

**Summary Report of the Level I Documentation of the
Duke Ditch (5DT2083.1), Delta County, Colorado**

by

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INTRODUCTION

The Duke Ditch Company has been funded through the Natural Resources Conservation Service (NRCS), a branch of the United States Department of Agriculture (USDA), and the Bureau of Reclamation (BOR) to pipe the Duke Ditch (5DT2083.1). The project is being implemented through the NRCS Environmental Quality Incentives Program (EQIP) and the BOR's Basin States Program to provide cost-share assistance to landowners who install salinity-control measures. The purpose of the project is to reduce the amount of salt and selenium entering the Colorado River. The project area is on private lands in Delta County, Colorado. Because the project is a federal undertaking and is federally funded, various cultural resources laws apply, including Section 106 (54 U.S.C. § 306108) of the National Historic Preservation Act (54 U.S.C. § 300101 et seq.). These laws require that all significant cultural resources be identified prior to planned development, and are intended to insure that historic and prehistoric cultural resources important to our national heritage are not inadvertently harmed or destroyed by federally initiated or authorized actions. The canal was inventoried in its entirety by Alpine Archaeological Consultants, Inc. (Alpine), of Montrose, Colorado in 2016 (Harrison 2016) and determined to be eligible for the National Register of Historic Places (NRHP). Level I Documentation was recommended as mitigation for adverse effects to the 2.62-mile (mi.)-long Duke Ditch. The specifications for Level I Documentation are presented in History Colorado Publication No. 1595 (History Colorado 2013). The Duke Ditch Company hired Alpine to conduct the Level I Documentation and supplemental narratives and to present these data in a summary report.

Level I Documentation is the most basic form of site documentation and closely follows the survey and recordation requirements established by the Office of Archaeology and Historic Preservation, with the additional specification that the documentation be prepared on archival bond paper and that photographic materials be archival. Photographs are stipulated to be black-and-white prints or digital images printed on fiber paper or archival-quality resin paper. Although prints are acceptable in 3-x-5-inch (in.) or larger sizes, 4-x-6-in. prints are preferred by History Colorado (2013).

METHODS

The information used in the preparation of the Level I Documentation was gathered during the Class III cultural resource inventory by Abbie L. Harrison of Alpine between October 3 and 4, 2016 (Harrison 2016). The entire length of the 2.62-mi.-long Duke Ditch, including all of the associated water-control structures, was recorded using a Global Positioning System unit capable of sub-meter accuracy. Documentation also included photographs and descriptions of the canal that focused on water-control features. A list of maps and a list of photographs are included in Appendix A. The maps and reproductions of photographs, themselves, are included in Appendix B.

LOCATION AND ENVIRONMENTAL SETTING

The Duke Ditch project area is just northwest of Hotchkiss, Colorado (Figure 1). The project area ranges between 5,480 feet (ft.) and 5,500 ft. in elevation and is on Barrow Mesa. The western portion of the project area is north of Leroux Creek, a tributary of the North Fork of the Gunnison River, and IX Gulch. Geologically, the project area is in mapped Mancos Shale deposits with adjacent Quaternary gravels and alluviums (Tweto 1979). Cottonwood, tamarisk, and Russian olive grow in riparian areas near the canal. The canal banks are primarily grass covered, but include areas of cattail, phragmites reed, kochia, horsetail, yarrow, heracleum, wild rose, aster, clover, thistle, and morning glory.

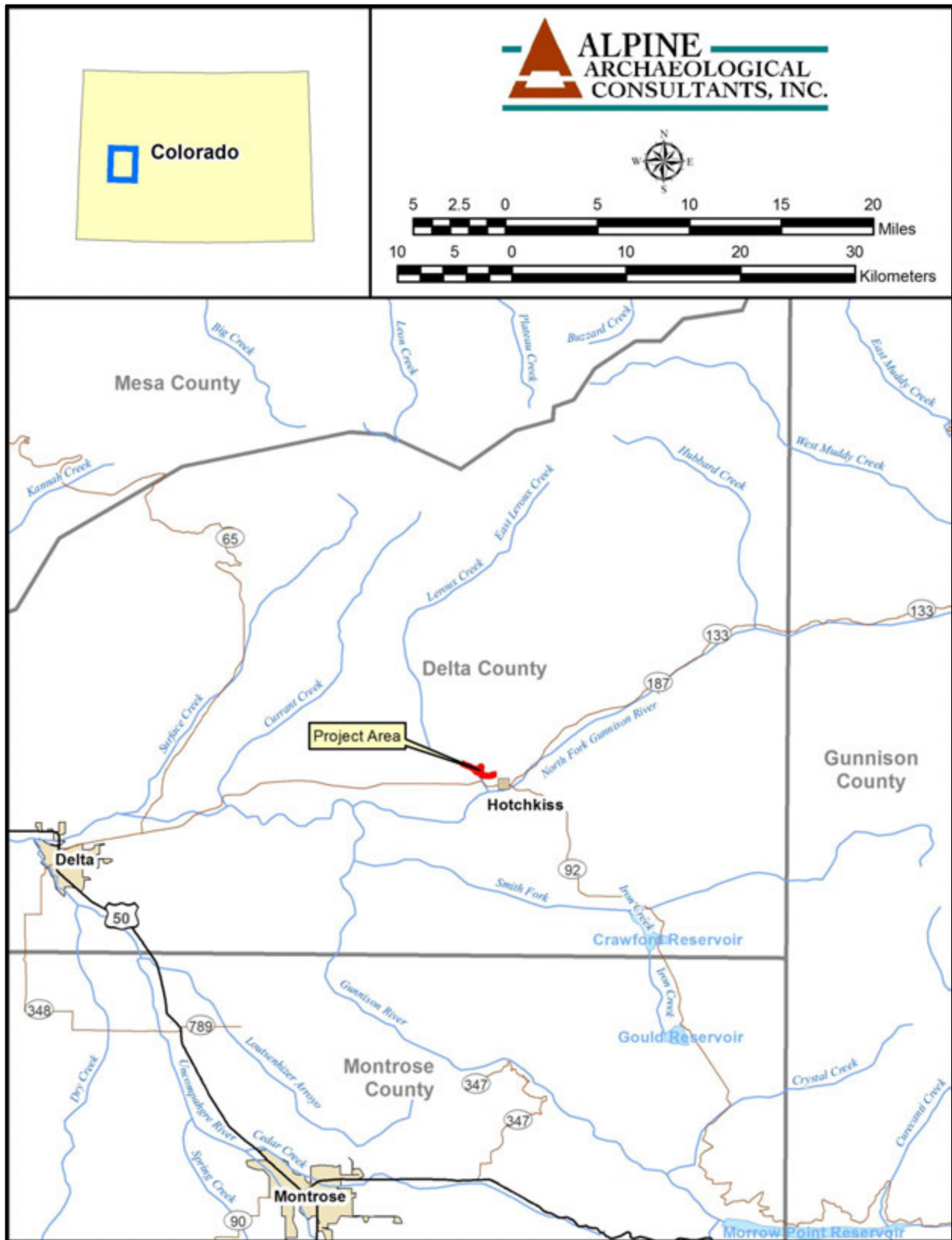


Figure 1. General location map of the project area.

HISTORICAL BACKGROUND

The first European people to enter the region were Spanish explorers. Juan de Rivera led an expedition in 1765, in search of mineral wealth. In 1776, the Spanish priests Escalante and Dominguez traversed western Colorado in search of a route to missions in California (Warner 1995). The Escalante/Dominguez expedition passed near present-day Montrose, crossed Grand Mesa, and crossed the Colorado River east of DeBeque. Trappers and fur traders entered the region in the 1820s and traded heavily with the Ute. Lucrative trade and trapping enterprises resulted in the establishment of the Northern Branch of the Old Spanish Trail (OST) through western Colorado (Horn et al. 2011a). The OST, which connected Santa Fe to California, was a well-used overland route that brought sheep and wool to California and horses back to New Mexico from the coast. The OST crossed the Colorado River near Grand Junction, Colorado, then turned northwestward and entered Utah (Horn et al. 2011b). The fur industry was strengthened with the construction of a trading post near Delta, Colorado, and the industry persisted until over-trapping and falling fur prices in the late 1830s made fur trapping unprofitable (O'Rourke 1992).

With the discovery of gold in the San Juan Mountains in the 1850s and the surge of Euroamericans to the area that followed, white settlement in western Colorado became permanent. Miners continued to explore the region, and by the late 1860s and early 1870s, large bodies of ore had been located in the San Juan Mountains. The influx of Euroamericans into the mountain regions of Colorado brought conflict with the indigenous Ute Indians and led to the creation of the Treaty of 1868. In order to satisfy the demands of the mines, farming and ranching quickly took hold in the Grand Valley, which further increased hostilities with Ute bands and eventually led to the Meeker Massacre of 1879 and the removal of the Utes from the area. The removal of the Utes from western Colorado led to immediate Euroamerican settlement of the Uncompahgre Valley and expansion of the Denver and Rio Grande Railroad line from Gunnison through Montrose, Delta, and Grand Junction in 1882.

Following the removal of the Ute, agricultural settlement was initially focused along the low-lying areas of the Uncompahgre, Gunnison, and Colorado river valleys, where diversions from the rivers and their tributaries enabled irrigated farming to take place. Less well-watered areas were quickly taken up as grazing lands for livestock, and the uplands were used for summer range. Almost immediately after the Euroamerican settlement and cultivation of the area began, it was realized that the climate of the valleys in western Colorado, particularly the Grand and North Fork valleys, were particularly well suited to fruit growing. Once the fruit was under cultivation, however, it was learned that the amount of area that could be put into productive agricultural use was limited by the availability of water. Water shortages during the late summer were acute and resulted in diminished crop production.

Farmers in the valleys had the advantage of diverting water from the rivers and smaller creeks and waterways that fed the rivers. Between the late 1880s and early 1890s, several irrigation companies were formed, resulting in the construction of numerous ditches, canals, and reservoirs. In addition, several natural lakes on the Grand Mesa were also being dammed as storage reservoirs for the lower valleys. Because of the large amount of precipitation and snow accumulation on the Grand Mesa, numerous creeks originate on the eastern and southern slopes of the mesa. As a result, the secondary mesas below the slopes of the Grand Mesa were at a distinct advantage when it came to water supply for irrigation.

One of the early pioneer ditches of the Hotchkiss region was the Duke Ditch. According to the Colorado Division of Water Resources database, construction of the Duke Ditch began on August 31, 1892. Water for the ditch was originally appropriated on August 31, 1892, with an allotment of 2.5 cubic ft. per second (cfs) from Leroux Creek and 2.5 cfs from Barrow Gulch. The ditch was claimed by E.M. Duke, W.F. Duke, G.H. Duke, G.W. Miller, E.W. Kelley, and Hill and was given Priority Number 26a, drawing water from Leroux Creek and Barrow Gulch.

5DT2083.1 – Duke Ditch

Site Description

The Duke Ditch is a 2.62-mi.-long, 7-ft.-wide, previously undocumented historical ditch that was recorded in its entirety for this project. It is an earthen, cut-and-fill constructed ditch, at an elevation of approximately 5,499 ft. (1,676 m). The trajectory of the ditch is generally southeastward from its diversion headgate off of Leroux Creek to its terminus within the city of Hotchkiss, Colorado. Soils consist of stony loams, and vegetation includes grasses, forbs, wild rose, sagebrush, mountain mahogany, cottonwood, and willow.

Ten headgates were recorded along the length of the ditch. Six of the ten diversion headgates (Table 1) consist of metal swing-type gates anchored within concrete-lined channels. The remaining four diversion headgates are modern and consist of a lift-gate headgate operated by a hand-wheel. The headgates are mostly concrete channels with concrete bottoms and triangular-shaped concrete diversion walls extending upstream. The widths and lengths of the diversion channels and the concrete walls vary by headgate and are aligned to the ditch and the direction the water is diverted. The concrete-lined channel walls along the ditch are typically anchored to the bank through wing walls that extend at 45-degree angles on the intake ends and on the outlet ends. Water from the headgates is diverted to secondary irrigation ditches away from the main ditch by a horizontal metal swing gate that pivots and is anchored to the diversion wall within the headgate on a vertical pipe. The volume of the water diverted from the ditch is controlled by the width of the swing gate opening. The upstream end of the swing gate is under a 2-x-8-in. board catwalk that spans the width of the headgate. The width of the swing gate opening is held by two pins placed in holes drilled through the catwalk.

In addition to the headgates, two features were also recorded along the Duke Ditch (Table 2). These features consist of a Parshall flume and a pipe intake with a metal grate. These features are further described in Table 2. During the ditch recording, 11 modern culverts were also observed.

SUMMARY

The Level I Documentation was performed on the entire length of the 2.62-mi.-long Duke Ditch in advance of piping the NRHP-eligible open ditch. This undertaking is implemented through the NRCS EQIP and the BOR's Basin States Program. Along the Duke Ditch (5DT2083.1), 10 headgates, a Parshall flume, and a pipe intake with a metal grate were documented. A list of maps and a list of photographs are provided in Appendix A, and maps and reproductions of photographs are included in Appendix B. Original archival black-and-white photographs are included with the documentation package to the Colorado State Historic Preservation Office.

Table 1. Headgates Recorded along the Duke Ditch (5DT2083.1).

Headgate	Canal Side	Hand-Wheel Diameter (in.)	Gate Width (ft.)	Stem Diameter (in.)	Associated Feature	Additional Information
1	North	15	3	1	1	Metal hand-wheel liftgate. "18" written on gate.
2	Southwest	10	1	¾	2	Metal hand-wheel liftgate.
3	Southwest	10	6	¾		Metal hand-wheel liftgate. An associated metal swing gate diversion structure is located immediately downstream to the south.
4	Southwest		5			Metal swing gate within concrete-lined channel. "RST" inscribed on concrete.
5	Southwest		5	¾		Metal swing gate within concrete-lined channel. Pipe intake and concrete cleanout box located to the south. U-shaped concrete structure is 5 ft. long and 4 ft. wide. Three PVC pipes divert water to secondary ditches.
6	South		5	1 ¾		Metal swing gate within concrete-lined channel with associated pipe intake and cleanout box structure. "MAR 1961" inscribed on concrete.
7	South		5			Metal swing gate within concrete-lined channel.
8	South	10	12	¾		Metal hand-wheel liftgate.
9	South		5	1 ½		Metal swing gate within concrete-lined channel. "MAR 1961" and "AST" inscribed on concrete.
10	South	8	3	¾		Metal hand-wheel liftgate with associated metal swing gate. Two long concrete channels lead to pipe intakes. "APR 1967" and "RST" inscribed on concrete.

Table 2. Features Recorded along the Duke Ditch (5DT2083.1).

Feature No.	Associated Headgate	Notes
1	1	Parshall Flume. It is 4½ ft. wide at the intake, 2 ft. wide in the middle, and 3 ft. wide at the outlet.
2	2	Pipe intake and metal grate.

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2011b *National Historic Trails Inventory Project, Tasks 4, 5, and 6 Memo Report for Utah, Main Route, Northern Branch, and Armijo Route of the Old Spanish Trail, Emery, Grand, Kane, Piute, San Juan, and Sevier Counties, Utah*. Prepared by Alpine Archaeological Consultants, Inc., Montrose, Colorado. Prepared for AECOM, Fort Collins, Colorado. Copies available from Office of Archaeology and Historic Preservation, Colorado Historical Society, Denver.

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APPENDIX A

Level I Documentation: List of Maps and List of Photographs

List of Maps

Map 1: The Duke Ditch (5DT2083.1), showing photographic points for Headgates 1–10 and Features 1–2.

List of Photographs

Subject: The Duke Ditch (5DT2083.1).

Photographer: Abbie L. Harrison

Dates: October 3–October 4, 2016.

Photographs of the Duke Ditch (5DT2083.1).

Photograph 1. Looking to the northeast at Headgate 1, a metal hand-wheel liftgate.

Photograph 2. Feature 1, a Parshall flume associated with Headgate 1.

Photograph 3. Overview of the Duke Ditch, facing east-southeast.

Photograph 4. Overview of Headgate 2, a metal hand-wheel liftgate. View is to the east-southeast.

Photograph 5. Feature 2, a pipe intake and metal grate associated with Headgate 2, facing east.

Photograph 6. Overview of the Duke Ditch, facing southwest.

Photograph 7. Looking to the southwest at Headgate 3, a metal hand-wheel lift gate.

Photograph 8. Swing gate diversion structure associated with Headgate 3. View is to the west.

Photograph 9. Overview of the Duke Ditch, facing north.

Photograph 10. Looking to the east-southeast at Headgate 4, a metal swing gate within a concrete-lined channel.

Photograph 11. Overview of Headgate 5, a metal swing gate within a concrete-lined channel. View is to the east-southeast.

Photograph 12. Looking to the east at Headgate 6, a metal swing gate within a concrete-lined channel.

Photograph 13. Cleanout box associated with Headgate 6. View is to the south.

Photograph 14. Looking to the east at Headgate 7, a metal swing gate within a concrete-lined channel.

Photograph 15. Headgate 8, a metal hand-wheel lift gate. View is to the south-southeast.

Photograph 16. Looking to the east-northeast at Headgate 9, a metal swing gate within a concrete-lined channel.

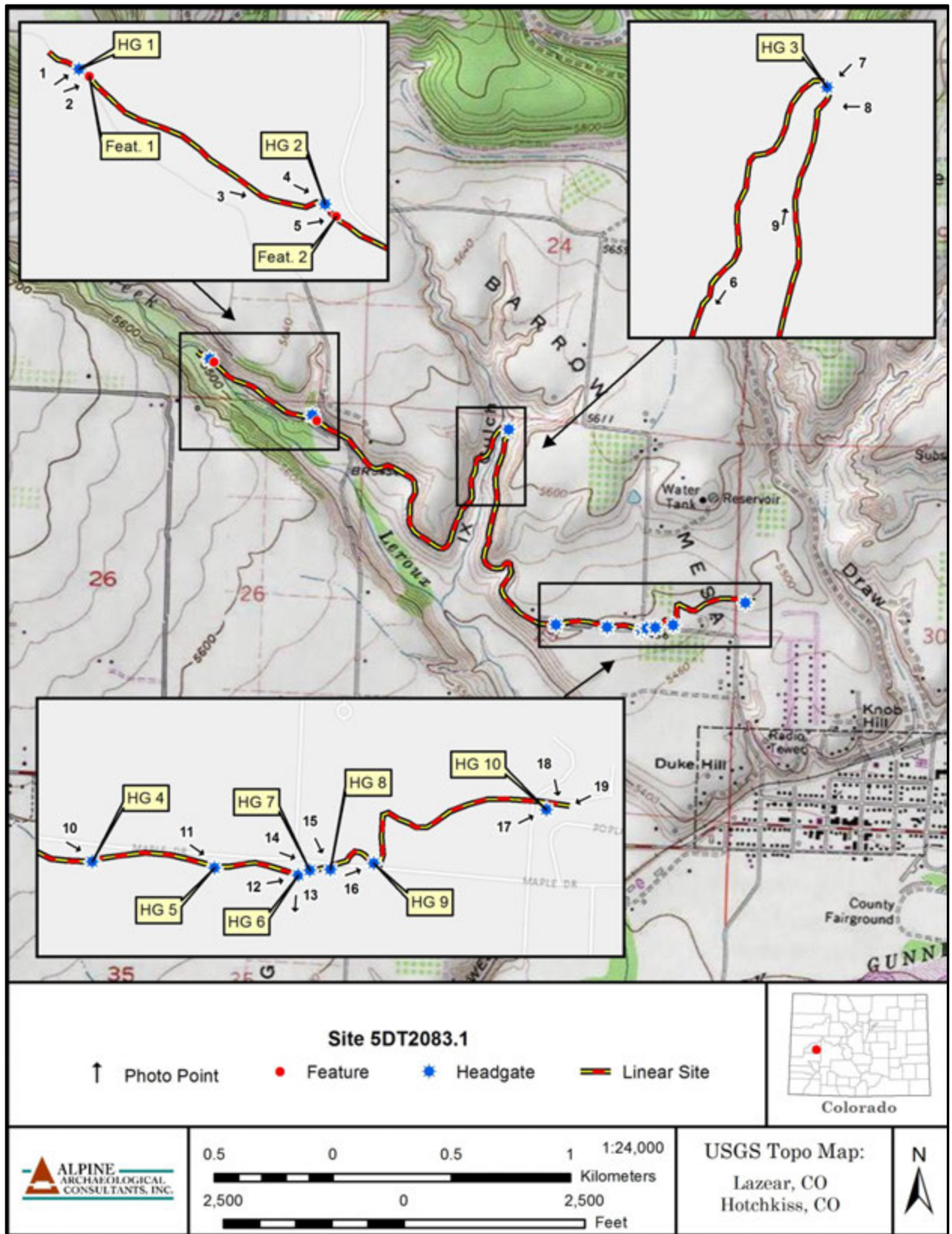
Photograph 17. Headgate 10, a metal hand-wheel lift gate and metal swing gate. View is to the east-northeast.

Photograph 18. Looking to the south at a long concrete channel and pipe intake associated with Headgate 10.

Photograph 19. Overview of the Duke Ditch, facing west-southwest.

APPENDIX B

Level I Documentation: Maps and Photographs



Map 1.



Photograph 1.



Photograph 2.

Duke Ditch (5DT2083.1)



Photograph 3.



Photograph 4.



Photograph 5.



Photograph 6.



Photograph 7.



Photograph 8.

Duke Ditch (5DT2083.1)



Photograph 9.



Photograph 10.



Photograph 11.



Photograph 12.



Photograph 13.



Photograph 14.



Photograph 15.



Photograph 16.

Duke Ditch (5DT2083.1)



Photograph 17.



Photograph 18.

Duke Ditch (5DT2083.1)



Photograph 19.

