic consequences are anticipated.

Appendix 3(6)

King II

Cultural Resource Inventory for GCC Energy's Proposed King II Mine Dunn Ranch Lease by Application Project in La Plata County, Colorado

Prepared by:

Paula Fluder, Mike Proper, and Doug Loebig (P.I.)
Stratified Environmental & Archaeological Services, LLC
P.O. Box 1078 (210 Goddard Avenue)
Ignacio, CO 81137
(970) 563-4615

Prepared for:

Sarah Vance, Environmental Manager
GCC Energy, LLC
P. O. Box 100
Tijeras, NM 87123

Submitted to:

Connie Clementson, Field Manager
Bureau of Land Management
Tres Rios Field Office
29211 Highway 184
Dolores, CO 81323

Mychal Yellowman, Manager
OSMRE - Western Region
Indian Program Branch
1999 Broadway, Suite 3320
Denver, CO 80202

Ute Mountain Ute Permit No. 2018-5
BLM Permit No. C-72889
State of Colorado Archaeological Permit No. 73898
SEAS Report No. 18-086
October 2018

Abstract

Between September 5 and 21, 2018, Stratified Environmental & Archaeological Services, LLC (SEAS) completed a cultural resource inventory of GCC Energy's proposed King II Mine Dunn Ranch Lease by Application Project. The area included in the lease expansion is located on private lands owned by the Ute Mountain Ute Indian Tribe, other private lands, and Bureau of Land Management Tres Rios Field Office (BLMTRFO) administered lands in western La Plata County, Colorado. The proposed project is located south of Spring Gulch and northwest of Hay Gulch between Hesperus and Mancos, Colorado. The cultural resource inventory was conducted at the request of Sarah Vance, Environmental Manager at GCC Energy, LLC. Mike Proper, David Ayers, Douglas Lynne, Doug Loebig, and Erin Weaver of SEAS completed the cultural resource inventory, which was conducted under Ute Mountain Ute Permit No. 2018-5, State of Colorado Archaeological Permit No. 73898, and BLM Permit No. C-72889. The cultural resource inventory was performed in support of the Environmental Assessment analysis and the consultation requirements under Section 106 of the National Historic Preservation Act (P. L. 59-209) at the request of the BLMTRFO and the Office of Surface Mining Reclamation and Enforcement (OSMRE) Western Regional Office. The purpose of the inventory was to identify and record historic properties that might be affected by the proposed project and to comply with Section 106 of the National Historic Preservation Act (P.L. 59-209) and other applicable federal, tribal, and state regulations. The area of potential effect (APE) and total area surveyed for the proposed lease expansion is 1,392.13 acres, with 1,176.59 acres on private lands owned by the Ute Mountain Ute, 202.48 acres on other private lands, and 13.06 acres on BLMTRFO administered lands.

The cultural resource inventory for GCC Energy's proposed King II Mine Dunn Ranch Lease by Application Project encountered and documented one previously recorded site (5LP 10572), six newly recorded sites (5LP 11383, 5LP 11384, 5LP 11385, 5LP 11386, 5LP 11387, and 5LP 11388), and 15 isolated finds (5LP 11389 through 5LP 11403). The isolated finds are not considered eligible to the NRHP given their limited nature, shallow soils, eroded condition, and lack of significant data potential. Detailed field recording of the isolates has adequately characterized their limited information potential in archival form. The low site density found in the surveyed area is likely due to the high elevation, lack of surface water, and lack of arable soils. Sites 5LP 10572, 5LP 11383, 5LP 11385, and 5LP 11388 are all historic resources recommended not eligible for listing on the NRHP as the sites lack significant data potential (Criterion D) and do not qualify under Criteria A, B, or C. Similar to the isolated finds, detailed field recording of these historic sites has adequately characterized their limited nature and condition in archival form and no further work is recommended. Sites 5LP 11384, 5LP 11386, and 5LP 11387 are all Late Archaic hunting and gathering camps yielding diagnostic projectile points and are recommended potentially eligible (need data) for NRHP listing under Criterion D. Surface inspection alone was inadequate for determining the research potential of these prehistoric resources. Visibility is poor at these sites and dense chaparral vegetation and detritus likely cover additional artifacts and possibly features at sites 5LP 11384, 5LP 11386, and 5LP 11387. While no surface disturbance is anticipated in the survey area by the proposed action, if subsidence is considered a likely by-product of the underground mining operation, additional investigations at 5LP 11384, 5LP 11386, and 5LP 11387 may be warranted to ensure no significant or potentially significant cultural properties are adversely affected by the proposed mining lease expansion project.

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1.0 Introduction

Between September 5 and 21, 2018, Stratified Environmental & Archaeological Services, LLC (SEAS) completed a cultural resource inventory of the GCC Energy's proposed King II Mine Dunn Ranch Lease by Application Project. The area included in the lease expansion is located on private lands owned by the Ute Mountain Ute Indian Tribe (UMU), other private lands, and Bureau of Land Management Tres Rios Field Office (BLMTRFO) lands in western La Plata County, Colorado. The proposed project is located south of Spring Gulch and northwest of Hay Gulch between Hesperus and Mancos, Colorado. Sarah Vance, Environmental Manager at GCC Energy, LLC requested SEAS to conduct the Class III cultural resource inventory. Mike Proper, David Ayers, Douglas Lynne, Doug Loebig, and Erin Weaver of SEAS completed the cultural resource inventory, which was authorized under Ute Mountain Ute Permit No. 2018-5, State of Colorado Archaeological Permit No. 73898, and BLM Permit No. C-72889. The cultural resource inventory was performed in support of the Environmental Assessment (EA) analysis and the consultation requirements under Section 106 of the National Historic Preservation Act (P. L. 59-209) at the request of the BLMTRFO in Dolores, Colorado and the Office of Surface Mining Reclamation and Enforcement (OSMRE) Western Regional Office in Denver. The purpose of the inventory was to identify and record historic properties that might be affected by the proposed project and to comply with Section 106 of the National Historic Preservation Act (P.L. 59-209) and other applicable federal, tribal, and state regulations.

2.0 Project Description

In 2010, GCC Energy, LLC (GCC), submitted an application to the Colorado State Director of the Bureau of Land Management (BLM) to modify Federal Coal Lease COC-62920 pursuant to regulations in 43 Code of Federal Regulations (CFR) 3432. In 2014, GCC modified the application to adjust parcels and clarify legal land descriptions. The BLM, as the agency charged with administration of federal mineral estates, requires analysis of potential environmental impacts in determining approval or denial of the proposed lease modification. In 2017, GCC submitted a permit application package to the OSMRE to revise Federal Permit CO-0106A to mine additional lease acreage for the King II Mine. The OSMRE, as the regulatory authority for evaluating federal mine permits and as the provider of oversight authority to the Colorado Division of Reclamation, Mining and Safety (CDRMS) mine permit, requires analysis of potential environmental impacts for determination of permit revision and renewal approval or denial.

The BLM and OSMRE joined as co-lead agencies for the preparation of a single Environmental Assessment (EA) to analyze the potential environmental effects of GCC's proposed lease modification and mining plan revision. The EA will provide analysis for determining whether to prepare an environmental impact statement (EIS) or "Finding of No Significant Impact" (FONSI) statement.

2.1 Introduction and Background

In respective agency roles providing for the recovery of federal coal reserves in an efficient and environmentally sound manner, the BLM must respond to an application submitted by GCC for the modification of Federal Coal Lease COC-62920, and OSMRE must respond to related applications

submitted by GCC for the continuation of mining operations at the King II Mine. The Mineral Leasing Act of 1920 as amended (MLA), the Federal Land Policy Management Act of 1976 (FLPMA), and the National Environmental Policy Act of 1969 as amended (NEPA) establish the BLM's responsibility to consider and analyze potential significant impacts resulting from, and identify alternatives to, the proposed action. The MLA, Surface Mining Control and Reclamation Act of 1977 (SMCRA), and NEPA establish the OSMRE's responsibility to analyze potential significant impacts resulting from, and make a recommendation to the Assistant Secretary of the Interior, Land and Minerals Management (ASLM) regarding, modification of the mining plan and to administer Federal Mine Permit CO-0106A for permitted lands owned by the UMU. As established by the MLA of 1920 and the SMCRA, the OSMRE is the agency responsible for evaluating the environmental effects resulting from the mining and surface disturbance associated with the proposed lease modification to COC-62920, pursuant to the requirements of the NEPA, in order to make a recommendation to the ASLM on a decision to approve, disapprove, or approve with conditions the mining plan for the lease modification area. The ASLM will decide whether the mining plan modification is approved, disapproved, or approved with conditions. Additionally, OSMRE is the regulatory authority that administers Federal Mine Permit CO-0106A, which covers the permitted land owned by the UMU Tribe. As the regulatory authority, OSMRE must evaluate the environmental effects resulting from two Proposed Actions for the King II Federal Permit CO-106A.

2.2 Lead and Cooperating Agencies

The OSMRE is the lead agency for the Section 106 process. The BLM and OSMRE are co-lead agencies in the NEPA process, and both have jurisdiction of the King II Mine. The CDRMS and La Plata County Planning Commission are cooperating agencies possessing special expertise and jurisdiction. The King II Mine surface facilities cover approximately 25 acres regulated by CDRMS. Underground mining operations cover approximately 565 acres regulated by the Indian Programs Branch of OSMRE. Responsibilities of the BLM, OSMRE, and CDRMS include managing the coal mine permitting and mining plan approval processes that occur after leasing. If the King II lease modification is approved by the BLM, GCC is required to submit permit application package (PAP) revisions to CDRMS and OSMRE for approvals before mining occurs in the lease modification area.

Federal coal regulations 43 CFR § 3432 and 3400 require the BLM to consider leasing federally owned minerals for economic recovery. The BLM decision to lease lands is the necessary first step in the process before a mining plan can be authorized and mining commences. Ongoing management of the existing leases require the BLM to follow coal regulations at 43 CFR § 3400.

Most of the land encompassed by both the existing lease COC-62920 and the proposed lease modification area are "split-estate" lands where the federal government has retained ownership of the subsurface coal (and other minerals), but has disposed of the surface estate. The UMU owns much of the split-estate surface in this area. While the split-estate surface owned by the UMU is not within a designated Indian Reservation, the area meets the definition of "Indian Lands" as defined by the SMCRA, and thus the primary regulator of coal mining operations pursuant to SMCRA for those lands is the OSMRE. Therefore, the OSMRE and CDRMS are jointly responsible for issuing permits for mining at the King II Mine.

The Indian Programs Branch of OSMRE, Western Region, is responsible for reviewing plans to conduct coal mining and reclamation operations on lands classified by SMCRA as Indian Lands. The OSMRE is the regulatory authority for coal mining that occurs on Indian lands and is recognized as having jurisdiction by law to approve, disapprove, or conditionally approve federal permit renewal and revision applications under SMCRA for the Federal Mine Permit CO-0106A. OSMRE reviews the PAP for Federal Mine Permit CO-0106A for the surface overlying King II Mine on Ute Mountain Ute (UMU) surface lands to ensure compliance with SMCRA permitting standards. GCC submitted a significant revision to Federal Mine Permit CO-0106A in March, 2017 to include the proposed lease modification area. OSMRE will issue a decision on the permit renewal and revision after the NEPA process is complete.

The Field Operations Branch of OSMRE, Western Region, is responsible for the Federal Lands Program and the creation of Mining Plan Decision Documents for the Assistant Secretary for Land and Minerals Management (ASLM) review. Once the Regulatory Authority informs OSMRE of a permit revision occurring for leased federal coal and/or federal surface, OSMRE reviews the PAP to ensure it contains the necessary information to comply with the coal lease, MLA, NEPA, and other applicable federal laws and their attendant regulations (refer to Section 1.8). Then, in consultation with the BLM, OSMRE must determine if the action requires a mining plan decision document. While OSMRE is prohibited from implementing any function of the MLA, 30 CFR § 740.4(b) and 746.13 require the OSMRE to provide a MLA mining plan decision document recommendation for Secretarial approval. If a mining plan decision document is deemed necessary, pursuant to 30 CFR 746, OSMRE must prepare and submit to the ASLM a mining plan decision document recommending approval, disapproval, or approval with condition(s) of the proposed mining plan modification. OSMRE's recommendation is based upon: the PAP; the NEPA compliance information including the EA; documentation that assures compliance with the application requirements of federal laws, regulations, and executive orders other than the NEPA; comments and recommendations or concurrence of other federal agencies and the public; findings and recommendations of the BLM regarding the Resource Recovery and Protection Plan, federal lease requirements, and the MLA; the findings and recommendations of the CDRMS regarding the mine permit application and the Colorado State program; and the findings and recommendations of the OSMRE regarding the additional requirements of 30 CRF Chapter VII, Subchapter D. To assist with assuring compliance with other federal laws, regulations, and executive orders, the OSMRE also reviews, at a minimum, the following documents to make its recommendation to the ASLM: information and correspondence concerning the U.S. Fish and Wildlife (USFWS) Section 7 consultation for threated and endangered (T&E) species potentially affected by the proposed mining plan under the Endangered Species Act of 1973 and the National Historic Preservation Act of 1966 (NHPA) Section 106 consultations for the affected area. The ASLM must review the MPDD and decide whether to approve the mining plan modification, and if approved, what, if any, conditions may be needed. The Western Region of OSMRE is responsible for the oversight of State Regulatory Coal Programs.

CDRMS is the regulatory authority for coal mines in Colorado that occur on state and private lands. As provided for under SMCRA, the State of Colorado developed its own regulatory program to permit coal mining with OSMRE acting in an oversight role. CDRMS manages its own coal regulatory program under SMCRA and the Colorado Surface Coal Mining Control Act of 1976.

The role of the Colorado Department of Natural Resources is to act as a reviewing agency for the EA and to ensure conformance of the EA with the Colorado Surface Coal Mining Reclamation Act, the Regulations of the Colorado Mined Land Reclamation Board for Coal Mining, and the policies and guidelines of the CDRMS' Coal Program. La Plata County's role is to act as a reviewing agency for the EA and to ensure conformance of the EA with GCC's Conditional Class II Land Use Permit (Project #2012-0089).

2.3 Project Area

GCC Energy, LLC, has requested modification of their lease and permit for the King II Mine on lands owned by the UMU, other private lands, and BLMTRFO administered lands in western La Plata County, Colorado (Figures 2.1, 2.2, and 2.3). The proposed lease expansion area is within Section 18, Township 35 North, Range 11 West, NMPM, and Sections 13, 15, 23, 24, 26, and 27, Township 35 North, Range 12 West, NMPM within the Thompson Park, CO 1963 and Hesperus, CO 1963 USGS 7.5' Series Quadrangles. To comply with the BLMTRFO and OSMRE requests, SEAS completed the cultural resource inventory in support of the analysis required for the Environmental Assessment (EA) and the consultation requirements under Section 106 of the National Historic Preservation Act. The area of potential effect (APE) for the proposed lease expansion totals 1,392.13 acres (563.38 ha) with 1,176.59 acres (476.15 ha) on private lands owned by the UMU, 202.48 acres (81.94) on other private lands, and 13.06 acres (5.29 ha) on BLMTRFO administered lands. The APE was determined by OSMRE, and covers a large area, primarily due to the possibility of surface subsidence resulting from underground mining operations. No surface modifications are proposed in the inventoried area and no buffer zones were inventoried beyond the lease expansion APE. Project location information is provided in Table 2.1.

Table 2.1 Project Area Information

GCC Energy's King II Mine Dunn Ranch Lease by Application Project (SEAS Project No. 18-086)	
Project Location	S 1/2 of Section 13; SW 1/4 NE1/4 and S/2 of Section 14; S 1/2 of Section 15; E 1/2 NW 1/4 and E/2 of Section 22; Sections 23, 24, and 26; and NE 1/4 of Section 27, Township 35 North, Range 12 West, NMPM W 1/2 of Section 18, Township 35 North, Range 11 West, NMPM Private land owned by the Ute Mountain Ute Indian Tribe, BLM Tres Rios Field Office land, and other Private land in La Plata County, Colorado
USGS 7.5' Series Quadrangle Maps	Thompson Park, CO 1963 USGS Map Code 37108-C2-TF-024 Hesperus, CO 1963 USGS Map Code 37108-C1-TF-024
Area of Potential Effect (APE)	Lands Owned by the Ute Mountain Ute Tribe = 1,176.59 acres (476.15 ha) Other Private Lands = 202.48 acres (81.94 ha) BLM Tres Rios Field Office Lands = 13.06 acres (5.29 ha) **Total APE = 1,392.13 acres (563.38 ha)**

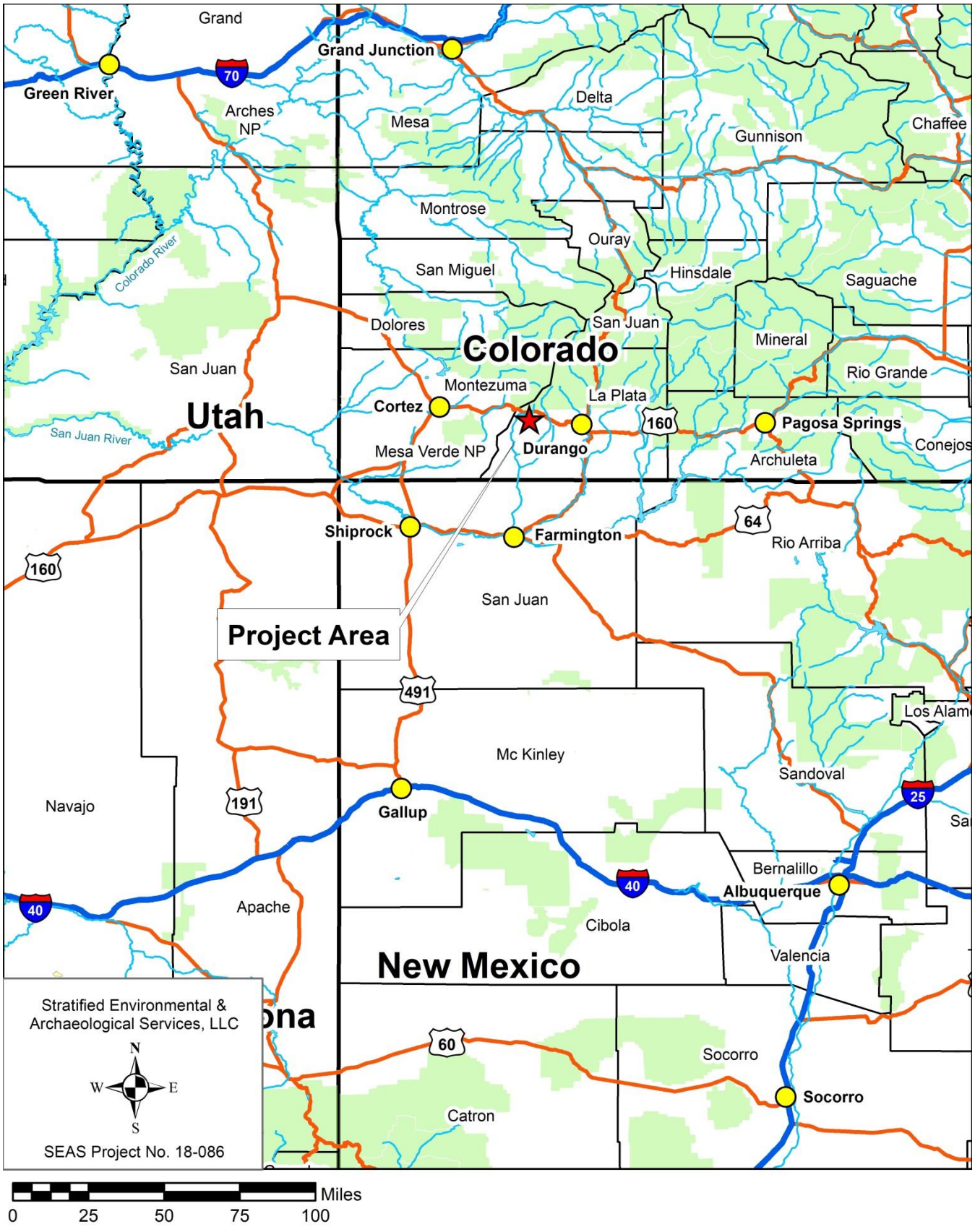


Figure 2.1 General Project Vicinity Map

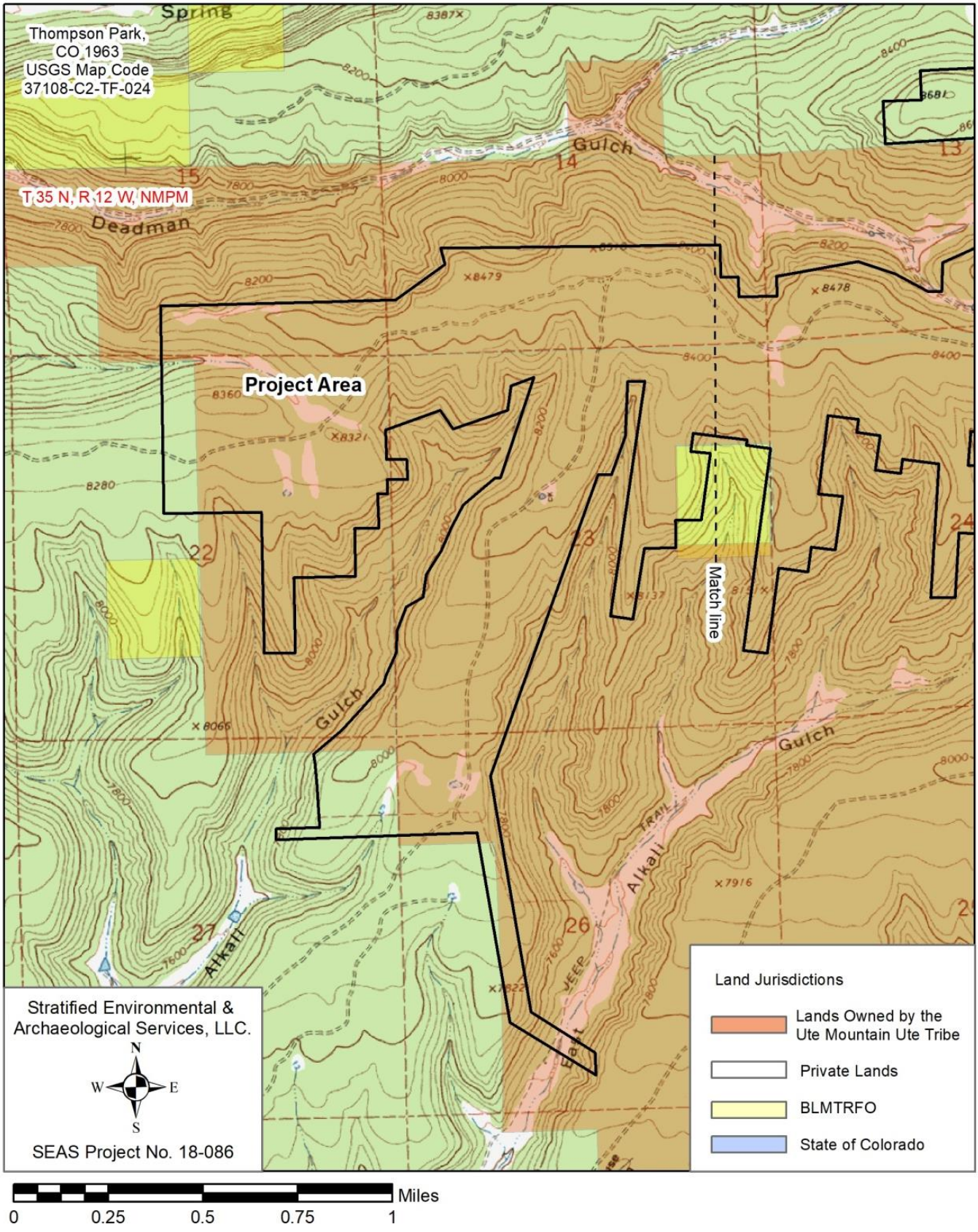


Figure 2.2 Project Location Map 1: Thompson Park, CO 1963 USGS 7.5' Series Quadrangle (1: 24,000 Scale)

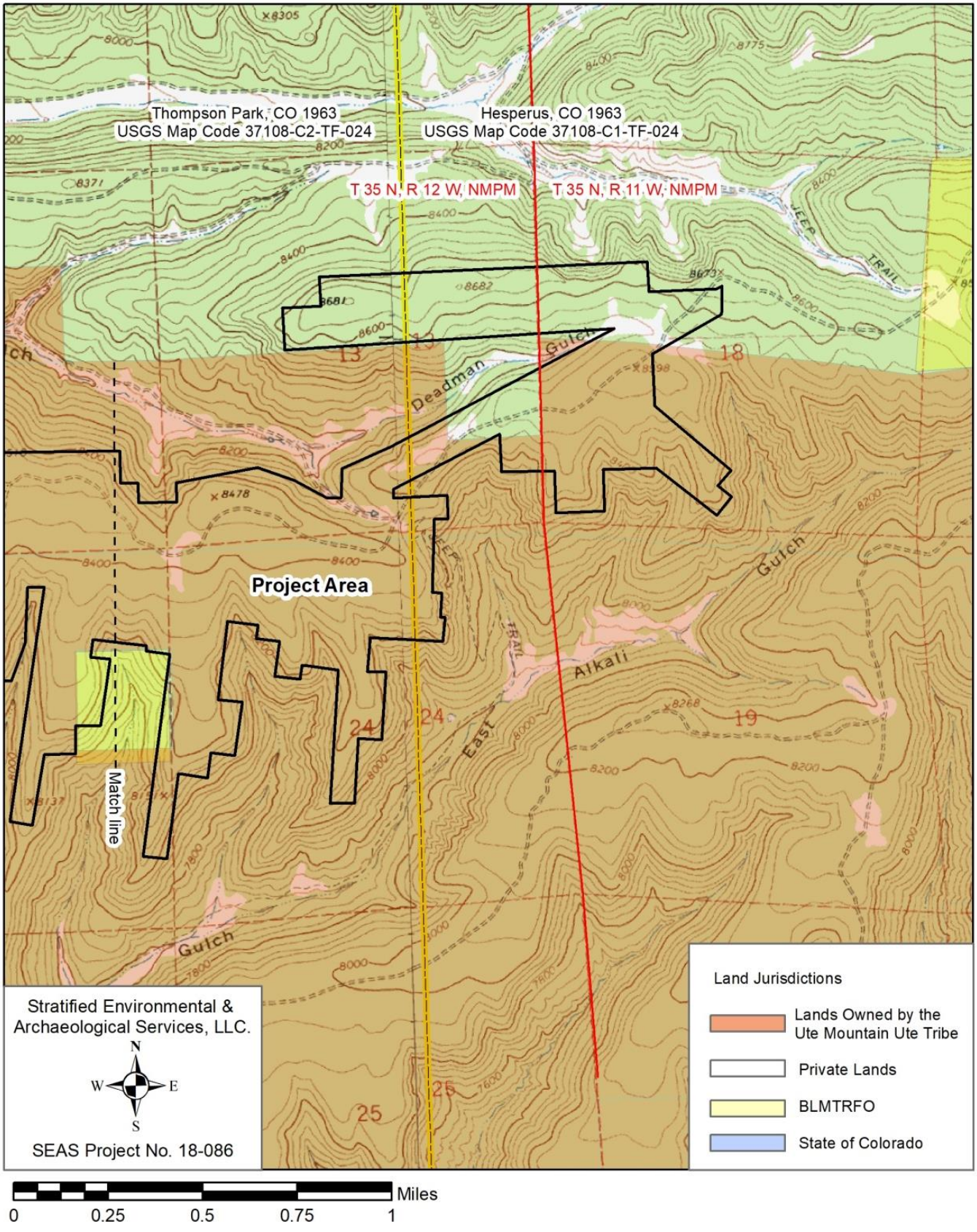


Figure 2.3 Project Location Map 2 Thompson Park, CO 1963 and Hesperus, CO 1963 USGS 7.5' Series Quadrangles (1: 24,000 Scale)

3.0 Environmental Setting

Elevation in the project area ranges between 7,460 ft (2,274 m) and 8,510 ft (2,594 m) amsl. The project area is located along a small mesa bounded by Deadman Gulch to the north, East Alkali Gulch to the east, and Devil Canyon, Reservoir Canyon, and West Alkali Gulch to the northwest and southwest. The project area drains north and west into Cherry Creek, which empties into the La Plata River about 11.5 miles south-southwest of the project area. The La Plata River discharges into the San Juan River near Farmington, New Mexico, the primary tributary of the Southern Colorado River Basin. Current land use in the project vicinity includes irrigated and dryland farming, ranching, coal mining, rural residential areas, livestock grazing, woodcutting, and hunting.

3.1 Climate, Geology, and Soils

The nearest settlement for which historical climate records are available is from Fort Lewis (Station 053016) for the period 1948 to 2005 (WRCC 2018). Table 3.1 summarizes climatic data from the station. Average annual maximum temperature at the Fort Lewis climate station is 58.3° F and average annual minimum temperature is 28.1° F for the same period. The frost-free growing season lasts from 110 to 130 days (Pannell 1981). Average annual total precipitation is 18.13 inches and average total snowfall is 44 inches. April, May, and June are the driest months of the year, ranging from 0.68 inches in June to 1.16 inches in April. July through October is the wettest period, ranging from 1.78 inches in September to 2.24 inches in August (WRCC 2018).

Table 3.1 Weather Data at the Fort Lewis, Colorado Climate Station from 1948 to 2005 (Station 053016)

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Maximum Temp. (F°)	36.9	40.6	46.4	56.1	65.9	76.5	81.2	78.2	71.9	61.2	46.8	38.4	58.3
Minimum Temp. (F°)	9.5	12.7	19.3	25.9	33.0	40.4	48.4	47.2	39.8	30.4	19.5	11..4	28.1
Total Precip. (in)	1.66	1.36	1.50	1.16	1.02	0.68	2.05	2.24	1.78	1.91	1.42	1.35	18.13
Total Snowfall (in)	12	14	8	1	0	0	0	0	0	0	1	5	3

Throughout the Northern Southwest, the marked increase in precipitation during late summer is caused by a monsoonal circulation pattern. This pattern originates when the hemisphere warms up in summer and shifts the westerlies and sub-polar lows northward. This places a high pressure cell (the Bermuda High) over the central United States. The western edge of the Bermuda High rotates clockwise sending moisture laden air into the Southwest from the Gulf of Mexico. The convective air currents created by the hot lowland deserts and the convergence of the moist air masses with the cooler highland air often creates powerful afternoon thunderstorms from mid to late summer (Sellers and Hill 1974; Gillispie 1985: 14-15).

Surface geology in the project area consists of Mesaverde Group deposits of Cretaceous-age Cliff House Sandstone on the mesa top with older Cretaceous-age Menefee Formation and Point Lookout Sandstone exposed along the southeast mesa slopes. The Cliff House Sandstone of the Mesaverde Group is a transgressive shallow marine sedimentary bed deposited on the upper shore face of a barrier island front. Cliff House Sandstone directly overlies the Menefee Formation, which consists of shale, carbonaceous

shale, coal, and siltstone with alternating lenticular sandstone beds, all deposited in a variety of non-marine depositional environments. Point Lookout Sandstone at the base of the Mesaverde Group formed from transgressive-regressive cyclic deposits during a time of relative shoreline stability (Aubrey 1991).

Soils within the project area are classified as Zau stony loam (56.4 percent of the APE) and Archuleta-Sanchez stony complex (26%) with smaller areas of Coni loam, Goldvale very stony fine sandy loam, and other types along slopes (NRCS 2018). Zau stony loam consists of stony loam residuum weathered from sandstone and shale. The Archuleta-Sanchez stony complex consists of Archuleta loam colluvium over residuum weathered from sandstone and shale and Sanchez very stony sandy clay loam colluvium over residuum weathered from sandstone.

3.2 Vegetation

Dense montane chaparral and conifer woodland habitats characterize most of the project area. Vegetation cover generally ranges from 60 to 80 percent throughout the project area with 90 to 100 percent coverage in Gambel oak (*Quercus gambelii*) thickets. Other dominate to common species in chaparral habitats include snowberry (*Symphoricarpos* sp.), mountain mahogany (*Cercocarpus montanus*), Utah serviceberry (*Amelanchier utahensis*), alder-leaved serviceberry (*Amelanchier alnifolia*), wild crabapple (*Peraphyllum ramosissimum*), cliff fendlerbush (*Fendlera rupicola*), bluestem wheatgrass (*Elymus smithii*), muttongrass (*Poa fendleriana*), Junegrass (*Koeleria macrantha*), yarrow (*Achillea lanulosa*), long-leaved aster (*Aster adscendens*), Indian ricegrass (*Oryzopsis hymenoides*), smooth brome (*Bromus inermis*), and side oats grama (*Bouteloua curtipendula*). Openings in oak thickets are often dominated by the low-growing black sagebrush (*Artemisia novum*).

Woodland overstory composition consists of Colorado piñon pine (*Pinus edulis*), Rocky Mountain juniper (*Juniperus scopulorum*), Utah juniper (*Juniperus osteosperma*), and Gambel oak (*Quercus gambelii*) thickets. The woodland understory is generally dominated by shrubs, particularly mountain mahogany (*Cercocarpus montanus*) and big sagebrush (*Artemesia tridentata*). Common understory herbaceous species include muttongrass (*Poa fendleriana*), Junegrass (*Koeleria macrantha*), Richardson's bitterweed (*Hymenoxys richardsonii*), basin prickly pear (*Opuntia macrorhiza*), rock goldenrod (*Petrodoria pumila*), spurred lupine (*Lupinus caudatus*), Colorado linaria penstemon (*Penstemon linarioides* ssp *coloradoensis*), spreading fleabane (*Erigeron divergens*), purple hoary aster (*Machaeranthera canescens*), bottlebrush squirreltail (*Elymus elymoides*), broom snakeweed (*Gutierrezia sarothrae*), banana yucca (*Yucca baccata*), and Indian ricegrass (*Oryzopsis hymenoides*).

4.0 Cultural Overview and Previous Investigations

4.1 Cultural Overview

The project area is situated in the Cherry Creek watershed, which drains into the La Plata River. The cultural histories of the river drainages in the Southern Colorado River Basin are complex and characterized by prehistoric contracting and expanding occupations and abandonments. The La Plata Drainage Unit (LPDU), the nearby Mesa Verde-Mancos Drainage Unit (MVMDU), and the Animas Drainage Unit (ADU) have similar cultural trajectories but with some important differences. The following comparative percentages reflect data current only up to 1999. Documented Paleo-Indian components are completely lacking within the LPDU, the MVMDU, and the ADU. Few Paleo-Indian sites have been documented in southwestern Colorado in general, although one to several Paleo-Indian components have been previously identified in the Ute, Monument-McElmo, Dolores, and Upper San Juan-Piedra Drainage Units. The Archaic period is more substantial, with 12.8 percent of identified components attributed to the Archaic in the LPDU compared to 0.1 percent in the MVMDU and 7.3 percent in the ADU (Lipe 1999: 406).

The Ancestral Pueblo occupation of the region begins with the Basketmaker II period (BMII), although the distinction from Late Archaic manifestations is difficult to decipher from survey data alone. In the LPDU, 6.2 percent of identified components have been classified as BMII, compared to 0.1 percent in the MVMDU and 8.3 percent in the ADU. The Basketmaker III period (BMIII) population expansion is substantial in both the LPDU (21.5%) and the ADU (35%), but muted in the MVMDU (5.3%). The Pueblo I period (PI) is well represented in the LPDU (24.4%), MVMDU (35.4%), and the ADU (34.4%), as well as the remainder of the Southern Colorado River Basin Drainage Units in Colorado, with the exception of the Ute Drainage Unit (8.5%). The Pueblo II period is prolific in the MVMDU (40.8%), but demographic contractions occur in both the LPDU (13.6%) and especially the ADU (4.0%). The number of identified Pueblo III period (PIII) components suggests a further population decline with 1.4 percent of identifiable components in the ADU, 2.5 percent in the LPDU, and 18.2 percent in the MVMDU attributable to the PIII. However, just south of the project in the New Mexico portion of the La Plata River Valley, an intensive Pueblo II-III occupation is apparent.

Following the abandonment of the region by Ancestral Pueblo peoples at the termination of the Pueblo III period (ca. AD 1280 to 1300), possibly after AD 1400, Numic (Ute and Paiute) and Athabaskan (Navajo and Apache) peoples began to settle into the Four Corners region, though the timing and nature of these migrations are not fully understood. Post-Pueblo occupations, presumably late prehistoric to protohistoric Athabaskan and Numic groups, are well represented in the LPDU (19.0%) and the ADU (9.7%), but are mostly lacking in the MVMDU (0.2%) (Lipe 1999: 406).

4.1.1 Paleo-Indian

Paleo-Indian occupation of the region occurred at the termination of the Pleistocene (ca. 12,000 to 8,000 B.C.). Archaeological evidence suggests these peoples had developed a highly specialized and mobile subsistence strategy focused on large, Pleistocene megafauna. Archaeological remains of these cultures typically contain spear points in association with bones of the extinct megafauna and other game. Paleo-Indian sites do not appear to be abundant in the region, although this may be due to the lack of diagnostic

artifacts on surface scatters. Paleo-Indian sites have been reported from the Arroyo Cuervo region, San Juan Mountains, and Chaco Canyon areas (York 1991; Hayes et al. 1981; Irwin-Williams 1973). Paleo-Indian components have not been identified in LPDU, MVDU, or ADU (Lipe 1999: 406). In southwestern Colorado, primarily Late Paleo-Indian materials have been documented, including Angostura and Great Basin Stemmed complexes. Most of the points found are made from local materials and many occur in the lower montane zone, today typified by ponderosa pine and Gambel oak woodlands and forests (Lipe and Pitblado 1999: 102). York (1991) argues that even if many of the Paleo-Indian points are curated by later groups, as has often been suggested for the region, the fact that they are made of local materials indicate there was a Late Paleo-Indian presence in southwestern Colorado regardless. The flaked lithic materials used for points occur in a wide variety of elevation ranges and biotic zones, indicating Late Paleo-Indian groups were probably involved in complex seasonal movements and exploitation of a wide variety of habitats and resources. No Paleo-Indian components were identified within the project area.

4.1.2 Archaic

The Archaic period (ca. 8,000 to 2,000 B.P.) is characterized by a period in which subsistence systems became more generalized, probably in response to demographic trends and extinction of the Pleistocene megafauna. Subsistence strategies included a wide variety of resources, such as small game, birds, fish, and plants. A technological shift accompanied the focus on a wider variety of resources, reflecting the processing and storage techniques required for the subsistence change. Irwin-Williams (1979) defined the Oshara Tradition of the Northern Southwest through a series of phases, including the Jay, Bajada, San Jose, Armijo, and En Medio. These sites are generally distinguished by dart point and other artifact style changes, reflecting gradual technological and demographic shifts with decreasing mobility through time. While particulars of the Oshara phase sequence are not always applicable to the area, the frequency with which the Oshara point types are reported in southwestern Colorado is strong evidence of southern influence from the Oshara Tradition. A major increase in summer precipitation, approximately 6,000 years ago during the Middle Archaic, seems to correlate with a marked increase of Archaic populations moving into the region. The lack of local excavation data with well-dated occupations, which is particularly lacking in the Southern Colorado River Basin, makes it difficult to identify common trends in the area. The appearance of maize in the Southern Colorado River Basin of Colorado by ca. 400 BC ushered in a transition to the more sedentary lifestyle of the Ancestral Pueblo Tradition, though the rate of this change appears to have varied considerably throughout the Four Corners region (Lipe and Pitblado 1999: 129-130). As noted earlier, 12.8 percent of identified components are attributed to the Archaic in the LPDU, compared to 7.3 percent in the ADU and 0.1 percent in the MVMDU (Lipe 1999: 406). Three Archaic components were identified during the current cultural resource inventory.

4.1.3 Ancestral Pueblo Tradition

The project area occurs within the Mesa Verde Branch of the Ancestral Pueblo based on pottery types and architectural trends. Ancestral Pueblo components were not recognized in the project area, likely due to the relatively high elevation and lack of arable soils.

4.1.3.1 Basketmaker II Period

The Basketmaker II period (ca. 400 BC-AD 500) is generally understood to consist of pre-ceramic populations in the northern Southwest who began to experiment with maize and squash horticulture.

Several BMII period sites have been excavated within the nearby Animas Drainage Unit, including the well-known Talus Village and Falls Creek sites. The remarkable preservation at these sites enabled Morris and Burgh (1954:75-78) to characterize the assemblage of BMII sites as having expanding-stem and corner-notched dart points, horseshoe-shaped deep basin metates, one and two-hand manos, numerous cores, hammerstones, and choppers. They also documented the first appearance of cultivated corn and squash, tubular stone pipes, expanding-stem and spindle drills, sandals made of cross-woven yucca fibers, plaited rush stems, leather and close-coiled basketry. The structures tend to be shallow pithouses, some with a second chamber, which foreshadows the formalization of the antechamber in later Basketmaker III pithouses. Lipe (1999:152) notes that the general inability to confirm the presence of BMII and Archaic sites from surface manifestations precludes the recognition of a region-wide settlement pattern in lieu of more data. In the La Plata River drainage, 6.2 percent of identified components have been classified as Basketmaker II. One undifferentiated Late Archaic/BM II component was documented during the current cultural resource inventory.

4.1.3.2 Basketmaker III Period

The Basketmaker III (BMIII) period (AD 500-750) is well documented within the LPDU and ADU. Wilshusen (1999a:184-185) notes that early BMIII sites are primarily concentrated in the west of and including the La Plata Drainage Unit. Most of the BMIII remains in the ADU occur rather late in the BMIII period and are usually defined as transitional BMIII-Pueblo I (PI) sites as they consistently post-date AD 750 and exhibit traits of both periods (p.184). Farther east, Sambrito phase sites, the Basketmaker III phase correlate of the Upper San Juan-Piedra Drainage Unit, are also very rare and often only identified through excavation. Wilshushen (1999a) suggests that the abnormally high population growth following AD 600 indicates migrations into the area, in addition to local population expansion.

Basketmaker III sites from the La Plata River westward are generally one to three household habitations located in close proximity to arable mesa top loess and upland resources. The pithouses are typically dual-chambered, relatively shallow structures with a variety of food processing features, indicative of agricultural intensification. A series of shallow discontinuous storage rooms are often placed in an arc north of the pithouse with a midden area to the south. This habitation site pattern foreshadows the layout for later Pueblo periods. Pottery becomes abundant by the BMIII period and consists primarily of plain graywares with some vessels exhibiting "stitched" basketry designs painted with mineral pigments. Chapin Gray, Chapin B/W, and Abajo R/O are common pottery types on BMIII sites in the western drainage units.

A variety of ephemeral site types and isolated occurrences occur as well and suggest that, in addition to agriculture, BMIII populations exploited virtually all habitats from desert scrublands to montane forests for native plant and animal resources. Evidence of cultivated beans in the region first appears in the archaeological record during BMIII times. Dependence on corn, beans, and squash increases dramatically during the BMIII period, although exploitation of wild resources is still significant. In addition, the clearing of farm fields and agricultural disturbance led to the proliferation of productive, ruderal (weedy, short-lived) plant and animal species (generally rodents/rabbits) in active and fallow fields. Agricultural disturbance, for the first time, concentrated edible ruderal plant and animal resources in a predictable manner well beyond what generally occurs in undisturbed natural landscapes (Ford 1984; Semé 1984). Archaeological evidence indicates that a consistent pattern of harvesting these incidental ruderal resources

from an increasingly anthropogenic landscape was well established by BMIII times. Exploitation of ruderal resources continues throughout the Ancestral Pueblo sequence into historic Pueblo times (e.g., see Castetter 1935), and ultimately served to decrease agricultural risk while providing a greater variety of foodstuffs. As noted previously, 21.5 percent of identifiable components in the LPDU are BMIII.

4.1.3.3 Pueblo I Period

The Pueblo I period (AD 750-900) is well represented in all of the Southern Colorado River Basin drainage units, except the Ute Drainage Unit. These sites are generally characterized by deep, single-chambered pitstructures with contiguous arching sets of jacal rooms placed to the north. Sets of upright slabs are often found on the surface of these sites and represent the footers for the jacal structures. Room suites typically consist of a front habitation room facing the open plaza with one to three attached back rooms used for storage. Ceramic manufacturing includes neck-banded graywares and white slipped decorated pottery, with some redwares. Typical pottery types in the western drainages include Moccasin Gray, Chapin Gray, Piedra B/W, and Bluff B/R. The period increasingly appears to be one of rapid aggregation and development. Many of the village communities of this period rival the size and complexity of the more infamous masonry Pueblo III communities (Wilshusen 1999b:224-226). However, after AD 875 these large communities in the western drainages begin to fragment and it appears that populations dispersed and/or moved southward into New Mexico and perhaps eastward into the Upper San Juan-Piedra Drainage Unit in response to environmental changes and ensuing cultural stresses. In the LPDU, 24.4 percent of identifiable components date to the Pueblo I period.

Whalen (1981) suggests the origin of the roomblock, or pueblo, during the Pueblo I period is an adaptive reorientation from a hunting and gathering subsistence system with some food production to a system primarily sustained by food production. As the intensification of agriculture proceeds and becomes more labor intensive, the need for larger residential groups and permanent habitation sites rises in response to a complex scheduling of processing, storage, and preparation activities required to maintain the cultural system. In this view, the pueblo or roomblock is interpreted to represent an architectural solution to the social consequences of agricultural intensification.

4.1.3.4 Pueblo II Period

The early Pueblo II (PII) period (AD 950-1050) is poorly understood and the population evidently much smaller than occurs during the peak of the PI period. Sites dating to early PII are few in number and have not been subject to extensive professional excavations, as have the more ubiquitous and formidable PI and late PII-PIII period sites (Lipe and Varien 1999a: 253). The habitation sites tend to be unit pueblos with a kiva and room suite usually representing only one to two households. It appears that by the AD 1000s, the region is beginning to be re-populated by former inhabitants and architectural units become more diverse and complex later in the era. Similar to BMIII sites, the PII habitations are placed in proximity to loess soils of mesa tops in middle elevation settings. Early Pueblo II sites are generally recognized by the appearance of Mancos Corrugated, Cortez B/W, and Deadmans B/R pottery and tend to use composite architectural techniques involving jacal with some masonry. By the late Pueblo II period (AD 1050-1150), horizontal-laid masonry architecture prevails and larger villages appear in addition to hamlets. Pottery types in the western drainages during the late Pueblo II include Dolores Corrugated and Mancos B/W, with decorated wares now utilizing organic instead of mineral paints. Decorated wares become more elaborate with better line execution and tradewares appear more frequently. By the late AD 1000s

to early 1100s, Chaco-style great houses appear amidst increasingly dense local communities, and some of the great houses are continuously occupied into the early PIII period. By the end of the late Pueblo II period, community growth stabilizes, while depopulation of the eastern drainage systems appears complete. In the LPDU, the PII period sees a contraction in population (13.6% of identifiable components), while in the adjacent MVMDU, 40.8 percent of identifiable components are classified as PII.

4.1.3.5 Pueblo III Period

The early Pueblo III period (AD 1150-1225) begins a trend towards increasingly large residential communities, although the vast majority of sites are still hamlets (Lipe and Varien 1999b). Paleoclimatical reconstructions indicate a prolonged drought occurred from AD 1130 to 1180, which seems to correlate with a period of little new construction based on cutting dates from structural beam-cut tree-ring samples (p. 292). Local pottery types found on early PIII sites in the western drainages include McElmo B/W, Dolores Corrugated, and Mesa Verde Corrugated, while exotic wares decrease. By late Pueblo III times, Mesa Verde B/W, Mesa Verde Corrugated, and Hovenweep Gray become more common and eventually replace the earlier wares. Settlement patterns in early PIII continue from earlier times with an emphasis on mesa top interiors surrounded by deep, arable, and loess soils. By late PIII times (AD 1225-1300), a dramatic shift toward canyon rim and alcove settings (cliff dwellings) near canyon heads is underway and settlements become aggregated with the majority of the population now living in densely populated villages and community centers (p. 303). These canyon oriented settlements are usually in close proximity to springs and often incorporated into the site itself. Ancestral Pueblo population growth probably reached its peak from AD 1200-1250. Tree-ring studies suggest that beam cutting rates continued to be high up to the AD 1260s to 1270s, with little to no evidence of beam-cutting in or following the 1280s, suggesting a rapid abandonment of the region was underway, and correlating with the Great Drought of AD 1276 to 1299.

Peterson (1992) argues that in addition to drought, this period is known as the Little Ice Age and infers, on several lines of evidence that the growing season contracted to an unbearable level for maize farmers. Conflict and warfare during periods of food scarcity likely increased and played a role in the depopulation of the area, although climate and warfare seem insufficient by themselves to explain the complete Ancestral Pueblo abandonment of the Four Corners region with its myriad of arable habitat types. As Lipe and Varien (1999b) point out, losers in warfare would likely be displaced, but the winners of such conflicts would stay. Furthermore, it seems unlikely that small, non-equestrian hunting and gathering groups, like the prehistoric Athabaskan and Numic, could possibly dislodge well-organized and fortified pueblo communities numbering in the hundreds and thousands. The Ancestral Pueblo migration out of the Four Corners region to the Rio Grande and Little Colorado watersheds in the late 1200s, where summer monsoonal moisture is stronger, probably involved a variety of climatological and social factors for such a thorough abandonment of an ecologically diverse and productive region. Lipe and Varien (1999b) argue that the cultural and economic attractiveness of the Little Colorado River and Middle Rio Grande regions, in addition to the typically cited environmental and social stresses in the Four Corners, must have been overwhelmingly strong for such a thorough abandonment of a vast cultural landscape. The LPDU sees a dramatic decrease in population during the PIII period (only 2.5 percent of identifiable components are classified as PIII in the LPDU).

4.1.4 Navajo Tradition

Both Dinetah and Gobernador phase Navajo sites are present in the LPDU, ADU, and Upper San Juan-Piedra Drainage Unit. These sites tend to increase with frequency south towards the New Mexico border, probably due to the presence of Ute Indians in southern Colorado. Dittert (1958) initially defined the Dinetah phase as occurring between ca. A.D. 1550 to 1692 and characterized the artifact assemblages as including Dinetah Gray sherds, but lacking Gobernador Polychrome pottery and other indications of later Puebloan influence. While Dittert's definition of the Dinetah phase has been criticized for a basis on negative traits, recent studies have confirmed the presence of a pre-Gobernador phase Navajo occupation in the San Juan Basin, possibly dating back to A.D. 1350 (Winter and Hogan 1992). Several early Navajo habitation sites were recently excavated in northwestern New Mexico that produced tree-ring samples from Navajo forked-stick hogans. The construction cutting dates from the pre-Gobernador phase sites cluster between A.D. 1541 and 1679 and the pottery assemblages are composed primarily of Dinetah Gray with only later intrusive Gobernador Polychrome sherds present (Brown 1996; Kearns 1996; Hancock 1997). The Gobernador phase (ca. 1692 to 1780) has historically been considered a period of intense interaction between Navajo and the Pueblos following the Pueblo Revolt of 1680, the campaign that successfully ousted the Spanish colonialists from New Mexico. The re-conquest of New Mexico in 1692 forced the abandonment of many pueblos, due to fear of Spanish reprisals. Many of the Rio Grande Pueblos sought refuge among the Hopi, Zuni, and Acoma Pueblos, as well as the Navajo of the Dinetah region (Hogan 1991; Dozier 1966). It was during this period that the Navajo probably adopted numerous Pueblo cultural elements, including polychrome pottery, intensive agricultural practices, masonry architecture, ceremonial elements, matrilineal and matrilocal descent, clan structure, Hero Twin stories, and origin legends (Powers and Johnson 1987: 5; Eddy et al 1984: 98; Hester 1962: 89).

However, recent archaeological investigations in the Dinetah region strongly suggest that substantial contact and trade between these groups occurred prior to the re-conquest period (Sesler and Hovezak 2002: 201-203). Furthermore, new data suggests that pueblito architecture and settlements apparently post-date the Spanish re-conquest period and do not appear to be associated with Pueblo refugees. Tree-ring and other data strongly indicate that pueblito settlements are contemporaneous with the forked-stick hogan features in the general vicinity of these sites. The pueblitos were constructed from ca. 1710 to 1754, as established by tree-ring data, well after the Pueblo refugees had returned to their respective homelands following the re-establishment of Spanish colonial rule (Towner 2003). In light of recent archaeological evidence and historical accounts of that period, the pueblitos have been re-interpreted to represent defensive structures built by the Navajo in response to repeated raiding excursions by the formidable Capote Ute-Comanche alliance, which also wreaked havoc on the Spanish settlements of the Upper Rio Grande Valley and Chama Valley (Towner 2003). By ca. 1780, due to increased warfare with the Ute and their allies, the Navajo had abandoned the Dinah region and moved to their present range south of the San Juan River and Largo Canyon. After the Treaty of Guadelupe Hildago was signed, conflicts between the United States and the Navajo arose, resulting in the removal of the Navajo from their homeland and containment at Fort Sumner from 1863 to 1868 (Van Valkenburgh 1938: 14-20). The Navajo were returned to their homeland following the treaty at Fort Sumner to a reservation of 3,500,000 acres and subsequent land acquisitions have restored the Navajo Nation to more than 15,000,000 acres (Kluckhohn and Leighton 1974: 43). Evidence of post-Gobernador phase Navajo use of southwestern Colorado is generally lacking. Navajo components were not identified during the current survey.

4.1.5 Ute Tradition

4.1.5.1 Ute Prehistory and Archaeology

The timing of the Ute Indian occupation of southwestern Colorado is less understood than in the case of the Navajo. Sites that can be positively attributed to the Ute Indians are lacking, but are undoubtedly present. The non-recognition of Ute sites is probably due to their extreme mobility, particularly following the adoption of an equestrian lifestyle, and the correspondingly diffuse archaeological remains, the lack of diagnostic artifacts attributable to southwestern Colorado Ute Indians, and the focus of professional archaeologists on the more recognizable Ancestral Pueblo and Navajo sites.

Two phases of the Ute cultural tradition have been defined for the Northern Colorado River Basin, which do not appear to be well represented in southwestern Colorado. The Canalla phase refers to a pedestrian hunting and gathering aboriginal culture (Reed 1994). Canalla Phase (ca. AD 1100 to 1650) sites are distinguished by the appearance of Uncompahgre Brown Ware. The Uncompahgre Brown Ware ceramic tradition includes a plain type and a finger-impressed type. It is still unclear if the construction method is coil and scrape or paddle and anvil (Reed and Metcalf 1999: 158). Projectile points typically associated with these sites include Desert Side-notched and Cottonwood Triangular point types, both of which are common throughout the Great Basin and Southwest during late prehistoric to protohistoric times. Evidence of wikiups and other brush structures are frequently encountered at Canalla phase sites. Reed (1994) asserts that the appearance of Uncompahgre Brown Ware marks the arrival of the Ute or their ancestors into Western Colorado from the Great Basin. The Antero phase (ca. AD 1650 to 1880) marks the transition from a pedestrian hunting and gathering society to an equestrian life style following the introduction of the horse by the Spanish. European trade goods begin to appear in Ute material culture, particularly glass beads, metal cone tinklers, cartridges, and tin cans. Uncompahgre Brown Ware was still produced. Desert Side-notched and Cottonwood Triangular projectile points are also manufactured during the Antero phase, but are eventually replaced by metal points and European goods, including firearms (Reed 1994). While the tipi is adopted following the inception of the horse, wikiups were still constructed during the Antero phase (Reed and Metcalf 1999).

While less than 1 percent of sites surveyed and documented in southwestern Colorado have been assigned Numic affiliation, virtually none have been excavated (Wilshusen and Towner 1999: 367). At Talus Village north of Durango, several tree-ring samples yielded non-cutting dates ranging from A.D. 1447vv to 1559vv, and are probably of Ute affiliation and postdates the earlier Basketmaker II components for which the site is famous (Rayne 1997). Sites attributable to the Ute are better documented in nearby west-central Colorado, where ample evidence suggests sites typified by scatters of brownware and side-notched points are Ute in origin dating between ca. A.D. 1100 to 1900 (Reed 1994). None of the sites documented during the present inventory are attributed to prehistoric-protohistoric Ute occupations.

4.1.5.2 Ute History

The Ute Indians were formed into at least seven bands at the time of historic contact. The Southern Ute Indians consist of three bands, including the Mouache and Capote bands, currently located on the Southern Ute Indian Reservation, and the Weeminuche band, currently located on the Ute Mountain Ute Indian Reservation. Historically, the Capote band inhabited the area east of the Continental Divide to the Sangre de Cristos, the San Luis valley, and as far south as Chama and Tierra Amarilla, New Mexico

region. The Mouache band lived in areas east of the Culebra and Sangre de Cristo Mountains and from the Trinidad to Denver areas along the Front Range (Schroeder 1965:54). The Weeminuche band inhabited the region of southwestern Colorado west of the Continental Divide, to the Abajo Mountains and canyon country of southeastern Utah, and from the Uncompahgre River in the north to the San Juan River in the south (Park et al 1938: 632). The Weeminuche band, unlike the Capote and Mouache bands, often had amiable relationships with the Navajo Indians. The Weeminuche band was reported to be living among the Navajo near the Carrizo Mountains in 1818, and frequently participated in raiding excursions together. In 1833, Navajos were reported to be living among the Weeminuche in the vicinity of the La Plata River and Ute (Datil) Mountain (Schroeder 1965: 64). The peaceful interactions between the Navajo and Weeminuche and the likely adoption of cultural traits between the two groups has probably further obscured the ability of archaeologists to distinguish Ute and Navajo ethnicity from the non-perishable material culture of the archaeological record.

The earliest historical reference to the Ute Indians is in A.D. 1626, when the Jemez Pueblo Indians told the Spaniards the Ute visited the area prior to Spanish settlement in A.D. 1598. The Spanish waged war on the Ute between A.D. 1637 and 1641, for unknown reasons and 80 Ute Indians were captured and used as slave labor in Santa Fe. By 1670, following the adoption of the horse and the rise of the tribe as a formidable force, the Spanish arranged their first treaty with the Ute (Schroeder 1965: 54). However, intermittent Ute raiding parties, particularly the Mouache and Comanche alliance, hampered the settlement of northern New Mexico and southern Colorado until the United States took control of the territory in 1848, after the Treaty of Guadalupe Hildalgo was signed with Mexico. However, conflicts with the Ute Indians apparently continued as the governor of New Mexico arranged the Treaties of Abiquiu with the Ute in 1855, whereby the Ute relinquished all territory in New Mexico with the exception of that area north of the San Juan River (Callaway et al 1986: 355). Due to increasing encroachment by Anglo and Hispanic settlers and subsequent conflicts with the Ute near Colorado City and the San Luis Valley, the Treaty of 1868 redefined the territory of the seven Ute bands and restricted them to the western third of Colorado.

The Colorado Gold Rush began with the discovery of gold in the Colorado Springs and Denver area in 1859. By 1860, miners had found rich mineral deposits in the San Juan Mountains. Miners kept pouring into the region despite the Treaty of 1868 and by 1874 the United States had forced the Ute bands to sign another treaty, whittling the original Ute Reservation down to two narrow strips of land along the Colorado-Utah and Colorado-New Mexico borders (Delaney 1974: 52-55). Following the Meeker Massacre of 1879, the Northern Ute bands were forced from Colorado to remote lands in eastern Utah and the Southern Ute lands were again reduced to a small strip of land along the Colorado-New Mexico border. In 1894, the Hunter Act was passed, leading to the privatization of Indian lands. The Weeminuche had not signed the treaty as had the Capote and Mouache bands, and the Weeminuche were eventually given the western half of the remaining reservation lands (Ute Mountain Ute Indian Reservation). The checkerboard of land ownership that resulted from private allotments of the Capote and Mouache land on the east half of the reservation (Southern Ute Indian Reservation) was partially restored in 1937, when previous land holdings of some 222,016 acres of the original 523,079 acres not allotted (and sold to European American settlers at $1.25 an acre) were returned to the Ute (Delaney 1974: 67-79).

Three sites were identified during the cultural resource inventory that are attributed to historic Ute Mountain Ute occupations, primarily associated with livestock grazing and hunting activities.

4.1.6 European Tradition

By 1859, the presence of gold was confirmed in the mountains of Colorado. In 1861, miners had crossed the Continental Divide and entered the San Juan Mountains. Placer mining, a low investment technique based on exploiting surface gravel deposits with pans, shovels, picks, and sluice boxes, was the primary mining technique employed throughout most of the 1860s. Miners established Animas City, just north of present-day Durango in 1861, for processing gold from ore. By the late 1860s, high investment lode mining (underground) was established due to limited and dwindling placer mine deposits, which required heavy machinery, a large work force, transportation, and processing mills (Husband 1984: 20, 27). By 1874, stimulated by the mining activity, small communities at the gateways into the San Juan Mountains were springing up in Silverton, Lake City, Del Norte, Parrott City, and Animas City. The mining operations were in desperate need of mills, smelters, and efficient transportation, problems that were cured by the railroads. Due to disagreements with the inhabitants of Animas City, the Denver & Rio Grande (D&RG) railroad created the town of Durango in 1880 to use as a railroad hub, which was also strategically located near substantial coal deposits. By 1882, the D&RG linked Antonito in the San Luis Valley with Pagosa Springs, Durango, and Silverton. Within several months, the population of Durango swelled to 2,500 people and the town became a financial, business, and agricultural center that supported the regional mining operations. Gold had lured the miners into southwestern Colorado, but silver was the primary source of mineral wealth generated, with gold, copper, lead, and zinc recovered as by products. Silver mining was dealt a permanent and devastating blow throughout Colorado during the market crash and depression beginning in 1893 (Smith 1996: 234-246).

The need for substantial coal mining in the region was initiated by the expanding railroad system. The La Plata Coal Field, including parts of La Plata, Montezuma, Dolores, and San Miguel Counties, became developed during this period. Further economic stimulation came from the lode mining operations, which required a major fuel source for their extensive smelting needs. Coke oven operations soon appeared in Rico and Durango, followed by similar ventures in nearby Hesperus and Perins. By 1920, the value of coal production in the region surpassed that of mineral mining. A depression in coal related production occurred from 1923 to 1945 throughout the nation (Husband 1984: 41-42).

Also fueled by the mining rush, ranches and farms sprung up throughout the western valleys of Colorado during the late 1860s to early 1870s. The cattlemen practiced open range grazing and the industry boomed along with the towns they helped sustain. The first herds were Shorthorn cattle, but within a short period, more hardy Hereford cattle replaced them. The extremely harsh winter of 1885-1886 nearly devastated the cattle industry, though it quickly bounced back. The inevitable end of open range grazing began in 1891, when National Forest reserves were created, in part, to regulate grazing on public lands and to address watershed concerns. The cattle industry experienced grave difficulties with farmers and their fences, as well as competition with Hispanic and Basque sheepherders. Open range grazing did not end until 1934, when the Taylor Grazing Act protected unappropriated public lands. While many cattlemen turned to sheep herding during the cattle price depression prior to World War I, soon after World War II, the cattle and sheep markets both fell drastically and the industry never fully recovered (Husband 1984: 71-72). While cattle and sheep are still raised on many farms and ranches in rural

portions of La Plata County, very few operations are completely dependent on livestock for income. Following World War II, the regional economy has become increasingly dependent on tourism and the energy extraction industry, primarily oil and natural gas production and coal mining. Only one component was documented during the survey that is associated with historic European Americans.

4.2 Research Objective

The survey was structured specifically to meet one objective. The study sought to determine if any cultural properties considered eligible or potentially eligible (need data) for nomination to the National Register of Historic Places (NRHP) were located within the project area. On a broader scale, the inventory results enhance our general archaeological knowledge of sites within the region. Collectively, small-scale survey data may assist in understanding population distributions throughout the prehistoric and historic periods and enable the formulation of hypotheses towards a variety of research domains that can be accepted, modified, or rejected by researchers. A low to moderate site density was expected in the project vicinity based on record search results, relatively high elevation, lack of arable soil, no immediate surface water, and previous experience in the area.

4.3 Previous Investigations

On August 27, 2018, Paula Fluder of SEAS performed a Compass records search. Seven previously recorded sites occur within a mile radius of the project (Table 4.1). One site is an unspecified Native American open lithic site (5LP 9600), one is an historic Ute habitation/homestead (5LP 9601), one is an historic Ute hunting cabin (5LP 10572), and four sites are historic European American retention dams with reservoirs and intakes (5LP 10262, 5LP 10263, 5LP 10264, and 5LP 10589). Of the seven sites, one (5LP 10572) is within the surveyed project area. The site was re-evaluated during the current project and is described below in Section 5.

4.4 Methodology and Definitions

The project area for the proposed GCCE King II Mine Dunn Ranch Lease by Application Project totals 1,392.13 acres (563.38 ha) with 1,176.59 acres (476.15 ha) on lands owned by the Ute Mountain Ute Indian Tribe, 202.48 acres (81.94) on other private lands, and 13.06 acres (5.29 ha) on BLMTRFO lands. Additional buffer zones were not surveyed beyond the proposed lease expansion areas. The project area was surveyed for cultural resources by walking parallel transects space no more than 15 meters apart.

For this inventory, a site was defined as any manifestation of past human activity consisting of a feature and /or 10 or more artifacts. An isolated find is defined as one to nine artifacts in a definable space not associated with a feature or structure, typically representing an isolated event or expedient activity. However, site and IF definitions are guidelines only and all cultural manifestations are individually evaluated for data potential. All field notes, maps, photographs, and inventory documents are on file at the SEAS office in Ignacio, Colorado. Sites are mapped, photographed, and site forms completed. Artifact inventory forms are completed with exact counts for artifact classes up to 100 items. For sites with more than 100 artifacts in any artifact class, field analysis may include 100 or more items per artifact class, until the nature of the assemblage has been adequately characterized. A primary flake is defined as having 100 percent cortex on the dorsal surface; a secondary flake is defined as having 1 to 99 percent

cortex on the dorsal surface; a tertiary flake is defined as having no cortex on the dorsal surface. Bifacial thinning flakes are recognized by faceted, retouched, or lipped platforms, diffuse bulbs, thin cross sections, multiple flake scars paralleling the dorsal surface margin, and eraillures. Pressure flakes are small (less than 1 cm), thin, and usually non-cortical with a high frequency of collapsed platforms. Many indeterminate flake fragments are often found in which the flake type is not readily apparent. These flakes were assigned as indeterminate flake fragments. Usually, the vast majority of indeterminate flake fragments are non-cortical and probably derived from late stage decortication or flaked tool production. Hammerstones are generally large chunks or cobbles and recognized by battering wear on edges, which is often seen on cores as well (core/hammerstone). Utilized flakes are unshaped and exhibit retouched edges, evidently used for expedient purposes. Retouched edges or use wear patterns would have to be visually obvious in the field without magnification to be assigned to the utilized flake category. Flaked lithic tools include both informal tools, such as cores, utilized flakes, or hammerstones, and formal tools in which purposeful shaping is evident, such as scrapers, bifaces, projectile points, drills, knives, or choppers. Cobbles or raw materials displaying less than three flake scars are referred to as assayed cobbles. The term non-flaked lithic refers to ground stone implements and other artifacts, such as polishing stones, shaft abraders, ornaments, or non-flaked mauls and hoes.

Features, diagnostic points, or any other unique attributes, are measured, photographed, plotted, and described. A site datum consisting of an aluminum site tag attached to a tree bearing the temporary site number is placed in a visible locale, usually near the site center. The sites were mapped using sub-meter accurate GIS data. For this project, a Trimble Geo 7X PC loaded with TerraSync software was utilized to record location data. Site dimensions, site areas, and distance to intermittent and named drainages were calculated from the GPS data. Project maps and site plan maps were produced from the GPS data using base maps from Terrain Navigator Pro. GIS project and site plan maps were produced by Paula Fluder. Between September 5 and 21, 2018, SEAS archaeologists Mike Proper (Crew Chief), David Ayers, Douglas Lynne, Doug Loebig, and Erin Weaver completed the cultural resource inventory.

4.5 Protection and Evaluation of Cultural Resources

Cultural resources are protected and managed under a variety laws and regulations by federal agencies. The primary laws under which cultural resource compliance studies are reviewed include Section 106 of the National Historic Preservation Act (NHPA) of 1966 (PL 89-665; 80 Stat. 915; 16 USC 470 et seq.) as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800); the Archaeological Resources Protection Act (ARPA) of 1979 (PL 96-95; 93 Stat. 721; 16 USC 470aa et seq.) as amended (PL 100-555; PL 100-588); the American Indian Religious Freedom Act (AIRFA) of 1978 (PL 95-431; 92 Stat. 469; 42 USC 1996); and the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (PL 101-601; 104 Stat. 3048; 25 USC 3001; 43 CFR Part 10). Cultural resources protected under ARPA, AIRFA, and NAGPRA are typically considered and evaluated under the review process set forth in Section 106 of the NHPA. In addition, the conservation of historic and cultural resources is established through federal policy as a component of the NEPA (Section 101[b][4]) process for federally authorized permits, funding, and projects (40 CFR Part 1 1502.16[g]). Cultural properties considered significant and eligible for listing on the National Register must possess integrity of location, design, setting, materials, workmanship, feeling, and association and must meet one or more of the following criteria;

Criterion A: Association with events that have made a significant contribution to the broad patterns of our history

Criterion B: Association with lives of persons significant in our past

Criterion C: Embodiment of distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic values, or representation of a significant distinguishable entity whose components may lack individual distinction

Criterion D: Has yielded, or may be likely to yield, information important in prehistory or history

Most archaeological sites are evaluated in terms of Criterion D, although numerous exceptions occur, particularly if standing architecture or linear features are involved.

5.0 Cultural Resource Inventory Results

The cultural resource inventory encountered and documented one previously recorded site (5LP 10572), six newly recorded sites (5LP 11383, 5LP 11384, 5LP 11385, 5LP 11386, 5LP 11387, and 5LP 11388), and 15 isolated finds (5LP 11389 through 5LP 11403). Results from this survey indicate a low density of cultural resources with sporadic, ephemeral use during the Archaic and historic periods. Site types, cultural affiliations, and NRHP evaluations are summarized below in Table 5.1. Per 43 CFR 7.18, disclosure of site location data is prohibited. Project location maps with cultural resource plots and a corresponding table with location data are provided in the attached confidential appendix (Appenix A).

Table 5.1 Site Summary Table

CO Site No.	Temporary Site No.	Cultural Affiliation	Site Type	NRHP Evaluation
5LP 10572	SEAS 18-086-01	Historic Ute Mountain Ute	Temporary camp (hunting cabin)	NRHP not eligible
5LP 11383	SEAS 18-086-02	Historic Ute Mountain Ute	Temporary camp	NRHP not eligible
5LP 11384	SEAS 18-086-03	Late Archaic	Artifact scatter	NRHP potentially eligible (need data)
5LP 11385	SEAS 18-086-04	Unknown historic	Artifact scatter	NRHP not eligible
5LP 11386	SEAS 18-086-05	Late Archaic	Artifact scatter	NRHP potentially eligible (need data)
5LP 11387	SEAS 18-086-06	Middle to Late Archaic	Artifact scatter	NRHP potentially eligible (need data)
5LP 11388	SEAS 18-086-08	Historic Ute Mountain Ute	Ranching facility	NRHP not eligible

5.1 Previously Recorded Sites

5.1.1 Site 5LP 10572

Site Number: 5LP 10572 (SEAS 18-086-01)
USGS Map: Thompson Park, CO 1963, USGS Map No. 37108-C2-TF-024
Land Ownership: Private Land (owned by Ute Mountain Ute Indian Tribe)
Site Type: Temporary camp (hunting cabin)
Cultural Affiliation: Historic Ute Mountain Ute (ca. AD 1954-1964)
Site Dimensions and Area: 43 (N-S) x 29 m (E-W); 901 m² = 0.22 acres (0.09 ha)

Site Description:

Site 5LP 10572 is a recent historic temporary camp dating within the 1954-1964 era with one structure and a sparse artifact scatter of probable Ute Mountain Ute cultural affiliation (Figures 5.1 and 5.2). At 8,360 ft (2,548 m) amsl, the site is located on the southeast margins of a saddle between Deadman Gulch and East Alkali Gulch. The site is near the saddles' edge overlooking East Alkali Gulch. The aspect is south and southwest and the slope varies little from 6 to 8 degrees. Soil depth is 30-50 cm based on the adjacent road cut and the excavated depression associated with the structure. Soils consist of mixed

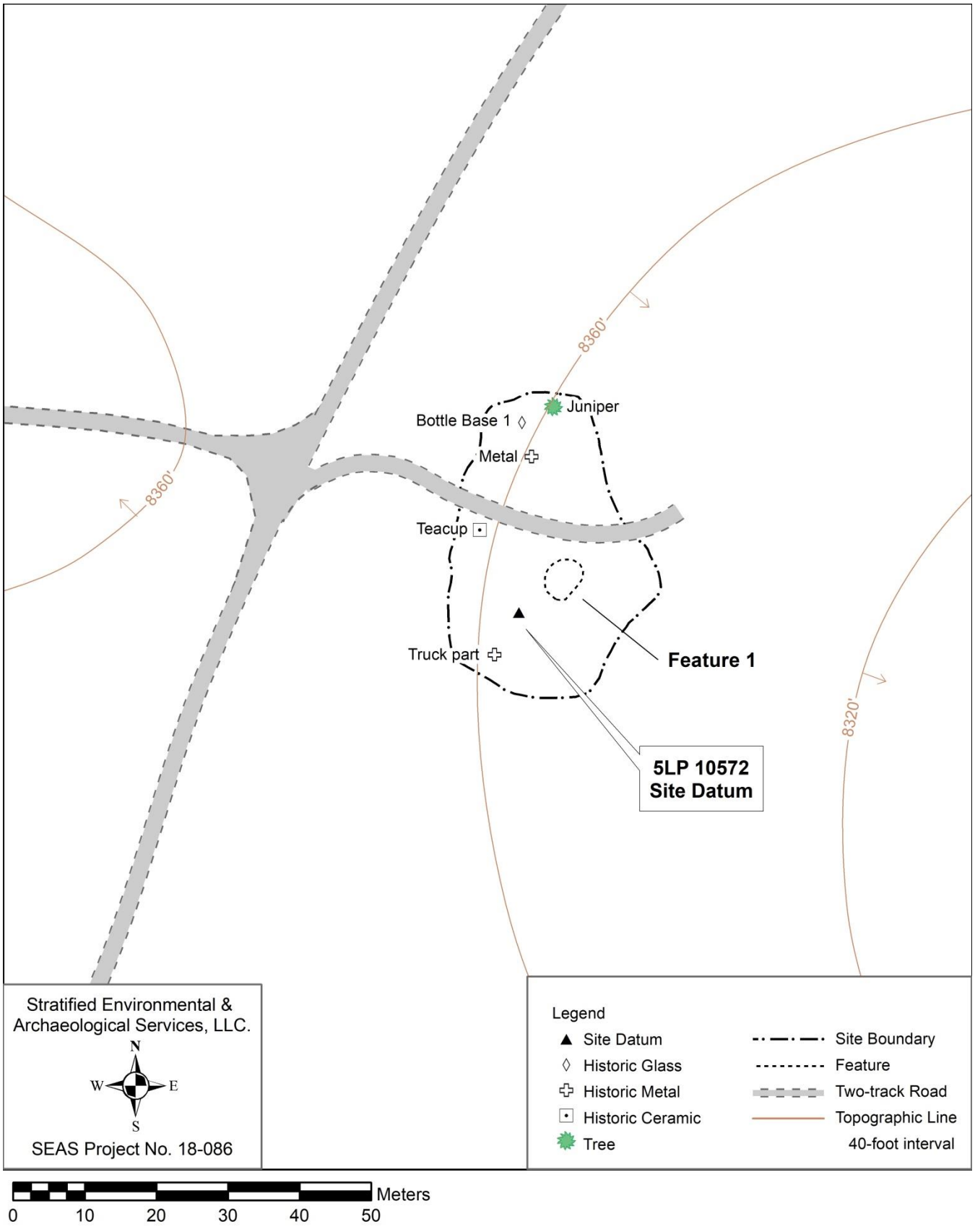


Figure 5.1 Site Plan Map, 5LP 10572

Figure 5.2 Site Overview Facing East with Feature 1 Depression and Lumber at Center, 5LP 10572

colluvial and residual light brown silt loam with sandstone rock inclusions. Most of the site area has good vegetative cover with erosion mostly restricted to the road bed. A lower montane chaparral plant community characterizes the area with vegetation and detritus covering 80 percent of the ground surface. The vegetation consists of Gambel oak, Rocky Mountain juniper, Utah serviceberry, and a variety of native grasses. The site is in poor condition and structural materials were apparently salvaged. This site measures 43 m (N-S) by 29 m (E-W) with an area of 901 m^2 or 0.22 acres (0.09 ha).

The site was first recorded in 2014 by PaleoWest Archaeology (Schwegman and Rude 2014). The site was described as a late historic Ute Mountain Ute hunting camp with the remains of one structure and a limited artifact assemblage. Most of the artifacts listed were construction materials associated with the collapsed structure and included approximately 40 machine-made nails and 20 pieces of lumber. One sanitary can fragment and an automobile part were recorded. The site was recommended and officially determined not eligible for listing on the NRHP.

SEAS found 5LP 10572 to be as previously described. The PaleoWest site datum, structure (Feature 1), and both of their described artifacts were relocated. Feature 1 is concentration of deteriorating lumber on the edge of a shallow depression. The depression measures 4 by 4 m and 20 cm deep with the lumber and associated nails lying on the eastern margin. Additional artifacts found during this recording include a clear glass beverage bottle base and a teacup fragment. The bottle base shows an "I" in a circle with a "4" to the right (Owens-Illinois maker's mark) and cursive Duraglas inscription, indicating the bottle was made in either 1954 or 1964. The teacup base is embossed with "CHINA." The current recording slightly expanded the site area from 40-by-16 m (522 m^2) to 43-by-29 m (901 m^2).

Previous work: The site was originally recorded by PaleoWest in 2014 (Schwegman and Rude 2014) and was recommended and officially determined not eligible for listing in the NRHP.

Significance: This recording agrees with the previous determinations that site 5LP 10572 is not eligible for inclusion in the NRHP. The temporary shelter is collapsed and heavily deteriorated, and some construction materials were probably salvaged. Water erosion is prevalent along a two-track road bisecting the site, associated trash items are very limited, and the site is of relatively recent historic origin, dating to the 1954-1964 era. The site has no important historical associations (Criteria A & B) and does not embody distinctive characteristics of a period or type, nor does it possess high artistic value (Criterion C). Given the poor condition, recent age, and paucity of associated cultural materials, 5LP 10572 is unlikely to yield significant historical information (Criterion D). Detailed field recording has adequately characterized the nature and condition of the site in archival form.

5.2 Newly Recorded Sites

5.2.1 Site 5LP 11383

Site Number: 5LP 11383 (SEAS 18-086-02)
USGS Map: Thompson Park, CO 1963, USGS Map No. 37108-C2-TF-024
Land Ownership: Ute Mountain Ute Tribe
Site Type: Temporary camp
Cultural Affiliation: Historic Ute Mountain Ute (ca. 1950-1980)
Site Dimensions and Area: 11 m (N-S) x 10 m (E-W); 80 m² = 0.02 acres (0.008 ha)

Site Description:

Site 5LP 11383 is a late historic temporary camp dating to the 1950-1980 era of probable Ute Mountain Ute cultural affiliation (Figures 5.3 and 5.4). At 8,460 ft (2,579 m) amsl, the site is located on an unnamed mesa top south of Deadman Gulch. Slope on the site is 2 to 4 degrees and 4 to 6 degrees in the surrounding area. Aspect is south. The drainage in Deadman Gulch passes 570 m to the northeast. Based on the road cut, soil depth is at least 30 to 40 cm. Soils consist of dark brown silt loam with sandstone rock inclusions. A lower montane chaparral plant community characterizes the area with vegetation and detritus covering 70 percent of the ground surface. The plant community is dominated by dense Gambel oak thickets, snowberry, and a variety of native grasses. The site is adjacent to the main bladed road along the ridge crest and is in poor condition with disturbances from water erosion and salvaging of construction materials. This small site measures 11 m (N-S) by 10 m (E-W) with an area of 80 m² or 0.02 acres (0.008 ha).

Site 5LP 11383 consists of one feature and associated artifacts. Feature 1 is a collapsed structure consisting of lumber, machine-made nails, and one piece of rusted roof tin. The structural remains are in 6 by 5 m area. Remains of four 4-by-4 inch lumber posts, some of which were nailed to 1-by-10 inch

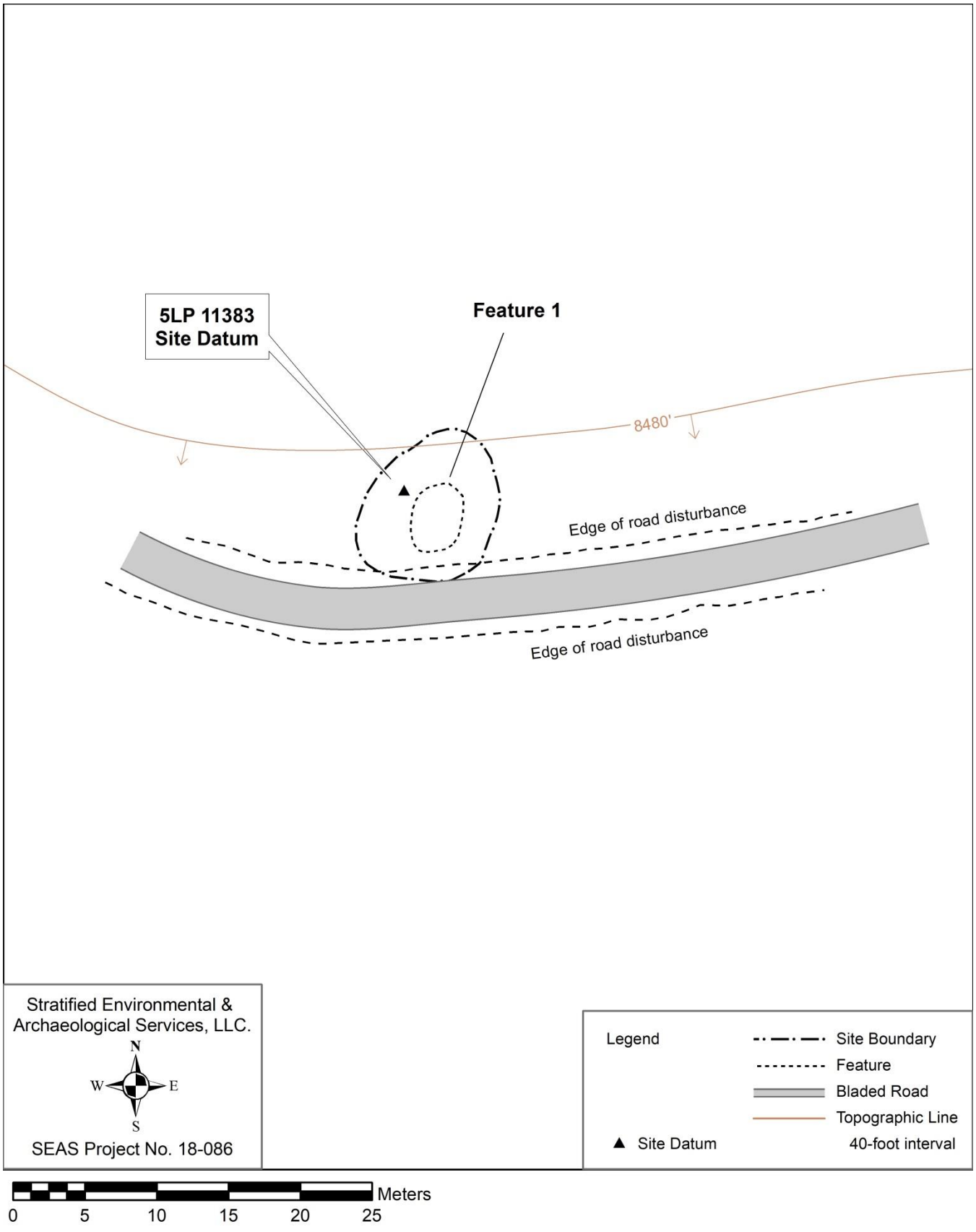


Figure 5.3 Site Plan Map, 5LP 11383

Figure 5.4 Site Overview Facing South Showing Feature 1, 5LP 11383

wooden planks and 2-by-4 inch studs, delineate a small square structure. Most of the rubble is scattered around a shallow depression. The depression is approximately 30 cm deep with sandstone boulders exposed along the depression border. At the time of this visitation, water had pooled in the depression. Remaining lumber includes three fragments of 1-by-10 inch boards and three fragments of 2-by-8 inch wooden boards. Four 4-by-4 lumber posts may have supported a tin roof. The limited number of 1-inch boards indicates the structure was largely open or that a portion of the structure was salvaged for use elsewhere. No additional artifacts were observed. The function of the isolated structure is unknown but likely was associated with ranching or hunting activities. The similarity to other historic ranching and hunting structures in the area and the location suggest the site dates between 1950 and 1980 and is of historic Ute Mountain Ute cultural affiliation.

Significance: 5LP 11383 is recommended not eligible for listing on the NRHP. The structure is collapsed, badly deteriorated, and building materials were likely salvaged. A road has disturbed the site and water erosion is considerable. Other than milled lumber and machine-made nails, there is no associated artifact assemblage and archaeological depth seems negligible. The site may not be 50 years, but is likely no older than the 1950s based on weathering of the wood and similar sites in the region. The site has no important historical associations (Criteria A & B) and

does not embody distinctive characteristics of a period or type, nor does it possess high artistic value (Criterion C). Given the poor condition, relatively recent age, and lack of associated cultural materials or other features, 5LP 11383 is unlikely to yield significant historical information (Criterion D). Detailed field recording has adequately characterized the nature and condition of the site in archival form.

5.2.2 Site 5LP 11384

Site Number:	5LP 11384 (SEAS 18-086-03)
USGS Map:	Thompson Park, CO (USGS Map No.37108-C2-TF-024)
Land Ownership:	Ute Mountain Ute Tribe
Site Type:	Artifact scatter
Cultural Affiliation:	Late Archaic (ca. 1800 BC-AD 400)
Site Dimensions and Area:	54 m (NW-SE) x 31 m (NE-SW); 949 m² = 0.23 acres (0.09 ha)

Site Description:

Site 5LP 11384 is an artifact scatter of Late Archaic period cultural affiliation (Figures 5.5 and 5.6). At 7,920 ft (2,414 m) amsl, the site is located on a gently sloping bench between West Alkali Gulch, 755 m to the northwest, and East Alkali Gulch, 855 m to the southeast. An unnamed intermittent drainage passes 370 m east. The aspect is south and slope is 4 to 6 degrees. Soil depth is up to 100 cm based on road cuts within the site. Soils consist of tan silt loam with sandstone rock inclusions formed from alluvial, colluvial, and residual materials. The plant community is transitional lower montane chaparral and conifer woodland with vegetation and detritus covering 60 to100 percent of the ground surface. Vegetation includes Gambel oak thickets, Colorado piñon pine, and Rocky Mountain juniper with an understory of black sagebrush, big sagebrush, blue grama grass, broom snakeweed, snowberry, and narrowleaf yucca. The site is in good to fair condition with minimal impact from road and fence line construction. This site measures 54 m (NW-SE) by 31 m (NE/SW) with an area of 949 m² or 0.23 acres (0.09 ha).

Site 5LP 11384 consists of a sparse flaked lithic artifact scatter of Late Archaic cultural affiliation. No features, ceramic sherds, or ground stone tools were observed. Most of the artifacts were exposed on the eastern margin of dense oak thickets. All 15 artifacts observed on the site surface were analyzed in the field. The lithic assemblage includes one primary core flake, two secondary core flakes, five tertiary core flakes, three biface thinning flakes, two pieces of angular debris, and two projectile points (Tables 5.2 and 5.3). Projectile Point 1 is the convex base fragment of a side-notched dart point and may represent a late En Medio or Armijo-style point. Projectile Point 2 is the tang fragment of a corner-notched point that may represent an Elko point. Lithic materials represented in the assemblage include tan and gray orthoquartzites (6), red and black cherts (5), silicified wood (2), and obsidian (1). With the exception of the obsidian, which represents an imported item, all materials are locally available in the region. Based on size and morphology, the points are associated with the Late Archaic period (ca. 1800 BC to AD 400). The site likely functioned as a temporary warm season hunting camp, given the elevation, with limited tool manufacturing/refurbishing activities occurring on site.

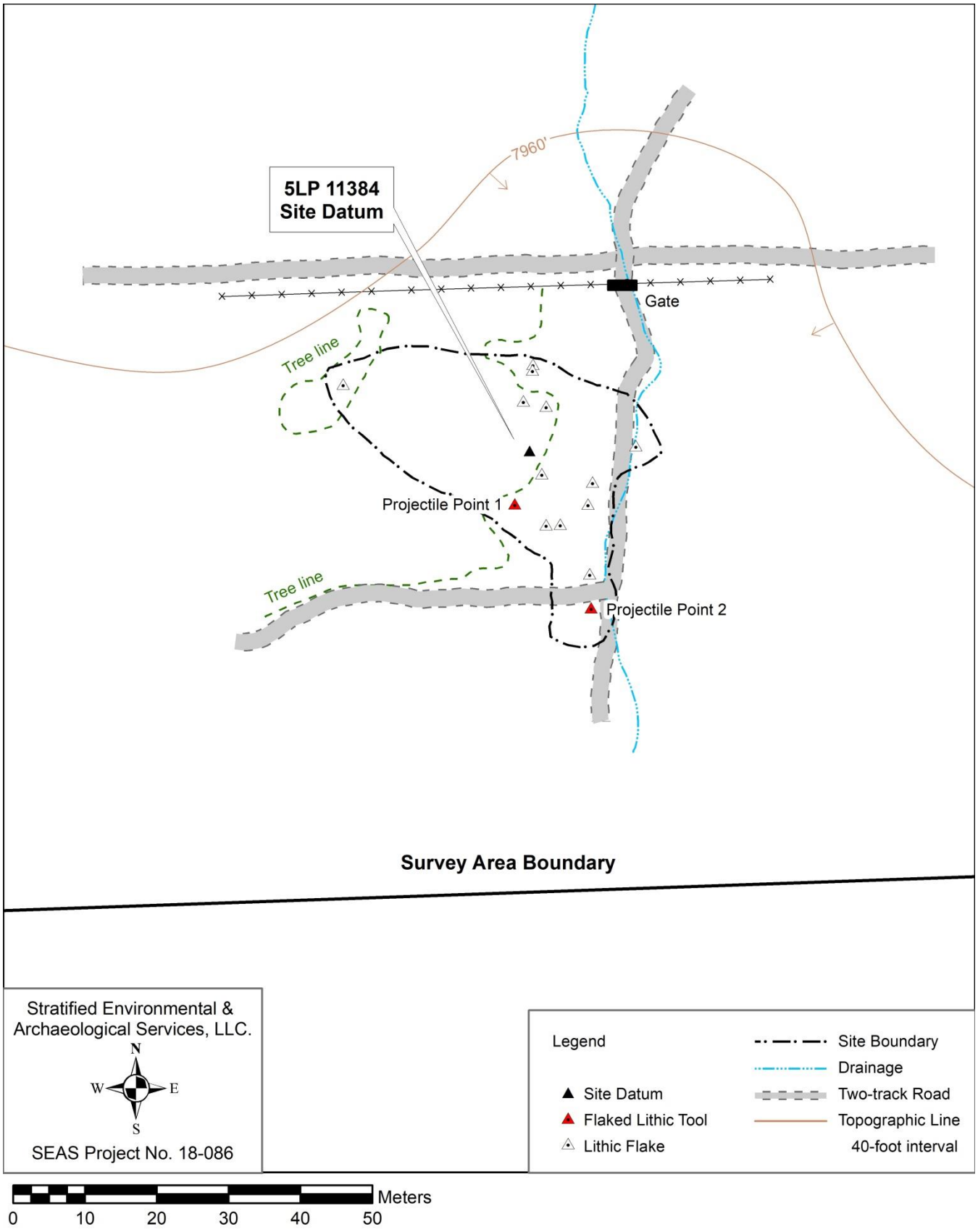


Figure 5.5 Site Plan Map, 5LP 11384

Figure 5.6 Site Overview Facing South-southwest (Top) and, from Left to Right, Projectile Points 1 and 2 (Bottom), 5LP 11384

Table 5.2 Flaked Lithic Artifact Tallies, 5LP 11384

Material Type	Size (cm)	Primary FL	Secondary FL	Tertiary FL	Pressure FL	Biface FL	FL Fragment/ Angular Debris	FL Tools	Material Type Totals
Tan orthoquartzite	0-2		1						3
	2-4								
	>4			1			0/1		
Red chert	0-2			3					3
	2-4								
	>4								
Black chert	0-2					1			2
	2-4			1					
	>4								
Gray orthoquartzite	0-2							1	4
	2-4	1	1						
	>4						0/1		
Silicified wood	0-2					1			2
	2-4					1			
	>4								
Obsidian	0-2							1	1
	2-4								
	>4								
		1	2	5		3	0/2	2	15
Total = 15									

Table 5.3 Lithic Tools, 5LP 11384

Tool Type	Material	Dimensions (cm)	Notes
Projectile point	Gray orthoquartzite	1.8 x 2.1 x 0.4	Projectile Point 1: convex base fragment of a side-notched possible En Medio or Armijo dart point
Projectile point	Obsidian	1.5 x 1.4 x 0.3	Projectile Point 2: tang fragment of a possible Elko Corner-notched point

Significance: 5LP 11384 is recommended NRHP-potentially eligible (need data) under Criterion D. Surface inspection alone was inadequate for determining the site's data potential. The site has relatively deep soils and the surface is well-stabilized by dense vegetation and detritus, despite some disturbance from two-track roads crossing the site. In addition, the dense vegetation and detritus likely obscures additional artifacts and features. Moderate to good potential exists for intact, subsurface cultural deposits, including thermal features. The site could yield important data regarding Late Archaic settlement and abandonment patterns, subsistence and land use systems, trade networks, cultural identity, diachronic/synchronic variation, social organization, and/or chronological refinement among other research domains.

5.2.3 Site 5LP 11385

Site Number: 5LP 11385 (SEAS 18-086-04)
USGS Map: Thompson Park CO 1963, USGS Map No.37108-C2-TF-024
Land Ownership: Private lands
Site Type: Trash scatter
Cultural Affiliation: Unknown historic (ca. AD 1890s to 1920s)
Site Dimensions and Area: 18 m (N-S) x 24 m (E-W); 316 m² = 0.08 acres (0.03 ha)

Site Description:

Site 5LP 11385 is an historic trash scatter dating to the 1890s to 1920s era (Figures 5.7 and 5.8). At 7,980 ft (2,432 m) amsl, the site is located near the southwest terminus of a mesa top. West Alkali Gulch is 270 to the northwest. The aspect is south to southeast and slope on and surrounding the site is 2 to 4 degrees. Soils are approximately 30 cm deep based on a drainage cut and consist of tan silt loam mixed colluvium and residuum with sandstone inclusions. Conifer woodland vegetation and detritus covers 70 percent of the ground surface. Colorado piñon pine trees dominate the overstory, while the understory is primarily composed of black sagebrush, mountain mahogany, snowberry, and various native grasses. The site is in poor condition with disturbances from livestock grazing and water erosion. This small site measures 18 m (N-S) by 24 m (E-W) with an area of 316 m² or 0.08 acres (0.03 ha).

The site consists of a small trash scatter of unknown historic cultural affiliation. Field analysis included all 23 artifacts observed on the ground surface. The assemblage consists of three sun-colored amethyst (SCA) bottle glass fragments (ca. 1880 to 1920), two tobacco tins, 14 miscellaneous metal fragments, two bullet cartridges, one food tin fragment, and one metal cinch (Table 5.4). A striker plate on one of the tobacco tins indicates manufacturing occurred after 1892 and before World War II. Head stamps on the bullet cartridges show "PETERS 38 SW SPL" and PETERS 25.20 Marlin." The Peters Cartridge Factory was founded in 1887 and sold to the Remington Arms Company in 1934. The site likely represents the remains of a temporary camp and based on the presence of SCA glass, tobacco tins, and Peters cartridges, site use occurred between 1892 and the 1920s.

Significance: Site 5LP 11385 is recommended not eligible to the NRHP as it lacks archaeological depth potential and is unlikely to yield significant information important to understanding the historic period. This site is in poor condition from slope washing and livestock disturbances. The site has no important historical associations (Criteria A & B) and does not embody distinctive characteristics of a period or type, nor does it possess high artistic value (Criterion C). Given the poor condition, lack of features, shallow soils, and sparse artifact assemblage, 5LP 11385 is unlikely to yield significant historical information (Criterion D). Detailed recording of the site in the field has adequately characterized its limited information potential in archival form.

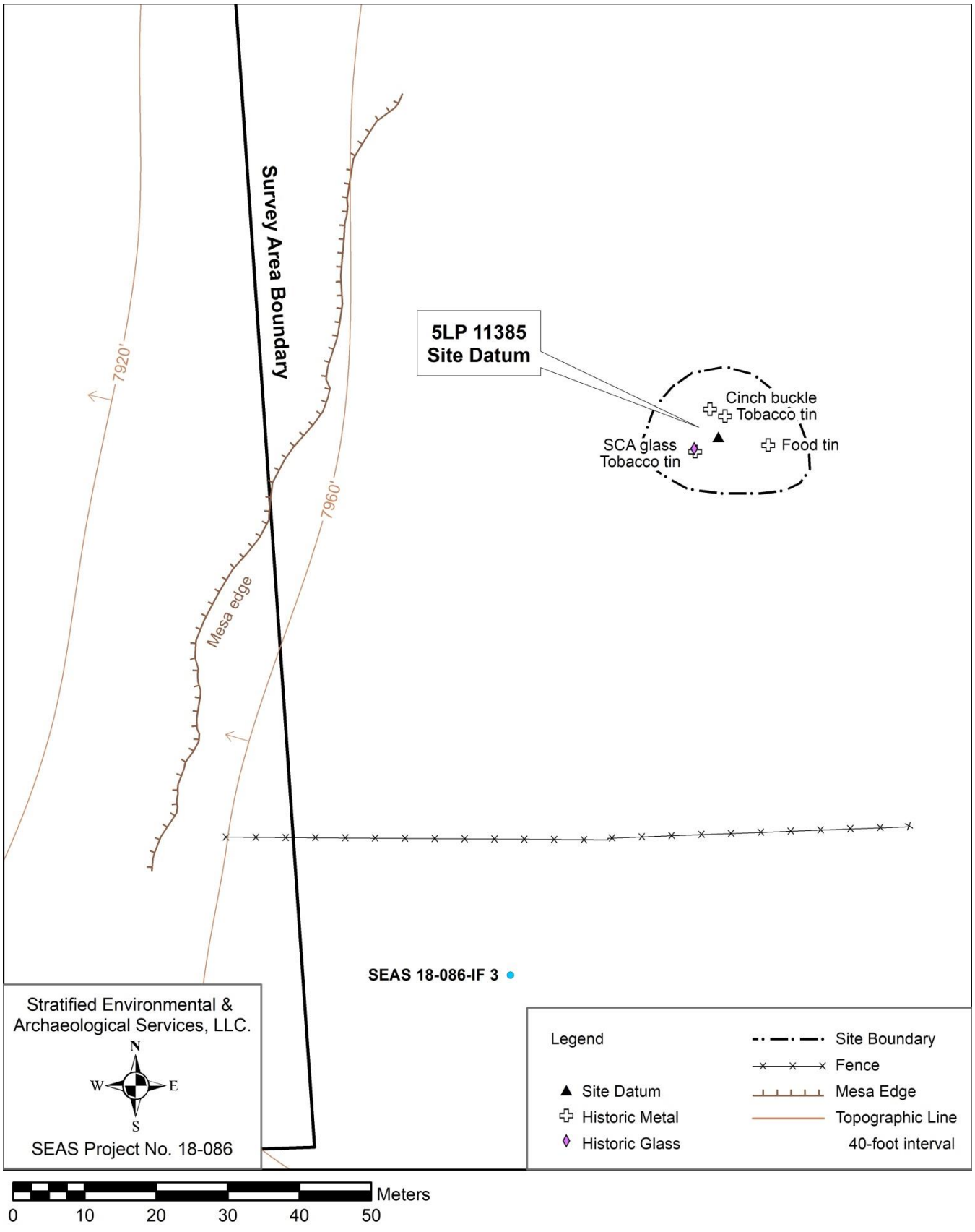


Figure 5.7 Site Plan Map, 5LP 11385

Figure 5.8 Site Overview from Western Site Boundary Facing East, 5LP 11385

Table 5.4 Historic Artifact Descriptions, Site 5LP 11385

Quantity	Historic Artifact Descriptions
3	Sun-colored amethyst bottle glass fragments (ca. AD 1880 to 1920)
1	Metal cinch
1	Crushed metal food tin with friction lid (possible coffee can)
2	Peters ammunition cartridges marked “Peters 38 SW SPL” and “Peters 25.20 Marlin” (ca. AD 1887 to 1934)
14	Miscellaneous metal can fragments
1	Tobacco tin with external hinge
1	Tobacco tin with external hinge and basal strike plate (ca. AD 1892 to pre-WW II)

5.2.4 Site 5LP 11386

Site Number:	5LP 11386 (SEAS 18-086-05)
USGS Map:	Thompson Park, CO 1963 USGS Map No.37108-C2-TF-024
Land Ownership:	Ute Mountain Ute Tribe
Site Type:	Artifact scatter
Cultural Affiliation:	Late Archaic (ca. 1000 BC to AD 400)
Site Dimensions and Area:	45 m (N-S) x 40 m (E-W); 1,351 m² = 0.33 acres (0.14 ha)

Site Description:

Site 5LP 11386 represents an artifact scatter of Late Archaic cultural affiliation (Figures 5.9 and 5.10). At 7,980 ft (2,432 m) amsl, the site is located on the western edge of a mesa top 250 m southeast of West Alkali Gulch. Aspect is south to southeast and the slope is 4 to 6 degrees on and surrounding the site. Based on landscape position and exposed bedrock, soil depth is 20 to 50 cm. Soils consist of stony reddish brown silt loam residuum with sub-angular sandstone gravel, cobble, and boulder inclusions. The site is within an erosional environment with active sheet washing. Mixed lower montane chaparral and conifer woodland vegetation covers 60 to 80 percent of the ground surface with 80 to 100 percent cover in Gambel oak thickets. Dominant plant species include Colorado piñon pine, Rocky Mountain juniper, Gambel oak, black sagebrush, mountain mahogany, snowberry, narrowleaf yucca, various native grasses, thistle, and one ponderosa pine tree. The site is in fair to good condition with moderate disturbance from water erosion. This site measures 45 m (N-S) by 40 m (E-W) with an area of 1,351 m² or 0.33 acres (0.14 ha).

Site 5LP 11386 is a flaked lithic artifact scatter of Late Archaic cultural affiliation. Features, artifact concentrations, ceramic sherds, or ground stone tools were not observed. Field analysis included all nine artifacts found on the ground surface. The assemblage consists of two tertiary core flakes, three indeterminate flake fragments, two pieces of angular debris, one En Medio Corner-notched projectile point, and one unidirectional core (Tables 5.5 and 5.6). Material types represented include dark brown chert/silicified wood (6), pint chert (1), gray orthoquartzite (1), and red orthoquartzite (1). All materials are locally available from local stream and glacial outwash deposits. Based on the presence of an En Medio projectile point, the site dates to the Late Archaic period (ca. 1000 BC to AD 400). Limited late stage core reduction and flaked lithic tool manufacturing/refurbishing occurred at the site, which likely represents a temporary warm season hunting camp given the high elevation and assemblage.

Significance: Site 5LP 11386 is recommended potentially eligible (need data) to the NRHP under Criterion D as the site is mostly obscured by vegetation and detritus and it may be more substantial than indicated by surface inspection. A diagnostic projectile point was observed and other associated artifacts and features are likely buried and/or obscured by cover. Given the moderate soil depth, the site could yield data important to understanding Late Archaic settlement and abandonment patterns, subsistence and land use systems, trade networks, cultural identity, diachronic/synchronic variation, social organization, and/or chronological refinement among other research domains.

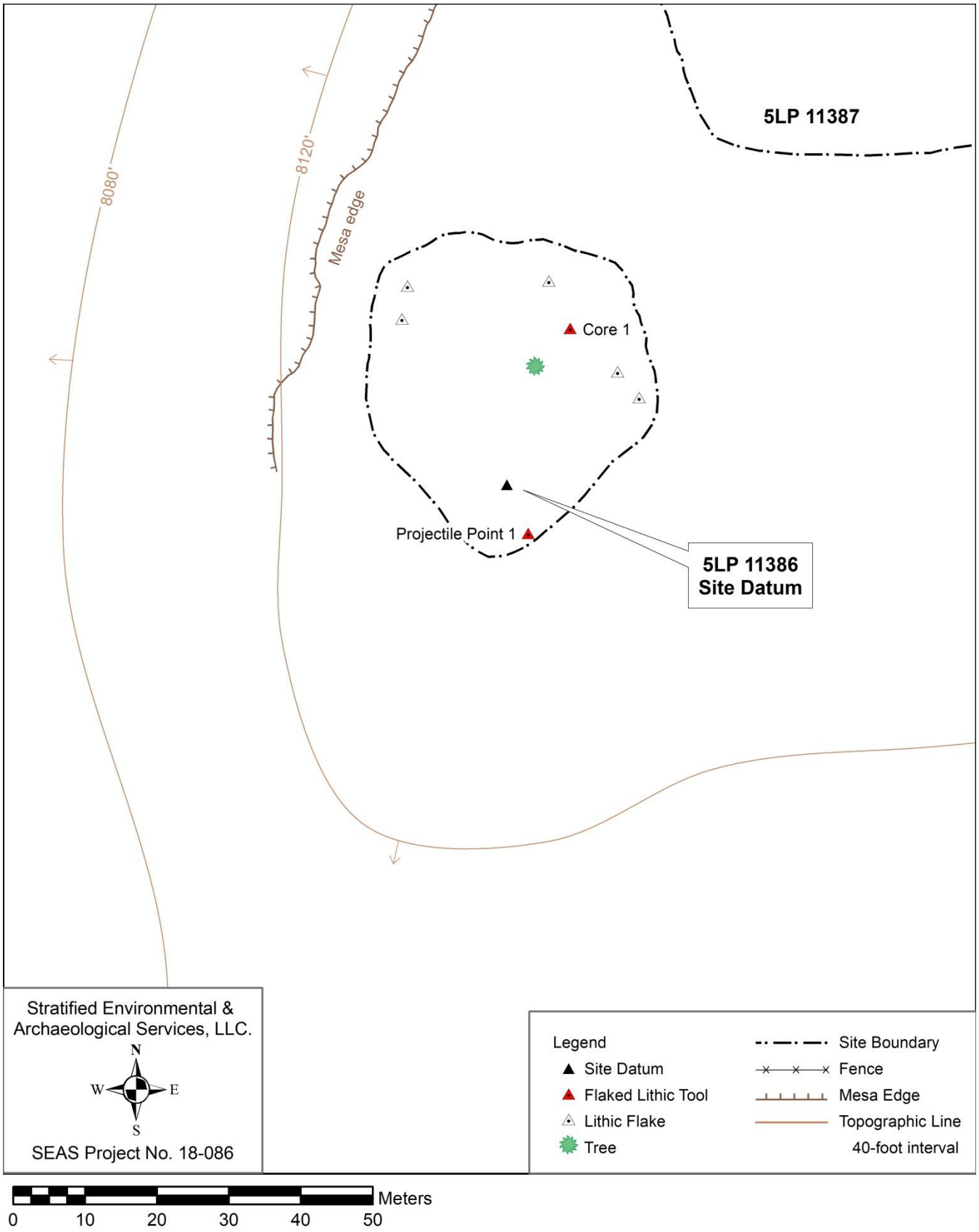


Figure 5.9 Site Plan Map, 5LP 11386

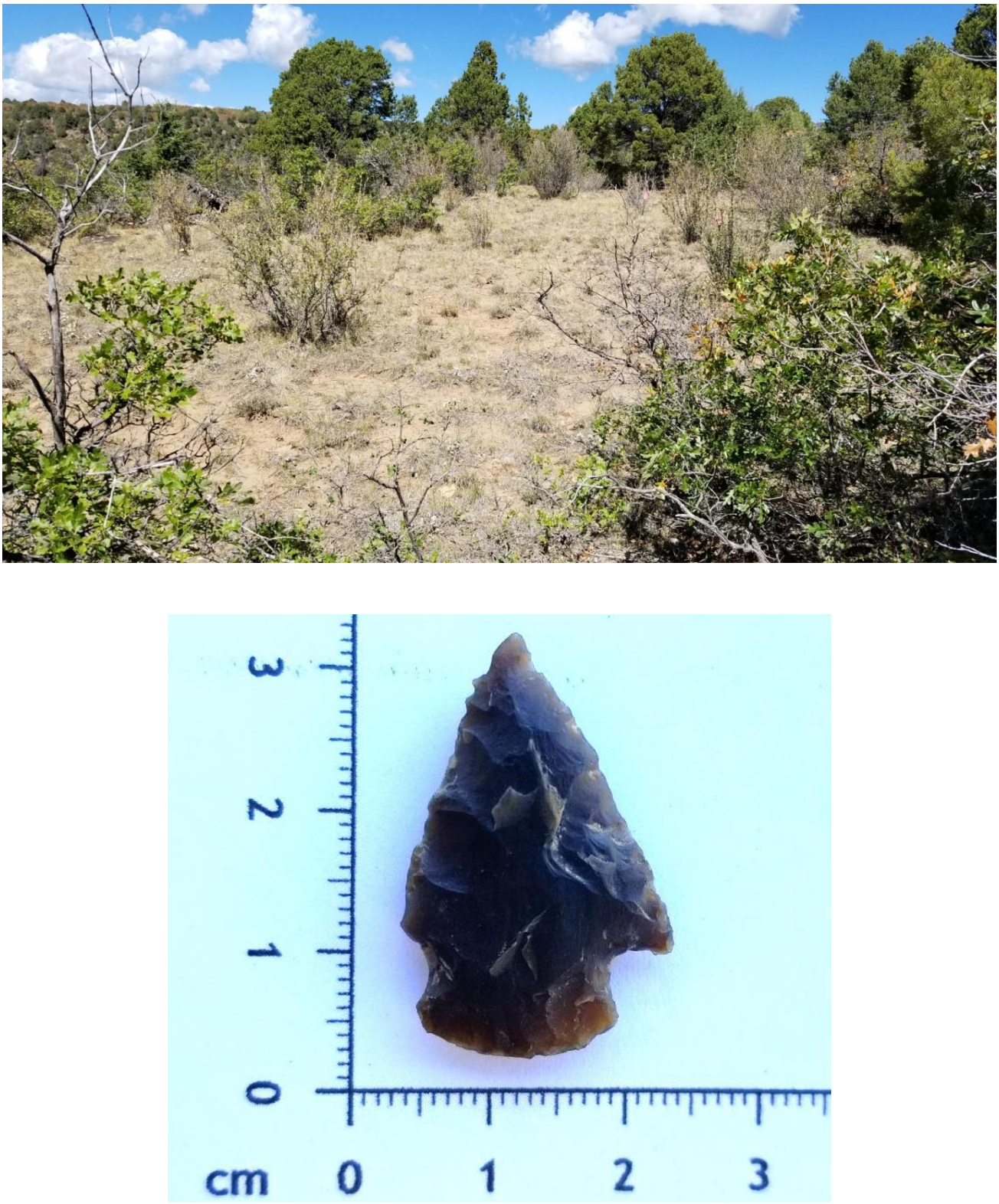


Figure 5.10 Site Overview Facing Northwest (Top) and Projectile Point 1 (Bottom), 5LP 11386

Table 5.5 Flaked Lithic Artifact Tallies, 5LP 11386

Material Type	Size (cm)	Primary FL	Secondary FL	Tertiary FL	Pressure FL	Biface FL	FL Fragment/ Angular Debris	FL Tools	Material Type Totals
Dark brown chert/silicified wood	0-2						3/1		6
	2-4							1	
	>4							1	
Pink chert	0-2						0/1		1
	2-4								
	>4								
Gray orthoquartzite	0-2								1
	2-4			1					
	>4								
Red orthoquartzite	0-2								1
	2-4			1					
	>4								
				2			3/2	2	9
Total = 9									

Table 5.6 Lithic Tools, 5LP 11386

Tool Type	Material	Dimensions (cm)	Notes
Projectile point	Brown chert	2.9 x 2.0 x 0.5	Projectile Point 1: complete point missing one tang; convex base; En Medio Corner-notched point
Core	Brown silicifed wood	4.1 x 2.7 x 2.5	Core 1: Unidirectional; 50 percent cortex present

5.2.5 Site 5LP 11387

Site Number: 5LP 11387 (SEAS 18-086-06)
USGS Map: Thompson Park, CO 1963 USGS Map No.37108-C2-TF-024
Land Ownership: Ute Mountain Ute Tribe
Site Type: Artifact scatter
Cultural Affiliation: Late Archaic (ca. 1000 BC to AD 400)
Site Dimensions and Area: 68 m (N-S) x 130 m (E-W); 5,806 m² = 1.43 acres (0.58 ha)

Site Description:

Site 5LP 11387 is an artifact scatter of probable Late Archaic cultural affiliation (Figures 5.11 and 5.12). At 7,580 ft (2,310 m) amsl, the site is located near the western edge of a mesa top 250 m southeast of West Alkali Gulch. The slope is 3 to 5 degrees on the mesa top and more than 15 degrees on the adjacent ridge slopes. Aspect is south. Based on landscape position and the quantity of fractured bedrock, soil depth is likely 15 to 40 cm. Soils consist of stony reddish brown silt loam residuum with tabular sub-angular sandstone gravel and cobble inclusions. The site is within an erosional environment with evidence of sheet washing without channelization. Visibility is poor with mixed conifer woodland and lower montane chaparral vegetation covering 60 to 80 percent of the site surface. The ground surface is completely obscured in and around Gambel oak thickets. The plant community is characterized by

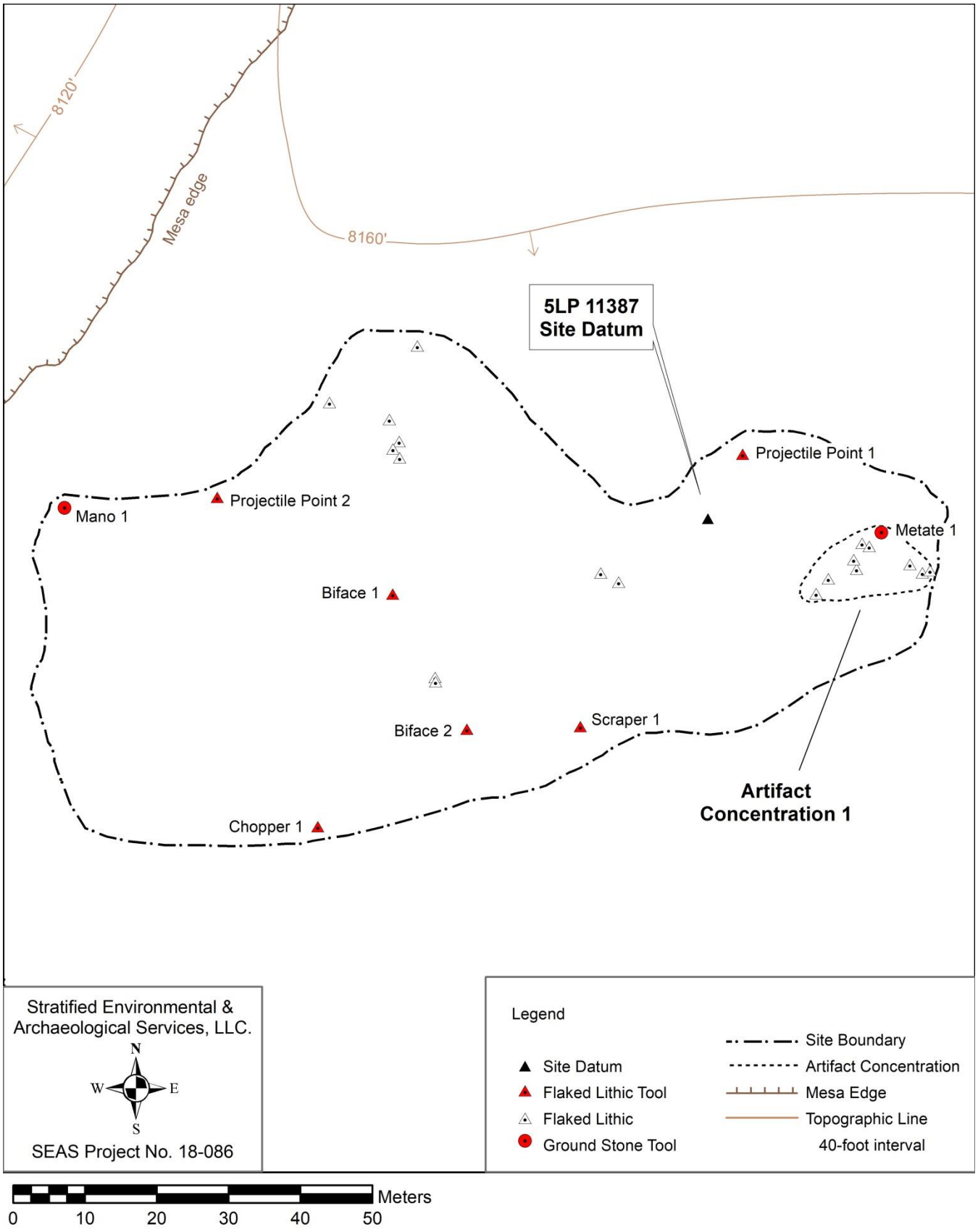


Figure 5.11 Site Plan Map, 5LP 11387

Figure 5.12 Site Overview Facing North-northwest (Top) and, from Left to Right, Projectile Points 1 and 2 (Bottom), 5LP 11387

Gambel oak thickets, Colorado piñon pine, Rocky Mountain juniper, black sagebrush, snowberry, side oats grama, creeping Oregon grape, and various native grasses. Moderate disturbance from water erosion is evident and the site is only in fair condition. Additional artifacts and possibly features likely occur under the dense ground cover. This site measures 68 m (N-S) by 130 m (E-W) with an area of 5,806 m² or 1.43 acres (0.58 ha).

Site 5LP 11387 consists of a lithic artifact scatter with one artifact concentration. Artifact Concentration 1 measures 18-by-7 m and contains nine pieces of flaked lithic debitage and one metate. No features or ceramic sherds were observed. Field analysis included all 30 artifacts observed on the ground surface. The flaked lithic assemblage consists of one primary core flake, one secondary core flake, three tertiary core flakes, one pressure flake, 12 indeterminate flake fragments, four pieces of angular debris, and six tools (Tables 5.7 and 5.8). Tools include a projectile point base fragment fractured at the notch that could be a Sudden Side-notched point type (ca. 4500-2000 BC), one Elko Corner-notched point fragment with broken tip and tang (ca. 1000 BC to AD 400), two bifaces, one core, and one scraper. Material types represented are locally available and include gray orthoquartzite (11), basalt (6), red orthoquartzite (3), granite (2), tan chert (2), dark brown chert (1), red chert (1), brown chert/silicified wood (1), and gray chert/silicified wood (1). Ground stone implements are comprised of a one-hand mano and a slab metate (Table 5.8).

Table 5.7 Flaked Lithic Artifact Tallies, 5LP11387

Material Type	Size (cm)	Primary FL	Secondary FL	Tertiary FL	Pressure FL	Biface FL	FL Fragment/ Angular Debris	FL Tools	Material Type Totals
Gray orthoquartzite	0-2				1		4/0		11
	2-4						2/0	3	
	>4	1							
Basalt	0-2						2/1		6
	2-4						2/0		
	>4		1						
Dark brown chert	0-2			1					1
	2-4								
	>4								
Red orthoquartzite	0-2						1/0		3
	2-4			1					
	>4						0/1		
Granite	0-2								2
	2-4								
	>4						0/1	1	
Tan chert	0-2						1/0		2
	2-4						0/1		
	>4								
Red chert	0-2			1					1
	2-4								
	>4								
Brown chert/silicified wood	0-2								1
	2-4								
	>4							1	
Gray chert/silicified wood	0/2								1
	2-4							1	
	>4								
		1	1	3	1		12/4	6	28
Total = 28									

The artifact assemblage suggests core reduction, tool manufacturing/refurbishing, hunting, and plant food procurement and processing occurred at the site, which probably represents a seasonal hunting and gathering camp. The presence of an Elko Corner-notched point type suggests site occupation probably occurred during the Late Archaic period (ca. 1000 BC to AD 400), with the other point base likely representing a curated item, or alternatively, is a sign of even earlier use.

Significance: Site 5LP 11387 is recommended potentially eligible (need data) to the NRHP under Criterion D as the site is mostly obscured by vegetation and detritus and may be more substantial than indicated by surface inspection alone. While water erosion is evident, the site is mostly stabilized by vegetation and detritus. The small but diverse assemblage suggests a range of activities and given the soil depth, there is good potential for intact, subsurface cultural deposits and features. The site would likely yield significant data regarding Late Archaic settlement and abandonment patterns, subsistence and land use systems, trade networks, cultural identity, diachronic/synchronic variation, social organization, and/or chronological refinement among other research domains.

Table 5.8 Lithic Tools, 5LP 11387

Tool Type	Material	Dimensions (cm)	Notes
Projectile point	Gray orthoquartzite	2.8 x 2.2 x 0.6	Projectile Point 1: Possible Sudden Side-notched dart point base (ca. 4500-2000 BC); no grinding; flat base; fractured at the notch
Projectile point	Gray chert/silicified wood	2.7 x 2.5 x 0.4	Projectile Point 2: Bifurcated base fragment; deep corner notches; missing tip portion; possible Elko Corner-notched
Biface	Brown chert/silicified wood	5.2 x 3.7 x 1.1	Biface 1: Round; middle to late stage; utilized
Biface	Gray orthoquartzite	1.3 x 2.0 x 0.6	Biface 2: late stage medial fragment; probably mid-section projectile point
Core	Granite	7.7 x 7.7 x 4.2	Core 1: core with three flake scars and 40 percent cortex
Scraper	Gray orthoquartzite	2.5 x 2.3 x 0.8	Scraper 1: thumbnail scraper fragment
Mano	Gray sandstone	13.8 x 11.1 x 6.7	Mano 1: Bifacially ground one-hand mano; pecked on both sides; not shaped
Metate	Red sandstone	38.09 x 20.2 x 6.5	Metate 1: Unifacially ground slab metate; shaped/ pecked

5.2.6 Site 5LP 11388

Site Number: 5LP 11388 (SEAS 18-086-008)
USGS Map: Thompson Park Co, 1963 USGS Map No.37108-C2-TF-024
Land Ownership: Ute Mountain Ute Tribe
Site Type: Ranching facility
Cultural Affiliation: Historic Ute Mountain Ute
Site Dimensions and Area: 25 m (NW-SE) x 31 m (NE-SW); 600 m² = 0.15 acres (0.06 ha)

Site Description:

Site 5LP 11388 is a recent historic probable Ute Mountain Ute ranching facility dating after 1950 and is still in-use (Figures 5.13 and 5.14). At 8,260 ft (2,518 m) amsl, the site is located on an unnamed mesa top 305 m southeast of West Alkali Gulch. Aspect is neutral and slope on and surrounding the site is 2 degrees. Based on an existing excavated earthen stock pond/holding tank, soil depth is at least 100 cm. Soils consist of mixed colluvial and residual tan sandy loam. Lower montane chaparral vegetation covers 80 to 100 percent of the ground surface and is dominated by Gambel oak thickets, scattered Colorado piñon pine trees, snowberry, broom snakeweed, and various native grasses. The site is in fair condition and the windmill is no longer functional. This small site measures 25 m (NW-SE) by 31 m (NE-SW) with an area of 600 m² or 0.15 acres (0.06 ha).

Site 5LP 11388 consists of an artifact scatter associated with a windmill, pump, and four metal water troughs. The Aermotor windmill is no longer functioning with most of the blades scattered on the ground below the derrick. The windmill generator sits on top of a 30-foot tall steel derrick made of 4-inch steel pipe. A steel ladder made from 1¾-inch steel rod is welded to the derrick. The derrick is welded to four 6½-inch steel pipes cut into 4-foot posts and set into a cement slab. This cement slab measures 10-by-10 feet and is 6 inches thick. Currently, a Jensen Straight Lift Jack Model 2D7 (Serial No. 56573) pumps water to the surface. The lift jack is manufactured by Jensen Brothers Manufacturing Company, Inc., in Coffeyville, Kansas. Three 12-foot steel fence panels form a rectangular barrier around the pump jack. Two-inch pipes connect four galvanized metal tanks to the well head. One sub-rectangular tank measures 8-by-3-by-2 feet, and the remaining tanks are circular and measure 8 feet in diameter. Four juniper posts surround the center circular tank. Miscellaneous ranch-related materials on the site include steel cable, a pile of lumber and juniper posts, galvanized metal frame parts, and windmill blades and parts. The site has been used from ca. 1950 to the present-day.

Significance: 5LP 11388 is recommended not eligible to NRHP due to the limited artifact assemblage, alterations, and lack of archaeological depth potential. The windmill is no longer functional and is dilapidated. Refurbishing and installation of a water pump has altered the original facility and it no longer possesses integrity of design or materials. The site has no important historical associations (Criteria A & B) and does not embody distinctive characteristics of a period or type, nor does it possess high artistic value (Criterion C). The site lacks significant subsurface information potential that would contribute to our understanding of regional history (Criterion D). Detailed field recording has adequately characterized the nature of the site in archival form.

5.3 Isolated Finds

Fifteen isolated finds (5LP 11389 through 5LP 11403) were recorded during the cultural resource inventory (Table 5.9). All of the isolated finds are prehistoric with limited flaked lithic debitage, flaked lithic tools, and/or ground stone implements. These finds typically were found in eroded contexts with shallow soils where intact, subsurface cultural deposits are unlikely to occur. The isolated finds are not considered eligible to the NRHP given their limited nature and lack of depth or further data potential. Detailed field recording has adequately characterized their limited information potential in archival form.

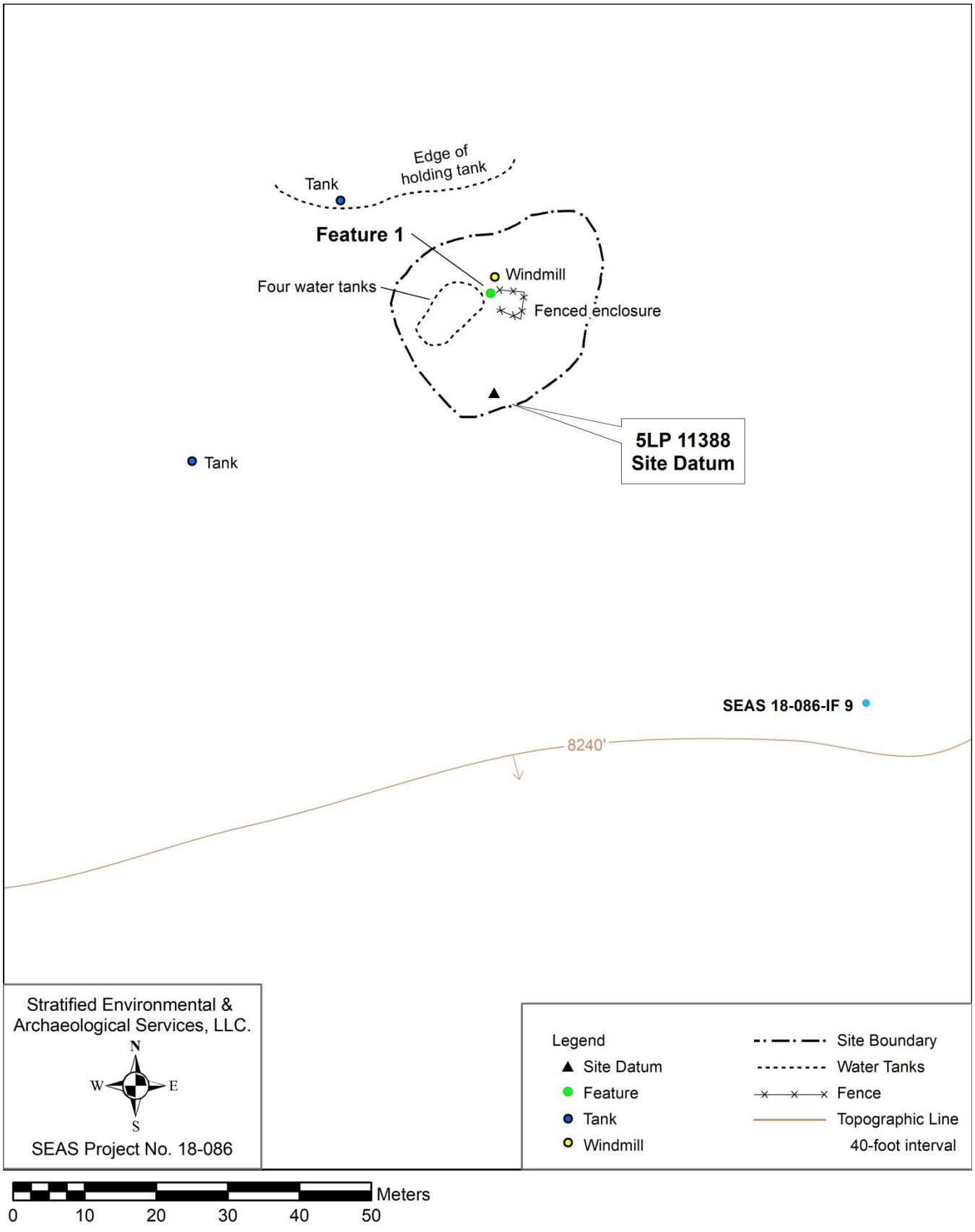


Figure 5.13 Site Plan Map, 5LP 11388

Figure 5.14 View of Windmill and Tanks Facing Southeast, 5LP 11388

Table 5.9 Isolated Finds

IF Number	Description	Environmental Setting	Location Information NAD 83 Zone 13
5LP 11389	Five artifacts found in a 30 m diameter area: one obsidian tertiary utilized flake (2.8 x 2.1 x 0.4 cm); one brown chert tertiary flake (2.0 x 2.4 x 0.6 cm); one obsidian tertiary flake (1.6 x 1.2 x 0.4 cm); one biface thinning flake (0.9 x 0.6 x 0.2 cm); and one obsidian tertiary flake fragment (1.1 x 0.9 x 0.2 cm)	At 8,390 ft (2,557 m) amsl, the isolate occurs on a 4-degree south-southwest facing slope on a mesa top between Deadman Gulch (640 m north) and Alkali Gulch (650 m south). Soils consist of dark brown silt loam with sandstone rock inclusions that support a lower montane chaparral plant community.	N 4130255 m E 752249 m SW1/4 SW1/4 SW1/4 of Section 14, Township 35 North, Range 12 West, NMPM
5LP 11390	Five artifacts found in a 5 m diameter area: one green quartzite core/hammerstone (6.0 x 5.0 x 3.5 cm); one green quartzite secondary flake with utilization on the right lateral edge (5.0 x 5.5 x 1.5 cm); one tan orthoquartzite piece of angular debris (3.5 x 2.0 x 1.2 cm); one red chert edge rejuvenation flake (0.8 x 2.0 x 0.8 cm); and one tan orthoquartzite piece of angular debris (4.0 x 2.5 x 2.0 cm)	At 7,760 ft (2,365 m) amsl, the isolate occurs on a 2-degree southwest-facing slope on the end of a mesa top above and 230 m northwest of East Alkali Gulch . Soils consist of tan silt loam with sandstone rock inclusions. Soils support a piñon pine-juniper woodland plant community.	N 4127323 m E 752743 m NW1/4 SE1/4 SW1/4 of Section 26, Township 35 North, Range 12 West, NMPM
5LP 11391	One gray chert flake tool with retouch and utilization on the left lateral edge (8.0 x 5.0 x 3.9 cm)	At 7,760 ft (2,365 m) amsl, the isolate occurs on a 2 to 4-degree south-facing slope on the mesa top. West Alkali Gulch is 255 m to the west. Soils consist of tan silt loam with sandstone rock inclusions. The soils support a mixed conifer woodland-chaparral plant community.	N 4128176 m E 751961 m SW1/4 NE1/4 NE1/4 of Section 27, Township 35 North, Range 12 West, NMPM
5LP 11392	One gray chert biface base fragment (4.7 x 2.5 x 0.8 cm)	At 8,000 ft (2,438 m) amsl, the isolate, exposed in a bladed road bed, occurs on a 6-degree southwest-facing slope on the mesa top. An unnamed intermittent drainage passes 300 m to the east. Alkali Gulch is 570 m northwest. Soils consist of tan silt loam with sandstone rock inclusions. Soils support a transitional conifer woodland-chaparral plant community.	N 4128477 m E 752557 m NE1/4 NW1/4 NW1/4 of Section 26, Township 35 North, Range 12 West, NMPM

Table 5.9 Isolated Finds (Continued)

IF Number	Description	Environmental Setting	Location Information NAD 83 Zone 13
5LP 11393	Four artifacts found in a 20 m diameter area: one obsidian tertiary flake fragment (0.8 x 1.2 x 0.1 cm); one gray chert tertiary flake fragment (1.7 x 0.8 x 0.4 cm); and two silicified shale tertiary flakes (3.0 x 2.3 x 0.5 cm and 2.4 x 2.1 x 0.5 cm)	At 8,030 ft (2,448 m) amsl, the isolate occurs on a 2 to4-degree south-facing slope on a mesa top. An unnamed intermitted drainage is 405 m east, West Alkali Gulch is 460 m to the northwest. Soils consist of tan silt loam with sandstone rock inclusions. The soils support a mixed conifer woodland-chaparral plant community.	N 4128564 m E 752478 m SE1/4 SW1/4 SW1/4 of Section 23, Township 35 North, Range 12 West, NMPM
5LP11394	Four artifacts found in a 20-by-10 m area: one stemmed obsidian arrow point (1.1 x 1.8 x 0.3 cm, photographs were deficient); one chalcedony biface thinning flake (1.6 x 1.2 x 0.1 cm); one silicified shale tertiary flake (3.9 x 3.2 x 0.6 cm); and one silicified shale primary flake (2.6 x 3.7 x 0.4 cm)	At 8,050 ft (2,459 m) amsl, the isolate occurs on a 3-degree south-facing slope 380 m southeast of West Alkali Gulch. Soils consist of silt loam with sandstone inclusions. Soils support a mixed conifer woodland-chaparral plant community.	N 4128639 m E 752414 m SW1/4 SW1/4 SW1/4 of Section 23, Township 35 North, Range 12 West, NMPM
5LP 11395	Three artifacts found in a 15 m diameter area: one orthoquartzite Pueblo side-notched projectile point (2.1 x 1.1 x 0.2 cm, Figure 5.15); one basalt secondary flake (6.1 x 5.1 x 0.9 cm); and one silicified wood secondary flake (2.3 x 1.5 x 0.9 cm)	At 8,150 ft (2,484 m) amsl, the isolate occurs on a 3-degree south-southeast-facing slope 375 m northwest of West Alkali Gulch. Soil consists of silt loam with sandstone inclusions that support a mixed conifer woodland-chaparral plant community.	N 4129078 m E 752624 m SE1/4 NW1/4 SW1/4 of Section 23, Township 35 North, Range 12 West, NMPM
5LP 11396	One bifacially ground sandstone mano with pecking on the grinding surfaces (11.9 x 8.5 x 4.7 cm, Figure 5.15)	At 8,210 ft (2,502 m) amsl, the isolate occurs on a 3-degree south-facing slope 350 m southeast of West Alkali Gulch. Soils consist of silt loam with sandstone inclusions and support a mixed conifer woodland-chaparral plant community.	N 4129342 m E 752730 m NW1/4 NE1/4 SW1/4 of Section 23, Township 35 North, range 12 West, NMPM
5LP 11397	Two artifacts 5 m apart: one chalcedony sub-rectangular-shaped scraper with retouch and utilization on the lateral and distal edges (2.9 x 4.2 x 0.9 cm) and one quartzite primary flake with use on the lateral edges (6.9 x 3.3 x 1.6 cm)	At 8,240 ft (2,512 m) amsl, the isolate occurs on a 5-degree south-facing slope. An unnamed drainage is 195 m east. Alkali Gulch passes 365 m to the northwest. Soils consist of silt loam with sandstone rock inclusions and support a mixed conifer woodland-chaparral plant community.	N 4129519 m E 752971 m SE1/4 SE1/4 NW1/4 of Section 23, Township 35 North, Range 12 West, NMPM

Table 5.9 Isolated Finds (Continued)

IF Number	Description	Environmental Setting	Location Information NAD 83 Zone 13
5LP 11398	Two artifacts 10 m apart: one obsidian tertiary flake (2.4 x 1.7 x 0.3 cm) and one gray orthoquartzite secondary flake (5.2 x 2.8 x 1.0 cm)	At 8,300 ft (2,530 m) amsl, the isolate occurs on a 5-degree south-facing slope within Gambel oak thickets. An unnamed drainage is 245 m to the east. Alkali Gulch is 210 m west. Soils consist of silt loam with sandstone rock inclusions.	N 4129762 m E 752965 m NE1/4 SE1/4 NW1/4 of Section 23, Township 35 North, Range 12 West, NMPM
5LP11399	Five artifacts in a 25 m diameter area: one gray orthoquartzite secondary flake (2.5 x 1.5 x 0.4 cm); one gray orthoquartzite biface thinning flake (1.0 x 1.0 x 0.2 cm); one gray orthoquartzite flake fragment (2.3 x 1.5 x 0.5 cm); one gray orthoquartzite flake fragment (1.3 x 1.7 x 0.6 cm); and one dark brown chert flake fragment (2.3 x 1.2 x 0.8 cm)	At 8,400 ft (2,560 m) amsl, the isolate occurs on a 6-degree south-facing slope. Deadman Gulch is 620 m north. Soils consist of silt loam with sandstone rock inclusions and support a lower montane chaparral plant community.	N 4130144 m E 753774 m NE1/4 NE1/4 NE1/4 of Section 23, Township 35 North, Range 12 West, NMPM
5LP 11400	One gray orthoquartzite serrated biface blade fragment (3.2 x 1.8 x 0.6 cm); possibly part of a San Jose projectile point	At 8,210 ft (2,502 m) amsl, the isolate occurs on a 3-degree south-facing slope within Gambel oak thickets. An unnamed intermittent drainage is 305 m northeast, and East Alkali Gulch is 750 m south. Soils consist of silt loam with sandstone rock inclusions.	N 4129392 m E 753973 m NW1/4 NW1/4 SW1/4 of Section 24, Township 35 North, Range 12 West, NMPM
5LP 11401	One gray orthoquartzite unifacial scraper (4.9 x 3.0 x 0.5 cm).	At 8,440 ft (2,573 m) amsl, the isolate occurs on a 4 to 6-degree south-facing slope within Gambel thickets. Deadman Gulch is 410 m north. Soils consist of silt loam with sandstone rock inclusions.	N 4130303 m E 753925 m SW1/4 SW1/4 SW1/4 of Section 13, Township 35 North, Range 12 West, NMPM
5LP 11402	One dark brown chert En Medio projectile point fragment (2.5 x 2.1 x 0.4 cm, Figure 5.16) with part of the blade missing	At 8,540 ft (2,603 m) amsl, the isolate occurs on a 2 to 4-degree south-facing slope within a lower montane chaparral plant community. Deadman Gulch is 230 m north. Soils consist of silt loam with sandstone rock inclusions.	N 4130788 m E 755538 m SW1/4 NW1/4 SW1/4 of Section 18, Township 35 North, Range 11 West, NMPM

Table 5.9 Isolated Finds (Continued)

IF Number	Description	Environmental Setting	Location Information NAD 83 Zone 13
5LP 11403	One gray orthoquartzite flake fragment (1.1 x 1.0 x 0.1 cm), red/gray chert tertiary flake (1.4 x 1.2 x 0.2 cm), and one red/gray chert secondary flake fragment (2.5 x 1.9 x 0.5 cm)	At 8,300 ft (2,530 m) amsl, the isolate occurs on a 5-degree southwest-facing within a mixed conifer woodland-chaparral plant community. An unnamed intermittent drainage is 185 m west, and Alkali Gulch is 635 m west. Soils consist of silt loam with sandstone rock inclusions.	N 4129712 m E 753391 m NE1/4 SW1/4 NE1/4 of Section 23, Township 35 North, Range 12 West, NMPM

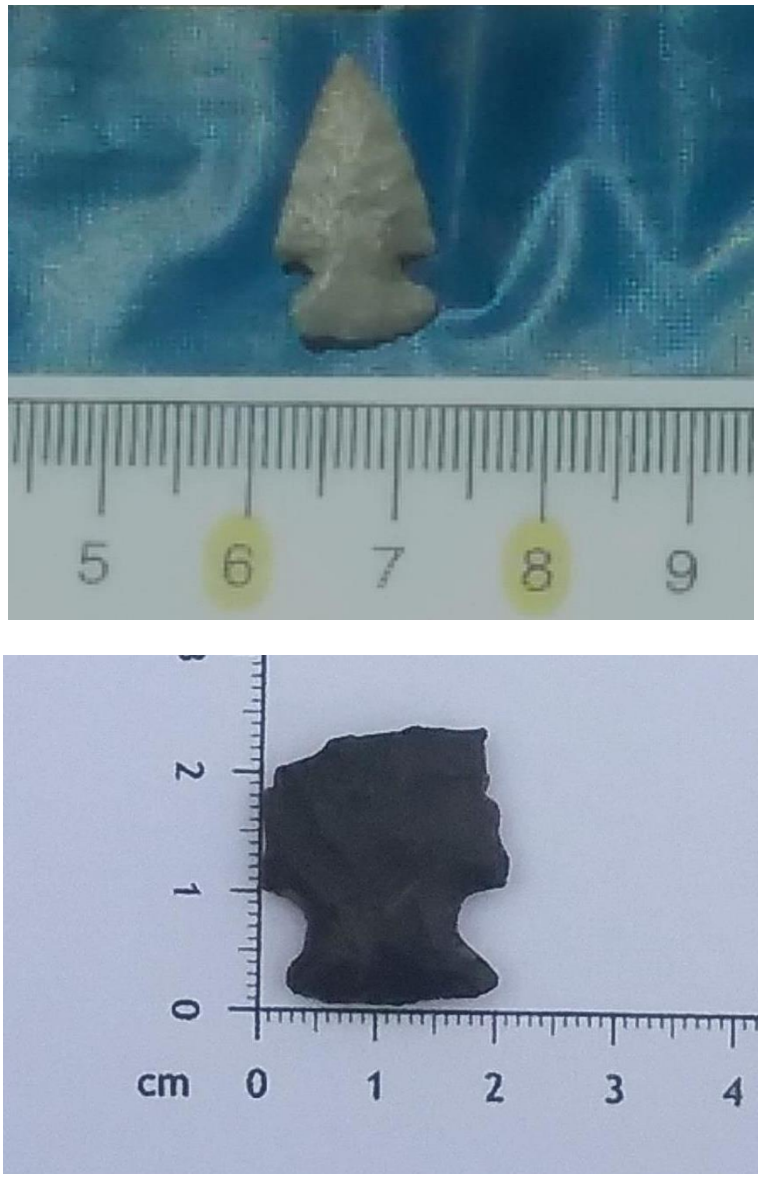


Figure 5.15 Isolated Find 5LP11395 (Top) and Isolated Find 5LP11402 (Bottom)

6.0 Conclusions

The cultural resource inventory for GCC Energy's proposed King II Mine Dunn Ranch Lease by Application Project encountered and documented one previously recorded site (5LP 10572), six newly recorded sites (5LP 11383, 5LP 11384, 5LP 11385, 5LP 11386, 5LP 11387, and 5LP 11388), and 15 isolated finds (5LP 11389 through 5LP 11403). The isolated finds are not considered eligible to the NRHP given their limited nature, shallow soils, eroded condition, and lack of significant data potential. Detailed field recording of the isolates has adequately characterized their limited information potential in archival form. Table 6.1 summarizes the NRHP evaluations for the seven sites. The low site density found in the surveyed area is likely due to the high elevation, lack of surface water, and lack of arable soils. Sites 5LP 10572, 5LP 11383, 5LP 11385, and 5LP 11388 are all historic resources recommended not eligible for listing on the NRHP as these sites lack significant data potential (Criterion D) and do not qualify under Criteria A, B, or C. Similar to the isolated finds, detailed field recording of these historic sites has adequately characterized their limited nature and condition in archival form and no further work is recommended. Sites 5LP 11384, 5LP 11386, and 5LP 11387 are all Late Archaic hunting and gathering camps yielding diagnostic projectile points and are recommended potentially eligible (need data) for NRHP listing under Criterion D. Surface inspection alone was inadequate for determining the research potential of these prehistoric resources. Visibility is poor at these sites and dense chaparral vegetation and detritus likely obscure additional artifacts and features at 5LP 11384, 5LP 11386, and 5LP 11387. While no surface disturbance is anticipated in the survey area by the proposed action, if subsidence is considered a likely by-product of the underground mining operation, additional investigations at 5LP 11384, 5LP 11386, and 5LP 11387 may be warranted to ensure no significant or potentially significant cultural properties are adversely affected by the mining lease expansion project.

Table 6.1 Site Evaluation Summary Table

Site Number	National Register of Historic Places 36CFR 60.4		
	50 years old	Integrity	Criterion
5LP 10572	Yes	No	Not eligible
5LP 11383	Yes	No	Not eligible
5LP 11384	Yes	Yes	Criterion D
5LP 11385	Yes	No	Not eligible
5LP 11386	Yes	Yes	Criterion D
5LP 11387	Yes	Yes	Criterion D
5LP 11388	Yes	No	Not eligible

7.0 References Cited

Aubrey, W.M.

1991 *Geologic Framework of Cretaceous and Tertiary Rocks in the Southern Ute Indian Reservation and Adjacent Areas in the Northern San Juan Basin, Southwestern Colorado*. United States Geological Survey Professional Paper 1505-B. U.S. Government Printing Office, Washington D.C.

Brown, G.M.
1996 The Protohistoric Transition in the Northern San Juan Region. In: *The Archaeology of Navajo Origins*, edited by R.H. Towner, pp. 47-69. Utah University Press, Salt Lake City.

Callaway, D.G., J.C. Janetski, and O.C. Stewart
1986 Ute. In: *Handbook of North American Indians : Volume XI; Great Basin*, edited by W.L. D'Azevado, pp. 336-337. Smithsonian Institution, Washington D.C.

Castetter, E.F.
1935 *Ethnobiological Studies in the American Southwest: Uncultivated Native Plants Used as Sources of Food*. The University of New Mexico Bulletin, No. 266.

Delaney, R.
1974 *The Southern Ute People*. Indian Tribal Series, Phoenix, Arizona.

Dittert, A.E. Jr.
1958 Preliminary Archaeological Investigations in the Navajo Project Area of Northwestern New Mexico. *Museum of New Mexico Papers in Anthropology:* No. 1, Santa Fe.

Dozier, E.P.
1966 *Hano: A Tewa Community in Arizona*. Holt, Rinehart, and Winston, New York.

Eddy, F.W., A.E. Kane, and P.R. Nickens
1984 *Southwest Colorado Prehistoric Context: Archaeological Background and Research Directions*. State Historical Society of Colorado, Denver.

Ford, R.I
1984 Ecological Consequences of Early Agriculture in the Southwest. In: *Papers on the Archaeology of Black Mesa, Arizona, Volume II*, edited by S. Plog and S. Powell, pp 127-138. Southern Illinois University Press, Carbondale and Edwardsville.

Gillispie, W.B.
1985 Holocene Climate and Environment of Chaco Canyon. In: *Environment and Subsistence in Chaco Canyon*, edited by F.J. Mathien, pp 13-45. Publications in Archaeology 18E, Chaco Canyon Studies. National Park Service, U.S. Department of the Interior, Albuquerque.

Hancock, P.
1997 *Dendrochronological Dates in the Dinetah*. Paper presented at the Fifteenth Fruitland Conference, Farmington, New Mexico.

Hayes, A.C., D.M. Brugge, and W.J. Judge
1981 *Archaeological Surveys of Chaco Canyon, New Mexico*. Publications in Archaeology No. 18A. Chaco Canyon Studies, National Park Service, Washington D.C.

Hester, J.J.
1962 Early Navajo Migrations and Acculturation in the Southwest. *Museum of New Mexico Papers in Anthropology*: No. 6.

Hogan, P.
1991 Navajo-Pueblo Interaction During the Gobernador Phase: A Reassessment of the Evidence. In: Rethinking Navajo Pueblitos, pp. 1-27. *Cultural Resource Series:* No. 8. U.S. Department of the Interior, Bureau of Land Management, Albuquerque District, Albuquerque.

Huntington, D.
2017 *Personal Communication, Hay Gulch Ditch, Inc.* April 28, 2017, Stratified Environmental and Archaeological Services, Ignacio, CO.

Husband, M.B.
1984 *Colorado Plateau Country Historic Context*. Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

Irwin-Williams, C.
1973 *The Oshara Tradition: Origins of the Anasazi Culture*. Contributions in Archaeology 5(1). Eastern New Mexico University, Portales.

1979 Post-Pleistocene Archaeology, 7,000-2,000 B.C. In: *Handbook of North American Indians: The Southwest; Volume 9*, edited by Alfonso Ortiz, pp. 31-42.

Justice, N.D.
2002 *Stone Age Spear and Arrow Points of the Southwestern United States*. Indiana University Press. Bloomington and Indianapolis.

Kearns, T.
1996 Protohistoric and Historic Navajo Lithic Technology. In: *The Archaeology of Navajo Origins*, edited by R.H. Towner, pp. 109-145. University of Utah Press, Salt Lake City.

Kluckholn, C. and D. Leighton
1974 *The Navajo*. Harvard University Press, Cambridge, MA.

Lipe, W.D.
1999 Concluding Comments. In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 405-436. Colorado Council of Professional Archaeologists, Denver.

Lipe, W.D. and B.L. Pitblado
1999 Paleoindian and Archaic Periods. In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 95-131. Colorado Council of Professional Archaeologists, Denver.

Lipe, W.D. and M.D. Varien
1999a Pueblo II (AD 900-1150). In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 242-289. Colorado Council of Professional Archaeologists, Denver.

1999b Pueblo III (AD 900-1150). In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 290-352. Colorado Council of Professional Archaeologists, Denver.

Morris, E.H. and R.F. Burgh
1954 *Basket Maker II Sites Near Durango, Colorado*. Publication 604. Carnegie Institution of Washington, Washington D.C.

NRCS
2018 Natural Resources Conservation Service, U.S. Department of Agriculture. *Custom Soil Resource Report for La Plata County Area, Colorado*. Information compiled from Web Soil Survey website at: http://websoilsurvey.nrcs.usda.gov.

Pannell, J.P.
1981 *Soil Survey of La Plata County, Colorado*. U.S. Department of Agriculture, Soil Conservation Service.

Park, W.Z., E.E. Siskin, A.M. Cooke, W.T. Mulloy, M.K. Opler, I.T. Kelley, and M.L. Zigmond
1938 Tribal Distribution in the Great Basin. *American Anthropologist* 40: 623-638.

Powers, M.A. and B.P. Johnson
1987 *Defensive Sites of Dinetah*. New Mexico Bureau of Land Management Cultural Resource Series No. 2, Santa Fe.

Rayne, A.M.
1997 *Colorado Absolute Date Synthesis*. Database on file at the Colorado Historical Society, Denver.

Reed, A.D.
1994 The Numic Occupation of Western Colorado and Eastern Utah during the Prehistoric and Protohistoric Periods. In: *Across the West: Human Population Movement and the Expansion of the Numa*, edited by D.B. Madsen and D. Rhode, pp. 188-199. University of Utah Press, Salt Lake City.

Schroeder, A.H.
1965 A Brief History of the Southern Utes. *Southwestern Lore* 30(1): 53-78.

Schwegman, J. and T. Rude
2014 *Class III Cultural Resource Inventory of GCC Energy's Proposed Coal Exploration, La Plata County, Colorado.* BLM Report No. TR14002; OAHP Report No. LP.LM.R112. PaleoWest Archaeology, Denver, Colorado.

Scott, G.R. and D.W. Moore
2007 *Pliocene and Quaternary Deposits in the Northern Part of the San Juan Basin in Southwestern Colorado and Northwestern New Mexico*. U.S. Geological Survey Scientific Investigations Report 2007-5006. U.S. Geological Survey, Reston, VA.

Sellers, W.D. and R.H. Hill
1974 *Arizona Climate, 1931-1972*. University of Arizona Press, Tucson.

Semé, M.
1984 The effects of Agricultural Fields on Faunal Assemblage Variation. In: *Papers on the Archaeology of Black Mesa, Arizona, Volume II*, edited by S. Plog and S. Powell, pp 139-157. Southern Illinois University Press, Carbondale and Edwardsville.

Sesler, L.M. and T.D. Hovezak
2002 Synthesis: Cultural and Adaptational Diversity in the Fruitland Study Area. In: *Archaeological Investigations in the Fruitland Project Area: Late Archaic, Basketmaker, Pueblo I, and Navajo Sites in Northwestern New Mexico*, pp 109-239. La Plata Archaeological Consultants, Dolores, CO.

Seyfarth, J. and R. Lambert
2010 *A Historic Resource Survey of 100 Sites in La Plata County (Vol. 1) and Pioneers, Prospectors and Trout, a Historic Context for La Plata County, Colorado (Vol. 2) (SHF 2008-01-012)*. OAHP Report No. LP.SHF.R29. Cultural Resource Planning for La Plata County Planning Department.

Shelton, D.C.
1985 *Revision to Grant Agreement for Hay Gulch and Cortez Meeker Projects; La Plata and Montezuma Counties, Colorado*. OAHP Report No. MC.OSM.R1. Mined Land Reclamation Division, State of Colorado.

Smith, D.A.
1996 The Miners: "They Builded Better Than They Knew". In: *The Western San Juan Mountains: Their Geology, Ecology, and Human History*, edited by R. Blair. University Press of Colorado, Niwot.

SUIT
1998 Southern Ute Indian Tribe Non-Disturbing Cultural Resource Inventory and Monitoring Permit Policy. Resolution No. 98-59, April 30, 1998.

Towner, R.
2003 *Defending the Dinétah: Pueblitos in the Ancestral Navajo Homeland*. University of Utah Press, Salt Lake City.

Twedo, O.
1979 *Geologic Map of Colorado*. U.S. Geological Survey, Washington D.C.

Van Valkenburgh, R.F.
1938 *A Short History of the Navajo People*. Radio Series-Station KTGM. U.S. Department of the Interior, Navajo Service, Window Rock, AZ.

WRCC
2018 Western Regional Climate Center. Information compiled from website at: http://www.wrcc.dri.edu/summary/climsmnm.html.

Whalen, M.E.
1981 Cultural Ecological Aspects of the Pithouse to Pueblo Transition in a Portion of the Southwest. *American Antiquity* 46(1): 75-92.

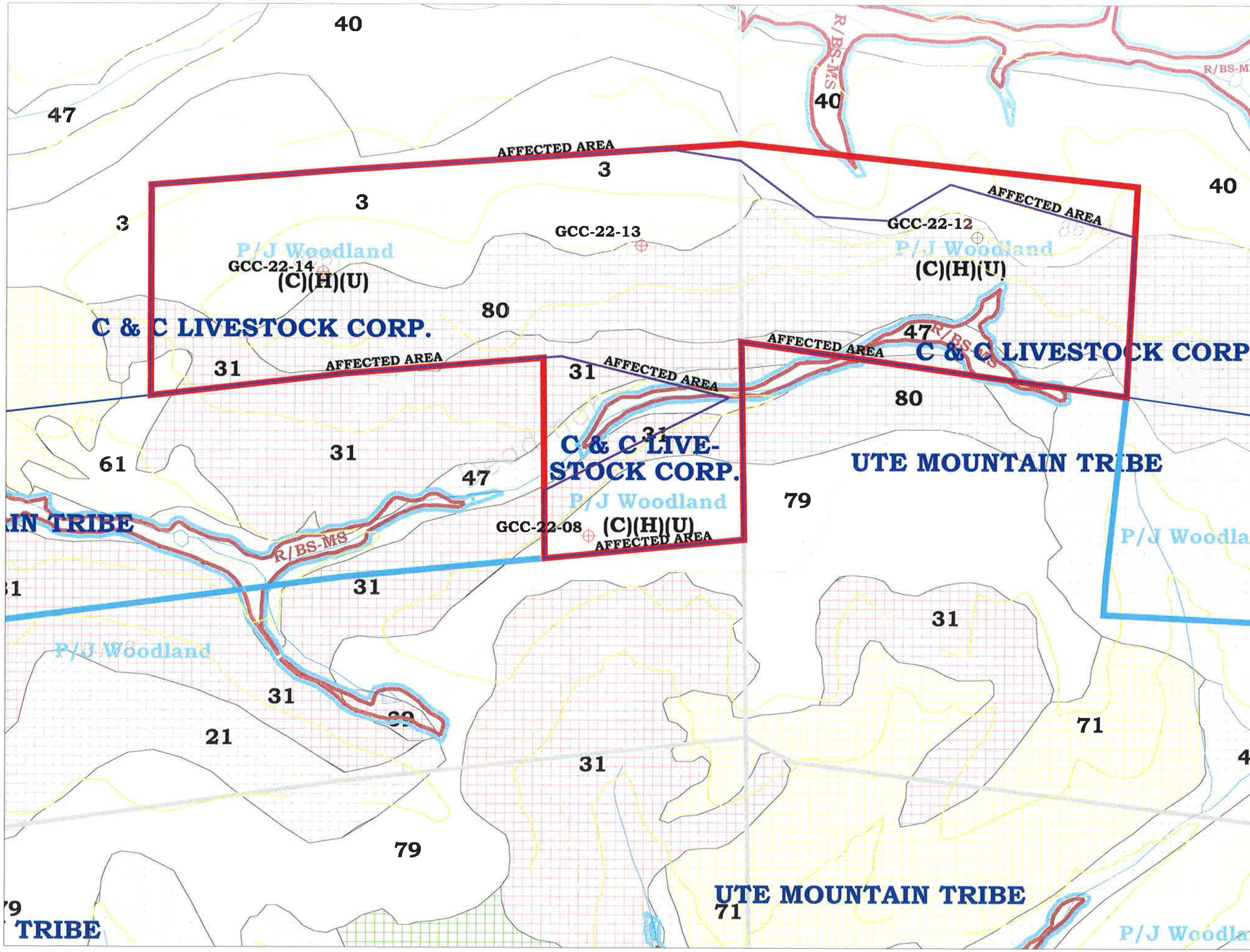
Wilshushen, R.H.
1999a Basketmaker III (AD 500-750). In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 166-195. Colorado Council of Professional Archaeologists, Denver.

1999b Pueblo I (AD 750-900). In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp. 196-241. Colorado Council of Professional Archaeologists, Denver.

Wilshusen, R.H. and R.H. Towner
1999 Post-Puebloan Occupation (AD 1300-1840). In: *Colorado Prehistory: A Context for the Southern Colorado River Basin*, edited by W.D. Lipe, M.D. Varien, and R.H. Wilshusen, pp.353-369. Colorado Council of Professional Archaeologists, Denver.

Winter, J.C. and P. Hogan
1992 The Dinetah Phase of Northwestern New Mexico: Settlement and Subsistence. In: *Current Research on the Late Prehistory and Early History of New Mexico*, edited by B.J. Vierra, pp. 299-312. New Mexico Archaeological Council Publication: No. 1.

York, R.
1991 *Evidence for Paleoindians in the San Juan National Forest, Southwest Colorado*. Southwestern Lore 57(2):5-2.



LEGEND

LEGEND - Soils

Vegetation	Land Use
	(C) - Rangeland
	(H) - Fish & Wildlife Habitat
	(U) - Undeveloped
	(P) - Pastureland

WELL LOCATIONS

Well	Latitude	Longitude
MW-1 Cluster	[illegible]	[illegible]
MW-2 Cluster	[illegible]	[illegible]
MW-3 Cluster	[illegible]	[illegible]
MW-4 Cluster	[illegible]	[illegible]
MW-5 Cluster	[illegible]	[illegible]
Well #1 (Upgradient)	[illegible]	[illegible]
Well #2 (Downgradient)	[illegible]	[illegible]
[illegible] Well	[illegible]	[illegible]
[illegible] Alluvial	[illegible]	[illegible]
Hay Gulch Ditch (Downgradient)	[illegible]	[illegible]
Hay Gulch Ditch (Upgradient)	[illegible]	[illegible]

MR-53 EXPLORATION DRILL HOLE LOCATIONS

Drill Hole	Latitude	Longitude
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GCC-22-12 Exploration Drill Hole	[illegible]	[illegible]
GCC-22-13 Exploration Drill Hole	[illegible]	[illegible]
GCC-22-14 Exploration Drill Hole	[illegible]	[illegible]

REVISIONS

DATE	DESCRIPTION

I, ______________, a professional engineer, certify that the information on this map is correct to the best of my knowledge and belief.

11-4-24

0 600' 1200' 1800'

GCC Energy, LLC
6473 County Road 120
Hesperus, CO 81326
Colorado Mining Permit C-1981-035

King II-006B (MR-53)
Soils & Vegetation
MR-53 Drill Site Location

Scale:	1" = 600'	Designed By:	Michael Dickson
Date:	11/04/2024	Drawn By:	Michael Dickson

File Path:	Environmental\King II\Permit Maps
File Name:	King II-006A Soils
Plot Date:	11/04/2024
Plot Time:	11:18 am